

# École d'Été de Physique Théorique

## LES HOUCHES

## ÉTÉ 1961

**Date.** — La prochaine session de l'École d'Été de Physique Théorique aura lieu du lundi 3 juillet au samedi 26 août 1961.

**Programme.** — La session 1961 sera consacrée à la physique des basses températures.

Phénomènes de transport dans les solides et détermination de la surface de Fermi des métaux :

A. B. PIPPARD, Université de Cambridge (Angleterre).

Problèmes de polarisation nucléaire :

A. ABRAGAM, Commissariat à l'Énergie Atomique (France).

État de base et premières excitations dans les substances magnétiques :

A. HERPIN, Commissariat à l'Énergie Atomique (France).

Supraconducteurs :

M. TINKHAM, Université de Californie (U.S.A.).

Supraconductivité et Magnétisme :

H. SUHL, Université de Californie (U.S.A.).

Résonance et relaxation ferromagnétique :

C. KITTEL, Université de Californie (U.S.A.).

Méthodes magnétiques appliquées à l'étude des défauts :

L. NÉEL, Université de Grenoble (France).

Les défauts ponctuels et les dommages de radiation :

J. FRIEDEL, Université de Paris (France).

Il est aussi prévu un cours sur les Semi-conducteurs et sur l'Hélium 3 et l'Hélium 4.

S'il est nécessaire, pour des raisons actuellement imprévisibles, de modifier certains des cours ci-dessus, l'École veillera à ce que le programme définitif soit aussi proche que possible, tant par le sujet des cours que par la qualité de l'enseignement, du présent programme.

Il est prévu deux cours par matinée. Les après-midi seront consacrées aux séminaires, aux travaux personnels ou par petits groupes.

Les cours seront donnés en français ou en anglais.

**Frais.** — La scolarité est gratuite. Les frais seront d'environ 550 Nouveaux Francs pour l'ensemble de la session. Pour les non-physiciens la pension sera d'environ 12 Nouveaux Francs par jour. Des bourses, en nombre limité, peuvent être accordées à ceux qui en justifieront le besoin.

### Inscriptions.

Les dossiers complets doivent parvenir le plus rapidement possible et au plus tard le 1<sup>er</sup> mars 1961 à :

**M. LE DIRECTEUR DES ÉTUDES**  
Ecole d'Été de Physique Théorique  
46, avenue Félix-Viallet - GRENOBLE (Isère) France

Les demandes qui parviendront au Secrétariat après le 1<sup>er</sup> mars ne seront plus examinées par la Commission d'admission.

Toute difficulté personnelle peut faire l'objet d'une lettre qui sera jointe à la demande d'inscription. Les élèves ayant fait une demande au cours des années précédentes et désireux de poser à nouveau leur candidature doivent renouveler leur demande.

Le programme détaillé des cours sera communiqué ultérieurement.

La formule de demande d'admission est à la disposition des intéressés à (1) ..... ou à l'adresse mentionnée ci-dessus.

### Connaissances requises.

Cet enseignement s'adresse aux étudiants et jeunes chercheurs désireux d'approfondir leur connaissance de la physique théorique.

Afin de retirer le maximum de profit du programme assez spécialisé qui leur est proposé les candidats devront avoir une bonne connaissance des bases de la Mécanique Quantique et de la Mécanique Statistique, ainsi qu'elles sont enseignées dans les cours de troisième cycle des facultés.

D'autre part, les candidats doivent parler couramment les langues française et anglaise.

### Participants.

L'École reçoit une trentaine d'étudiants et de jeunes chercheurs.

Ils sont tenus d'assister à toute la session.

Dans la limite des places disponibles, l'École peut accueillir la femme et les enfants des étudiants mariés, pour une durée maximum de quatre semaines.

### Emplacement.

L'École est installée dans des chalets de montagne situés près du village des Houches, dans les Alpes françaises, à proximité de Chamonix.

**Adresse :** La Côte des Chavants, Les Houches (Hte-Savoie).

### Organisation matérielle.

Chambres de une à trois personnes. Repas au restaurant de l'École.

(1) Prière de compléter avant d'attacher.



# École d'Été de Physique Théorique

## LES HOUCHES

## ÉTÉ 1962

**Date.** — La prochaine session de l'École d'Été de Physique Théorique aura lieu du lundi 2 juillet au samedi 25 août 1962.

**Programme.** — La session 1962 sera consacrée à la Géophysique extérieure.

### 1. Exposé des techniques physico-mathématiques :

- Propriétés générales des plasmas. Ondes dans les plasmas :  
 J. F. DENISSE, Observatoire de Meudon (France).  
 Magneto-ionic theory :  
 K. G. BUDDEN, Université de Cambridge (Angleterre).  
 Motions of charged particles in magnetic fields :  
 J. W. CHAMBERLAIN, Université de Chicago (U.S.A.).

### 2. Constitution et propriétés de la haute atmosphère :

- Composition, température, densité et autres paramètres thermodynamiques :  
 M. NICOLET, Centre National de Recherche de l'Espace (Belgique).  
 Structure of the exosphere and exospheric processes :  
 J. W. DUNGEY, Atomic Weapons Research Establishment Aldermaston (Angleterre).

### 3. The sun, earth storms and radiation belts : S. CHAPMAN, Université de Colorado (U.S.A.).

### 4. Lumière aurorale et lumière du ciel nocturne : D. BARBIER, Institut d'Astrophysique Paris (France).

### 5. General circulation and tides in the atmosphere : G. MACDONALD, Université de Californie (U.S.A.).

S'il est nécessaire, pour des raisons actuellement imprévisibles, de modifier certains des cours ci-dessus, l'École veillera à ce que le programme définitif soit aussi proche que possible, tant par le sujet des cours que par la qualité de l'enseignement, du présent programme.

Il est prévu deux cours par matinée. Les après-midi seront consacrés aux séminaires, aux travaux personnels ou par petits groupes.

Les cours seront donnés en **français** ou en **anglais**.

**Frais.** — La scolarité est gratuite. Les frais seront d'environ 650 Nouveaux Francs pour l'ensemble de la session. Pour les non-physiciens la pension sera d'environ 13 Nouveaux Francs par jour. Des bourses, en nombre limité, peuvent être accordées à ceux qui en justifieront le besoin.

### Inscriptions.

Les dossiers complets doivent parvenir le plus rapidement possible et **au plus tard le 1<sup>er</sup> mars 1962** à :

**M. LE DIRECTEUR DES ÉTUDES**  
 Ecole d'Été de Physique Théorique  
 46, avenue Félix-Viallet - GRENOBLE (Isère) France

Les demandes qui parviendront au Secrétariat après le 1<sup>er</sup> mars ne seront plus examinées par la Commission d'admission.

Toute difficulté personnelle peut faire l'objet d'une lettre qui sera jointe à la demande d'inscription. Les élèves ayant fait une demande au cours des années précédentes et désireux de poser à nouveau leur candidature doivent renouveler leur demande.

Le programme détaillé des cours sera communiqué ultérieurement.

La formule de demande d'admission est à la disposition des intéressés à (1) ..... ou à l'adresse mentionnée ci-dessus.

### Connaissances requises.

Cet enseignement s'adresse aux étudiants et jeunes chercheurs désireux d'approfondir leur connaissance de la physique théorique.

Afin de retirer le maximum de profit du programme assez spécialisé qui leur est proposé les candidats devront avoir une bonne connaissance de base de :

- électromagnétisme classique;
- thermodynamique classique;
- mécanique analytique;
- bonne connaissance d'un cours élémentaire de physique atomique et moléculaire.

D'autre part, les candidats doivent suivre sans difficulté des cours donnés en français ou en anglais.

### Participants.

L'École reçoit une trentaine d'étudiants et de jeunes chercheurs.

Ils sont tenus d'assister à toute la session.

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### Emplacement.

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**Adresse :** La Côte des Chevalets, **Les Houches** (Hte-Savoie).

### Organisation matérielle.

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(1) Prière de compléter avant d'afficher.



# École d'Été de Physique Théorique

## LES HOUCHES

## ÉTÉ 1963

**Date.** — La prochaine session de l'École d'Été de Physique Théorique aura lieu du lundi 1<sup>er</sup> juillet au samedi 24 août 1963.

**Programme.** — Le sujet de la session 1963 est Relativité, Groupes et Topologie.

Introduction to general relativity :

J. L. SYNGE, Dublin Institute for Advanced Studies (Ireland).

Group theory :

Feza GURSEY, Middle East Technical University, Ankara (Turkey).

Topology :

Charles W. MISNER, University of Maryland (U.S.A.).

Geometrodynamics :

J. A. WHEELER, Princeton University (U.S.A.).

Experimental general relativity :

R. H. DICKE, Princeton University (U.S.A.).

Experimental general relativity :

Joseph WEBER, University of Maryland (U.S.A.).

Gravitational radiation :

R. K. SACHS, Stevens Institute of Technology (U.S.A.).

Titulaires des propagateurs :

A. LICHTNEROWICZ, Collège de France (France).

Quantization :

B. S. DEWITT, University of North Carolina (U.S.A.).

S'il est nécessaire, pour des raisons actuellement imprévisibles, de modifier certains des cours ci-dessus, l'École veillera à ce que le programme définitif soit aussi proche que possible, tant par le sujet des cours que par la qualité de l'enseignement, du présent programme.

Il est prévu deux cours par matinée. Les après-midi seront consacrés aux séminaires, aux travaux personnels ou par petits groupes.

**Frais.** — La scolarité est gratuite. Les frais seront d'environ 650 Nouveaux Francs pour l'ensemble de la session. Pour les non-physiciens la pension sera d'environ 13 Nouveaux Francs par jour. Des bourses, en nombre limité, peuvent être accordées à ceux qui en justifieront le besoin.

### Inscriptions.

Les dossiers complets doivent parvenir le plus rapidement possible et **au plus tard le 1<sup>er</sup> mars 1963** à :

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Ecole d'Été de Physique Théorique  
**46, avenue Félix-Viallet - GRENOBLE (Isère) France**

Les demandes qui parviendront au Secrétariat après le 1<sup>er</sup> mars ne seront plus examinées par la Commission d'admission.

Toute difficulté personnelle peut faire l'objet d'une lettre qui sera jointe à la demande d'inscription. Les élèves ayant fait une demande au cours des années précédentes et désireux de poser à nouveau leur candidature doivent renouveler leur demande.

Le programme détaillé des cours sera communiqué ultérieurement.

La formule de demande d'admission est à la disposition des intéressés à (1) ..... ou à l'adresse mentionnée ci-dessus.

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# Ecole d'Été de Physique Théorique

## LES HOUCHES

## ÉTÉ 1964

**Date.** — La prochaine session de l'Ecole d'Été de Physique Théorique aura lieu du mercredi 1<sup>er</sup> juillet au mardi 25 août 1964.

**Programme.** — Le sujet de la session 1964 est : Interactions entre la matière et les ondes électromagnétiques.

Quantum theory of radiation :

N. KROLL, University of California, La Jolla (U.S.A.).

Statistical properties of light beams :

R. J. GLAUBER, Harvard University (U.S.A.).

Quantum theory of optical masers :

W. E. LAMB, Yale University (U.S.A.).

Optical pumping :

J. BROSSSEL, Ecole Normale Supérieure (France).

Non-linear processes :

N. BLOEMBERGEN, Harvard University (U.S.A.).

Linewidth of energy levels :

J.-M. WINTER, Commissariat à l'Énergie Atomique (France).

Paramagnetic resonance and relaxation :

A. ABRAGAM, Collège de France (France).

Solid state physics and optical masers :

A. AIGRAIN, Ecole Normale Supérieure (France).

Des séries de conférences seront organisées avec la participation du professeur C. H. TOWNES (Massachusetts Institute of Technology, U.S.A.).

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Il est prévu deux cours par matinée. Les après-midi seront consacrés aux séminaires, aux travaux personnels ou par petits groupes.

**Frais.** — La scolarité est gratuite. Pour les participants, les frais seront d'environ 750 Francs, prix forfaitaire pour l'ensemble de la session. En dehors du forfait, la pension sera d'environ 14 Francs par jour. Des bourses, en nombre limité, peuvent être accordées à ceux qui en justifieront le besoin.

### Inscriptions.

Les dossiers complets doivent parvenir le plus rapidement possible et **au plus tard le 1<sup>er</sup> mars 1964** à :

**M. LE DIRECTEUR DES ETUDES**  
Ecole d'Été de Physique Théorique  
46, avenue Félix-Viallet - GRENOBLE (Isère) France

Les demandes qui parviendront au Secrétariat après le 1<sup>er</sup> mars ne seront plus examinées par la Commission d'admission.

Toute difficulté personnelle peut faire l'objet d'une lettre qui sera jointe à la demande d'inscription. Les élèves ayant fait une demande au cours des années précédentes et désireux de poser à nouveau leur candidature doivent renouveler leur demande.

Le programme détaillé des cours sera communiqué ultérieurement.

La formule de demande d'admission est à la disposition des intéressés à (1) .....  
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# École d'Été de Physique Théorique

## LES HOUCHES

## ÉTÉ 1965

**Date.** — La prochaine session de l'École d'Été de Physique Théorique aura lieu du jeudi 1<sup>er</sup> juillet au mercredi 25 août 1965.

**Programme.** — Le sujet de la session 1965 est : Physique des Hautes Energies. Cette session est orientée vers les applications expérimentales.

Group theory. Invariance Principles. Symmetries :

G. C. WICK, Brookhaven National Laboratory (U.S.A.).

Théories des interactions fortes :

M. FROISSART, Commissariat à l'Énergie Atomique, Saclay (France).

R. OMNES, Université de Strasbourg (France).

Dynamics of Strong Interactions :

G. F. CHEW, University of California, Berkeley (U.S.A.).

Phenomenology of Strong Interactions :

R. H. DALITZ, Clarendon Laboratory, Oxford (England).

J. D. JACKSON, University of Illinois, Urbana (U.S.A.).

Weak Interactions :

X...

Conférences par B. P. GREGORY, CERN (Suisse) et C. N. YANG, Institute for Advanced Study (U.S.A.).

S'il est nécessaire, pour des raisons actuellement imprévisibles, de modifier certains des cours ci-dessus, l'École veillera à ce que le programme définitif soit aussi proche que possible, tant par le sujet des cours que par la qualité de l'enseignement, du présent programme.

Il est prévu un maximum de trois cours par jour.

Les après-midi seront en général consacrés aux séminaires, aux travaux personnels ou par groupes, et à des séances d'exercices, organisées en liaison avec les cours, qui permettront de traiter en détail quelques questions particulièrement importantes pour l'analyse des résultats expérimentaux.

**Frais.** — La scolarité est gratuite. Pour les participants, les frais seront d'environ 750 francs, prix forfaitaire pour l'ensemble de la session. En dehors du forfait, la pension sera d'environ 14 francs par jour. Des bourses, en nombre limité, peuvent être accordées à ceux qui en justifieront le besoin.

### Inscriptions.

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Le programme détaillé des cours sera communiqué ultérieurement.

La formule de demande d'admission est à la disposition des intéressés à (1) ..... ou à l'adresse mentionnée ci-dessus.

### Connaissances requises.

Cette session a été orientée plus vers les applications pratiques que vers les aspects formels de façon à intéresser, en premier lieu, les étudiants et chercheurs travaillant dans des groupes expérimentaux. Afin de retirer le maximum de profit du programme qui leur est proposé, les candidats devront avoir une connaissance solide de la mécanique quantique et une certaine familiarité avec les méthodes mathématiques couramment utilisées en physique des hautes énergies (éléments de théorie des groupes et de fonctions d'une variable complexe). D'autre part, les candidats doivent parler le français et l'anglais et suivre activement des cours dans l'une ou l'autre langue.

### Participants.

L'École reçoit une trentaine d'étudiants et de jeunes chercheurs.

Ils sont tenus d'assister à toute la session.

Dans la limite des places disponibles, l'École peut accueillir la femme et les enfants des étudiants mariés, pour une durée maximum de quatre semaines.

### Emplacement.

L'École est installée dans des chalets de montagne situés près du village des Houches, dans les Alpes françaises, à proximité de Chamonix.

**Adresse :** La Côte des Chavants, **Les Houches** (Hte-Savoie).

### Organisation matérielle.

Chambres de une à trois personnes. Repas au restaurant de l'École.

(1) Prière de compléter avant d'afficher.



# École d'Été de Physique Théorique

## LES HOUCHES

## ÉTÉ 1966

**Date.** — La prochaine session de l'École d'Été de Physique Théorique aura lieu du lundi 4 juillet au samedi 27 août 1966.

**Programme.** — Le sujet de la session 1966 est : Hautes énergies en astrophysique.

Elementary particles in astrophysics :

H. Y. CHIU, Goddard Institute for Space Studies (NASA).

Elementary processes :

V. L. GINZBURG, Physical Institute, Academy of Science of USSR, Moscow.

H. REEVES, Université Libre de Bruxelles. *H. Reeves*

General relativity :

S. CHANDRASEKHAR, University of Chicago.

Properties of matter at high density :

A. G. W. CAMERON, Goddard Institute for Space Studies (NASA).

Accelerating mechanisms :

E. SCHATZMAN, Institut d'Astrophysique, Paris.

Origin of Cosmic rays :

V. L. GINZBURG, Physical Institute, Academy of Science of USSR, Moscow.

Observations of super novae :

E. M. BURBIDGE, University of California, La Jolla.

Observations of QSS and radiogalaxies :

Le nom du conférencier sera annoncé ultérieurement.

Theories of supernovae, QSS and radiogalaxies :

G. R. BURBIDGE, University of California, La Jolla.

Cosmology :

E. L. SCHUCKING, University of Texas, Austin.

S'il est nécessaire, pour des raisons actuellement imprévisibles, de modifier certains des cours ci-dessus, l'École veillera à ce que le programme définitif soit aussi proche que possible, tant par le sujet des cours que par la qualité de l'enseignement, du présent programme.

Il est prévu deux cours par matinée (maximum de trois cours par jour).

Les après-midi seront en général consacrés aux séminaires, aux travaux personnels ou par groupes.

**Frais.** — La scolarité est gratuite. Pour les participants, les frais seront d'environ 850 francs, prix forfaitaire pour l'ensemble de la session. En dehors du forfait, la pension sera d'environ 18,50 F par jour. Des bourses, en nombre limité, peuvent être accordées à ceux qui en justifieront le besoin.

### Inscriptions.

Les dossiers complets doivent parvenir le plus rapidement possible et **au plus tard le 1<sup>er</sup> mars 1966** à :

**M. LE DIRECTEUR DES ÉTUDES**  
 Ecole d'Été de Physique Théorique  
 46, avenue Félix-Viallet - GRENOBLE (Isère) France

Les demandes qui parviendront au Secrétariat après le 1<sup>er</sup> mars ne seront plus examinées par la Commission d'admission.

Toute difficulté personnelle peut faire l'objet d'une lettre qui sera jointe à la demande d'inscription. Les élèves ayant fait une demande au cours des années précédentes et désireux de poser à nouveau leur candidature doivent renouveler leur demande.

Le programme détaillé des cours sera communiqué ultérieurement.

La formule de demande d'admission est à la disposition des intéressés à (1) ..... ou à l'adresse mentionnée ci-dessus.

### Connaissances requises.

Le but de ces cours est de présenter les aspects de la physique des hautes énergies et de la mécanique statistique nécessaires à une discussion approfondie des théories astrophysiques.

Ils s'adressent essentiellement aux jeunes astrophysiciens désireux d'approfondir leur connaissance de la physique théorique, mais aussi aux physiciens qui voudraient s'initier à l'astrophysique.

Plusieurs cours seront consacrés aux observations des phénomènes mettant en cause des grandes énergies en astronomie.

Afin de retirer le maximum de profit du programme qui leur est proposé les candidats devront avoir une connaissance solide en mécanique quantique et en mécanique statistique.

D'autre part, les candidats doivent parler le français et l'anglais et suivre activement des cours dans l'une et l'autre langue.

### Participants.

L'École reçoit une trentaine d'étudiants et de jeunes chercheurs.

Ils sont tenus d'assister à toute la session.

L'École n'est pas équipée pour recevoir les familles des participants. Toutefois elle peut loger un certain nombre d'épouses et un nombre très limité de familles avec un enfant.

Dans la limite des places disponibles, l'École peut accueillir la famille des étudiants mariés, pour une durée maximum de quatre semaines.

### Emplacement.

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**Adresse :** La Côte des Chevants, Les Houches (Hte-Savoie).

### Organisation matérielle.

Chambres de une à trois personnes. Repas au restaurant de l'École.

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# École d'Été de Physique Théorique

## LES HOUCHES

## ÉTÉ 1967

### PROBLÈME A N CORPS

SESSION DESTINÉE AUX EXPÉRIMENTATEURS

**Date.** — La prochaine session de l'École d'Été de Physique Théorique aura lieu du lundi 3 juillet au samedi 26 août 1967.

**Programme :**

Measurements and correlation functions :

P. C. MARTIN, Harvard University (U.S.A.).

Méthodes de champ self-consistant :

A. BLANDIN, Faculté des Sciences, Orsay (France).

P. G. de GENNES, Faculté des Sciences, Orsay (France).

Méthode des perturbations, propagateurs, réponses :

C. De DOMINICIS, Service de Physique Théorique, Saclay (France).

Magnetic impurity effects in solids :

P. W. ANDERSON, Bell Telephone Laboratories (U.S.A.).

Many-body effects in metals and insulators :

W. KOHN, University of California, La Jolla (U.S.A.)

Problems in the theory of superconductivity :

V. AMBEGAOKAR, Cornell University (U.S.A.).

S'il est nécessaire, pour des raisons actuellement imprévisibles, de modifier certains des cours ci-dessus, l'école veillera à ce que le programme définitif soit aussi proche que possible, tant par le sujet des cours que par la qualité de l'enseignement, du présent programme.

Il est prévu deux cours par matinée. Les après-midi seront en général consacrés aux séminaires, aux travaux personnels ou par groupes, et à des séances d'exercices organisées en liaison avec les cours.

**Connaissances requises.**

Le but de la session est de présenter les méthodes théoriques développées au cours des dernières années pour l'étude des problèmes à N corps, et leurs applications à un certain nombre de phénomènes, dans les domaines de la physique

du solide et des liquides quantiques. Les cours s'adresseront tout particulièrement aux expérimentateurs désireux de se mettre au courant des progrès théoriques récents, mais pourront aussi servir d'initiation à de jeunes théoriciens.

Afin de retirer le maximum de profit du programme qui leur est proposé, les candidats devront avoir une connaissance solide de la mécanique quantique et des notions de base en physique du solide. D'autre part, les candidats doivent parler le français et l'anglais et suivre activement des cours dans l'une ou l'autre langue.

**Participants.**

L'École reçoit une trentaine d'étudiants et de jeunes chercheurs.

Ils sont tenus d'assister à toute la session.

L'École n'est pas équipée pour recevoir les familles des participants. Toutefois elle peut louer un certain nombre d'appartements et un nombre très limité de familles avec un enfant.

Dans la limite des places disponibles, l'École peut accueillir la famille des étudiants mariés, pour une durée maximum de quatre semaines.

**Emplacement.**

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**Adresse :** La Côte des Chavants, **Les Houches** (Haute-Savoie).

**Organisation matérielle.**

Chambres de une à trois personnes. Repas au restaurant de l'École.

**Frais.** — La scolarité est gratuite. Pour les participants, les frais seront d'environ 850 francs, prix forfaitaire pour l'ensemble de la session. Le prix des repas hors forfait sera d'environ 8 francs (petit déjeuner 2,50 F).

**Inscriptions.**

Les dossiers complets doivent parvenir le plus rapidement possible et **au plus tard le 1<sup>er</sup> mars 1967** à :

**M. LE DIRECTEUR DES ÉTUDES**  
 Ecole d'Été de Physique Théorique  
 46, avenue Félix-Viallet - GRENOBLE (Isère) France

Les demandes qui parviendront au Secrétariat après le 1<sup>er</sup> mars ne seront plus examinées par la Commission d'admission.

Toute difficulté personnelle peut faire l'objet d'une lettre qui sera jointe à la demande d'inscription. Les élèves ayant fait une demande au cours des années précédentes et désireux de poser à nouveau leur candidature doivent renouveler leur demande.

Le programme détaillé des cours sera communiqué ultérieurement.

La formule de demande d'admission est à la disposition des intéressés à (1) ..... ou à l'adresse mentionnée ci-dessus.

(1) Prière de compléter avant d'afficher.



# École d'Été de Physique Théorique

## LES HOUCHES

## ÉTÉ 1968

### PHYSIQUE NUCLÉAIRE

**Date.** — La prochaine session de l'École d'Été de Physique Théorique aura lieu du lundi 15 juillet au samedi 7 septembre 1968.

**Programme :**

- Two-body forces, nuclear matter and finite nuclei :  
S. MOSZKOWSKI, University of California,  
Los Angeles (U.S.A.).
- The three-body nuclear problem :  
I. SMORODINSKY, Joint Institute of Nuclear Research,  
Dubna (U.R.S.S.).
- Many-body theory for nuclear physicists :  
M. BARANGER, Carnegie Institute of Technology,  
Pittsburg (U.S.A.).
- Problems in nuclear spectroscopy :

Spectroscopy of deformed nuclei :  
V. G. SOLOVIEV, Joint Institute of Nuclear Research,  
Dubna (U.R.S.S.).

Nuclear continuum states and analog states :  
H. WEIDENMÜLLER, Institut für Theoretische Physik  
der Universität, Heidelberg (Allemagne de l'Ouest).

Aspects statistiques des noyaux :  
C. BLOCH, Service de Physique Théorique, Saclay (France).

High energy electro-magnetic excitation of nuclei and short  
range correlations :  
M. DANOS, National Bureau of Standards,  
Washington D.C. (U.S.A.).

Investigation of nuclei with elementary particles :  
H. LIPKIN, Institut Weizmann, Rehovoth (Israël).

S'il est nécessaire, pour des raisons actuellement impré-  
visibles, de modifier certains des cours ci-dessus, l'école  
veillera à ce que le programme définitif soit aussi proche  
que possible, tant par le sujet des cours que par la qualité  
de l'enseignement, du présent programme.

Il est prévu deux cours par matinée. Les après-midi  
seront en général consacrés aux travaux personnels ou par  
groupes, et à des séances d'exercices organisées en liaison  
avec les cours.

**Frais.** — La scolarité est gratuite. Pour les participants, les frais seront d'environ 900 francs, prix forfaitaire pour l'ensemble de la session. Le prix des repas hors forfait sera d'environ 8,50 F (petit déjeuner 2,70 F).

**Inscriptions.**

Les dossiers complets doivent parvenir le plus rapidement possible et **au plus tard le 1<sup>er</sup> mars 1968** à :

**M. LE DIRECTEUR DES ÉTUDES**  
Ecole d'Été de Physique Théorique  
**46, avenue Félix-Viallet - GRENOBLE (Isère) France**

Les demandes qui parviendront au Secrétariat après le 1<sup>er</sup> mars ne seront plus examinées par la Commission d'admission.

Toute difficulté personnelle peut faire l'objet d'une lettre qui sera jointe à la demande d'inscription. Les élèves ayant fait une demande au cours des années précédentes et désireux de poser à nouveau leur candidature doivent renouveler leur demande.

Le programme détaillé des cours sera communiqué ultérieurement.

La formule de demande d'admission est à la disposition des intéressés à (1) . . . . .  
ou à l'adresse mentionnée ci-dessus.

(1) Prière de compléter avant d'afficher.



# Les Houches

## école d'été de physique théorique

### aspects physiques

### de quelques problèmes biologiques

### 30 juin—23 août 1969

#### programme

- introduction à la biologie moléculaire—JD Watson
  - les macromolécules biologiques—PG de Gennes/JC Kendrew/AM Liquori
  - lipides, membranes—V Luzzati
  - nerfs, tissu nerveux—JP Changeux
  - transducteurs sensoriels
  - résonance nucléaire en biologie—RG Shulman
  - résonance électronique en biologie—G Feher
- Le directeur des études est Jean Matricon

Le but de la session est de présenter à des physiciens s'intéressant à la biologie quelques problèmes de biologie, à proprement parler ou s'y rattachant, que l'emploi de méthodes empruntées à la physique et à la physicochimie a permis d'aborder et parfois de résoudre. On envisagera notamment les problèmes de structure et de conformation des protéines et des acides nucléiques, de perméabilité des membranes, du rôle biologique des ions métalliques etc.

Les cours s'adresseront donc à des jeunes physiciens théoriciens et expérimentateurs qui désirent s'orienter vers des problèmes de biophysique et qui ont déjà des connaissances de base en chimie biologique et en biologie moléculaire.

L'école est installée dans des chalets de montagne situés près du village des Houches, dans les alpes françaises, à proximité de ChamoniX.

adresse : Ecole d'été de physique théorique 74 Les Houches  
La scolarité est gratuite. Pour les participants, les frais seront d'environ 1000 francs, prix forfaitaire pour l'ensemble de la session.

Le prix des repas hors forfait sera d'environ 9,00 f, petit déjeuner 3,00 f.

Inscriptions ● les dossiers complets doivent parvenir le plus rapidement possible et au plus tard le 15 mars 1969 à

Monsieur le Directeur des Etudes

Ecole d'été de Physique Théorique

74/les Houches/France

Les demandes qui parviendront aux Houches après le 15 mars ne pourront plus être examinées par la Commission d'Admission. Etant donné, d'une part le nombre des places disponibles et d'autre part la nature des cours, seules seront prises en considération les demandes d'admission pour la participation complète à la session.

La formule de demande d'admission est à la disposition des intéressés à et à l'adresse mentionnée ci-dessus





# LES HOUCHERS

école d'été de physique théorique  
physique mathématique théorie quantique  
des champs et mécanique statistique

5 JUILLET - 29 AOÛT 1970

## PROGRAMME :

- "Selected Topics in Functional Analysis" -  
J. Glimm, Courant Institute et A. Jaffe, Harvard
  - "Rigorous Results in Statistical Mechanics" - D. Ruelle, I.H.E.S.
  - "Present Status of Axioms of Quantum Field Theory"
  - "Models in Statistical Mechanics" - E.H. Lieb, M.I.T.
  - "Phase Transitions" - R.B. Griffiths, Carnegie Mellon University
  - "general Theory of Renormalization" - K. Hepp, E.T.H.
  - "Intégrale fonctionnelle en Mécanique statistique" - J. Ginibre, Orsay
- Le directeur des études est Raymond Stora, Marseille-Luminy.

Les cours s'adressent à des jeunes chercheurs qui travaillent en physique mathématique et à des théoriciens confirmés désireux d'étudier les problèmes mathématiques, posés par la physique théorique, avec les mathématiques les plus puissantes et à la rigueur qui leur appartient. On insistera sur les problèmes mathématiques des systèmes à un nombre infini de degrés de liberté, le fondement des théories et l'étude des modèles.

L'école est installée dans des chalets de montagne situés près du village des Houches, dans les Alpes françaises, à proximité de Chamonix.

Adresse : école d'été de physique théorique 74 - Les Houches France

Les frais seront d'environ 1200 francs, pour l'ensemble de la session, le logement et nourriture compris. Les logements pour les participants accompagnés de leurs épouses et, au maximum, d'un jeune enfant sont en nombre très limité. Ils sont mis à la disposition des intéressés par tranches de quatre semaines. Pour tous renseignements sur les logements à louer au village s'adresser à l'Office du Tourisme des Houches.

Inscriptions - les dossiers complets doivent parvenir le plus rapidement possible et au plus tard le 15 mars 1970 à

ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE  
74 - LES HOUCHEs FRANCE

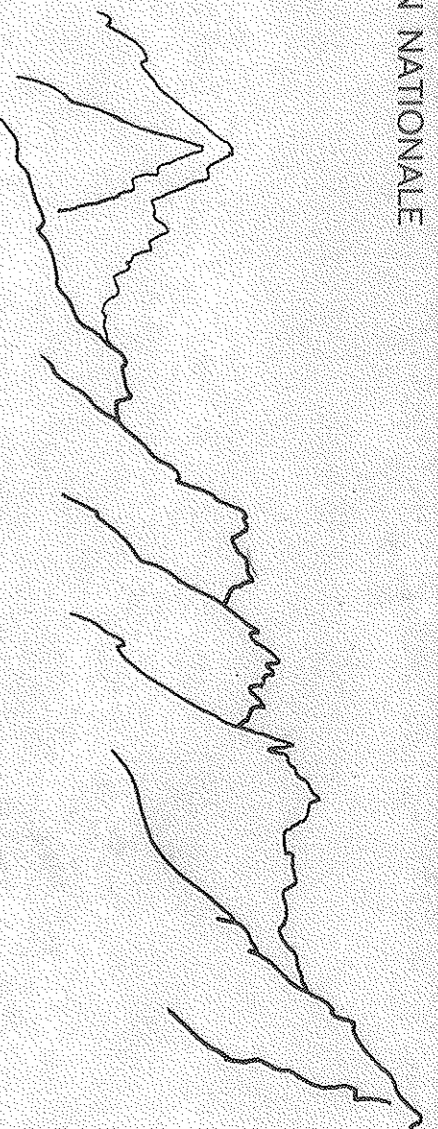
Les demandes qui parviendront aux Houches après le 15 mars ne pourront plus être examinées par la Commission d'Admission. Etant donné, d'une part le nombre des places disponibles, et d'autre part la nature des cours, seules seront prises en considération les demandes d'admission pour la participation complète à la session.

La formule de demande d'admission est à la disposition des intéressés  
à

et à l'adresse mentionnée ci-dessus

prêtère de compléter avant d'afficher





# LES HOUCHES

école d'été de physique théorique

physique des particules

4 JUILLET - 28 AOÛT 1971

**PROGRAMME :**

- « Field Theory Unitarity and Scattering Amplitudes » - André Martin, Cern
- « Duality in Strong Interaction Physics » - Sergio Fubini, M.I.T.
- « Modern Experimental Techniques » - Pierre Sonderegger, Saclay et Cern
- « Scale Invariance » - Curtis G. Callan, Jr. I.A.S. Princeton
- « Models in High Energy Physics » - Maurice Jacob, Cern
- « Lagrangian Field Theories » - Raymond Stora, C.N.R.S. Marseille
- « Photo-electro production » - Fred Gilman, S.L.A.C.
- « Very High Energy Physics » - C.N. Yang, S.U.N.Y. at Stonybrook

Ces cours s'adressent aux physiciens théoriciens et expérimentateurs

L'école est installée dans des chalets de montagne situés près du village des Houches, dans les Alpes françaises, à proximité de Chamonix.

Adresse : école d'été de physique théorique 74 - Les Houches France.

Les frais seront d'environ 1200 francs par personne, pour l'ensemble de la session, le logement à l'école et nourriture compris. Les logements pour les participants accompagnés de leur épouse et, au maximum, d'un jeune enfant sont en nombre très limité. Ils sont mis à la disposition des intéressés par tranches de quatre semaines. Pour tous renseignements sur les logements à louer au village s'adresser à l'Office du Tourisme des Houches.

Inscriptions - Les dossiers complets doivent parvenir au plus tard le 15 mars 1971 à

ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE  
74 - LES HOUCHES FRANCE

Les demandes qui parviendront aux Houches après le 15 mars ne pourront plus être examinées par la Commission d'Admission. Etant donné, d'une part le nombre des places disponibles, et d'autre part la nature des cours, seules seront prises en considération les demandes d'admission pour la participation complète à la session.

La formule de demande d'admission est à la disposition des intéressés à

et à l'adresse mentionnée ci-dessus

prière de compléter avant d'afficher





# LES HOUCHES

école d'été de physique théorique  
**PHYSIQUE DES PLASMAS**  
3 JUILLET - 29 JUILLET 1972

## PROGRAMME

Waves - Instabilities - Non linear processes (mainly in connection with thermo-nuclear devices).

A. BERS, M.I.T. & G. LAVAL, C.E.A. Fontenay-aux-Roses

Radiative processes in plasmas.

G. BEKEFI, M.I.T.

Atomic phenomena (with a view toward application in plasma chemistry).

J.-L. DELCROIX, Orsay

Strongly magnetized classical plasmas.

D. MONTGOMERY

Physics of dense plasmas. N...

Ces cours s'adressent aux physiciens théoriciens et expérimentateurs

L'école est installée dans des chalets de montagne situés près du village des Houches, dans les Alpes françaises, à proximité de Chamonix.

**Adresse** : école d'été de physique théorique, 74 - Les Houches — France.  
Les frais seront d'environ 600 francs par personne, pour l'ensemble de la session, le logement à l'école et nourriture compris. Les participants qui désirent louer pour leur famille un chalet ou un appartement au village peuvent s'adresser à l'Office du Tourisme des Houches. L'école ne se charge pas de ces locations.

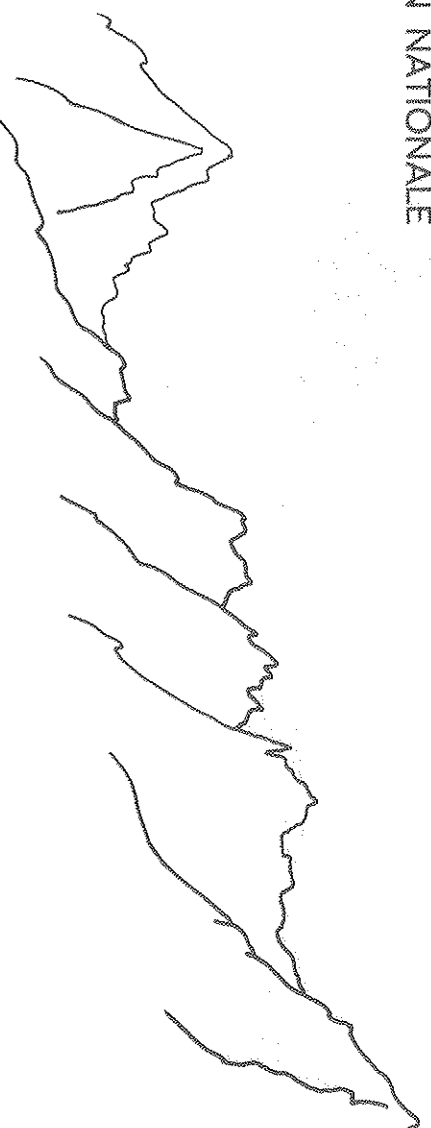
**Inscriptions** - Les dossiers complets doivent parvenir au plus tard le 15 mars 1972 à

ECOLE D'ETE DE PHYSIQUE THEORIQUE  
74 - LES HOUCHES — FRANCE

Les demandes qui parviendront aux Houches après le 15 mars ne pourront plus être examinées par la Commission d'Admission.  
Etant donné, d'une part le nombre des places disponibles, et d'autre part la nature des cours, seules seront prises en considération les demandes d'admission pour la participation complète à la session.

**LA FORMULE DE DEMANDE D'ADMISSION EST A LA DISPOSITION DES INTERESSES A L'ADRESSE MENTIONNEE CI-DESSUS**





# LES HOUCHES

école d'été de physique théorique

LES ASTRES NOIRS

30 JUILLET - 31 AOÛT 1972

## PROGRAMME

« Black Hole Astrophysics and Observational Searches for Black Holes »

I.D. Novikov,

Institute of Applied Mathematics, Moscou :

California Institute of Technology, Pasadena.

« The Event Horizon » — S.W. Hawking,

Institute of Theoretical Astronomy, Cambridge

« Energetics of Collapsed Objects » — R. Ruffini,

Princeton University, Princeton

« The Formation and Evolution of Rotating Black Holes » — J.-M. Bardeen,

University of Washington, Seattle

« Properties of the Kerr Metric » — B. Carter,

Institute of Theoretical Astronomy, Cambridge

Ces cours s'adressent aux physiciens théoriciens et expérimentateurs

L'école est installée dans des chalets de montagne situés près du village des Houches, dans les Alpes françaises, à proximité de Chamonix.

Adresse : école d'été de physique théorique, 74 - Les Houches — France.

Les frais seront d'environ 700 francs par personne, pour l'ensemble de la session, le logement à l'école et nourriture compris. Les participants qui désirent louer pour leur famille un chalet ou un appartement au village peuvent s'adresser à l'Office du Tourisme des Houches. L'école ne se charge pas de ces locations.

Inscriptions - Les dossiers complets doivent parvenir au plus tard le 15 mars 1972 à

ECOLE D'ETE DE PHYSIQUE THEORIQUE

74 - LES HOUCHES — FRANCE

Les demandes qui parviendront aux Houches après le 15 mars ne pourront plus être examinées par la Commission d'Admission.

Etant donné, d'une part le nombre des places disponibles, et d'autre part la nature des cours,

seules seront prises en considération les demandes d'admission pour la participation complète à la session.

LA FORMULE DE DEMANDE D'ADMISSION EST A LA DISPOSITION DES INTERESSÉS A L'ADRESSE MENTIONNÉE CI-DESSUS





# LES HOUCHES

école d'été de physique théorique

SESSION A

DYNAMIQUE DES FLUIDES

8 - 28 JUILLET 1973

Mathematical methods in fluid dynamics — P. Germain,  
Mécanique théorique, Univ. de Paris VI

General structure of flows — H.K. Moffatt,  
Dep. of applied math. and theor. phys., Univ. of Cambridge

Turbulence — S.A. Orszag, Dep. of applied math., MIT  
Transport properties in flows — J.-L. Peube, Lab. de dynamique des fluides, Univ. de Poitiers

Les aspects exclusivement mathématiques ou techniques ne seront pas développés. Les cours s'adressent à des physiciens théoriciens et expérimentateurs d'origines diverses (astrophysique, aérodynamique, météorologie, cinétique et thermodynamique chimiques, électrochimie, superfluidité, supraconductivité...). Ils seront complétés par des séances de travail plus spécialisées, au gré des participants.

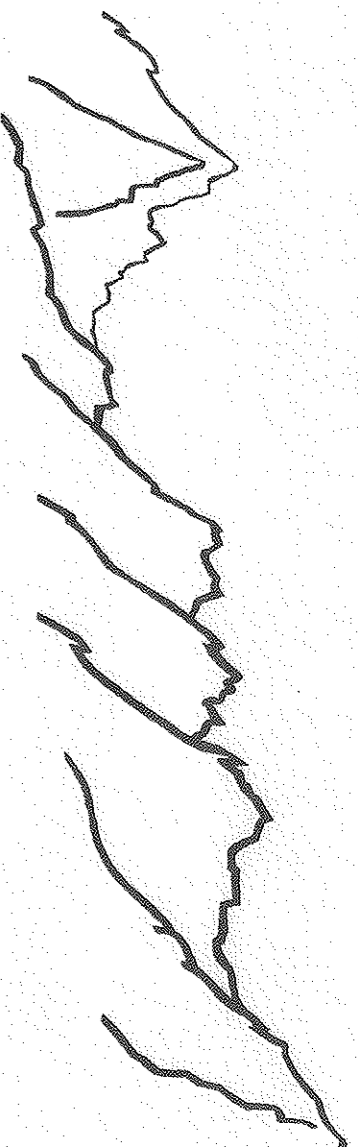
L'école est installée dans des chalets de montagne situés près du village des Houches, dans les Alpes françaises, à proximité de Chamonix. Les frais seront d'environ 500 francs par personne, pour l'ensemble de la session, logement à l'école et nourriture compris. Les participants qui désirent louer pour leur famille un chalet ou un appartement au village peuvent s'adresser à l'Office du Tourisme des Houches. L'école ne se charge pas de ces locations.

Inscriptions : Les dossiers complets (demandes d'admission et lettres de recommandation) doivent parvenir **au plus tard le 15 mars 1973** à  
ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE  
74310 LES HOUCHES — FRANCE

Etant donné la nature des cours et le nombre des places disponibles, seules seront prises en considération les demandes d'admission pour la participation complète à la session.

**LA FORMULE DE DEMANDE D'ADMISSION EST À LA DISPOSITION DES INTÉRESSÉS À L'ADRESSE CI-DESSUS**





# LES HOUCHEES

SESSION B

FLUIDES MOLECULAIRES

29 JUILLET - 1<sup>er</sup> SEPTEMBRE 1973

## GENERAL COURSES

Linear response theory - Irreversible thermodynamics — R. Zwanzig,  
Inst. for fluid dynamics and appl. math., Univ. of Maryland

Autocorrelation functions — C. Brot, Lab. de chimie phys., Orsay

## POLYMERS

Chain statistics — S.F. Edwards, Dep. of theor. phys. Univ. of Manchester

Chain dynamics — W.H. Stockmayer, Dep. of chemistry, Dartmouth Coll., USA

Viscoelasticity — J.D. Ferry, Dep. of chemistry, Univ. of Wisconsin

## LIQUID CRYSTALS

Static properties — R.B. Meyer, Div. of engineering and appl. phys., Harvard

Dynamics — P.-G. de Gennes, Collège de France

Electrohydrodynamics — G. Durand, Gr. des cristaux liquides, Orsay

Ces cours s'adressent à des physiciens théoriciens et expérimentateurs et à des physicochimistes intéressés par les aspects théoriques.

L'école est installée dans des chalets de montagne situés près du village des Houches, dans les Alpes françaises, à proximité de Chamonix.

Les frais seront d'environ 900 francs par personne, pour l'ensemble de la session, logement à l'école et nourriture compris. Les participants qui désirent louer pour leur famille un chalet ou un appartement au village peuvent s'adresser à l'Office du Tourisme des Houches. L'école ne se charge pas de ces locations.

Inscriptions : Les dossiers complets (demandes d'admission et lettres de recommandation) doivent parvenir **au plus tard le 15 mars 1973** à

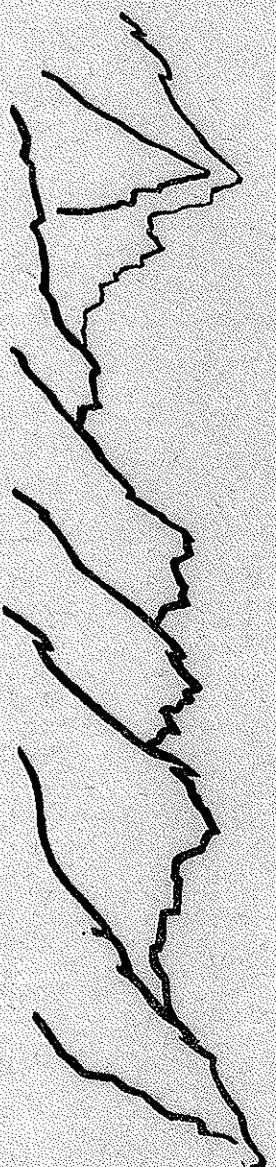
ECOLE D'ETE DE PHYSIQUE THEORIQUE  
74310 LES HOUCHEES — FRANCE

Etant donné la nature des cours et le nombre des places disponibles, seules seront prises en considération les demandes d'admission pour la participation complète à la session.

**LA FORMULE DE DEMANDE D'ADMISSION EST A LA DISPOSITION DES INTERESSES A L'ADRESSE CI-DESSUS**

Du 3 au 5 septembre, cette session sera suivie d'une réunion des chercheurs de l'ATP Fluides Moléculaires du C.N.R.S.





# LES HOUCHES

école d'été de physique théorique

## PHYSIQUE ATOMIQUE ET MOLECULAIRE ET MATIERE INTERSTELLAIRE

1<sup>er</sup> Juillet - 24 Août 1974

*Atomic physics* - H. Nussbaumer, Eidg. Technische Hochschule Zürich

*Molecular spectroscopy; excitation* - P. Thaddeus, Goddard Inst. New-York

*Physico-chemistry of molecule formation and destruction* - W. D. Watson, Univ. of Illinois

*Hydrodynamics, magnetohydrodynamics, and plasma physics* - F. D. Kahn. Univ. of Manchester

*Atomic collisions; physics of fully ionized regions* - D. R. Flower, Obs. de Paris, Meudon

*Observations and physics of dense neutral clouds* - A. A. Penzias, Bell Labs, Holmdel

*Heating, ionization and dynamics of interstellar matter; star formation* - G. B. Field, Harvard Coll. Obs

*Interstellar masers* - P. Goldreich, Caltech

*High energies; cosmic rays; spallation* - H. Reeves, Saclay

*Interstellar dust* - J. M. Greenberg, State Univ. NY, Albany

L'école est installée dans des chalets de montagne situés près du village des Houches, dans les Alpes françaises, à proximité de Chamonix.

Les frais seront d'environ 1.700 francs par personne, pour l'ensemble de la session, logement à l'école et nourriture compris. Les participants qui désirent louer pour leur famille un chalet ou un appartement au village peuvent s'adresser à l'Office du Tourisme des Houches. L'école ne se charge pas de ces locations.

Ces cours s'adressent aussi bien à des physiciens atomiques et moléculaires qu'à des astrophysiciens.

Inscriptions: Les dossiers complets (demandes d'admission et deux lettres de recommandation) doivent parvenir **au plus tard le 1<sup>er</sup> mars 1974** à

ECOLE D'ETE DE PHYSIQUE THEORIQUE  
74310 LES HOUCHES - FRANCE

Etant donné la nature des cours et le nombre des places disponibles, seules seront prises en considération les demandes d'admission pour la participation complète à la session.

LA FORMULE DE DEMANDE D'ADMISSION EST A LA DISPOSITION DES INTERESSES A L'ADRESSE CI-DESSUS

L'école dépend de l'Université de Grenoble et reçoit une subvention du Nato Advanced Study Institutes Programme.



# LES HOUCHEs

June Institute of Theoretical Physics

## STRUCTURAL ANALYSIS OF MULTIPARTICLE COLLISION AMPLITUDES IN RELATIVISTIC QUANTUM THEORY

3-28 June, 1975

Mathematical courses .....	- V. GLASER (CERN)
	- J. BROs (Saclay),
	D. IAGOLNITZER (Saclay)
Axiomatic quantum field theory .....	- J. BROs, H. EPSTEIN (CERN),
	V. GLASER
S-matrix theory .....	- D. IAGOLNITZER, H. P. STAPP
	(LBL, Berkeley)
Asymptotic theorems, rigorous constraints on scattering amplitudes, construction of amplitudes from experimental data .....	- A. MARTIN (CERN),
	- D. ATKINSON (Groningen),
	G. MAHOUX (Saclay)
Regge theory and Reggeon calculus .....	- C. DETAR (CERN), H.P. STAPP
	- A. WHITE (Univ. of Berkeley)
Dual theory .....	- S. MANDELSTAM (Univ. of Berkeley)

The detailed program of the courses is available upon request.

The purpose of the school is to provide a coherent and unified presentation of basic theoretical developments on the analytic structure of two-body and multiparticle collision amplitudes and related topics. The emphasis will be on the most recent advances. However, the courses will be self-contained, and the organization of the lectures should enable non specialists to follow the session.

The school occupies a group of mountain chalets surrounded by meadows and woods in the French Alps near Chamonix, facing Mont-Blanc. The location offers numerous mountain-climbing, hiking and touring opportunities. The weather is usually beautiful in June and the days are long.

Accommodations and meals are provided within the school for participants and lecturers for an expected total cost of about 1 200 francs per person. Several possibilities for participants with families are available.

Information and admission forms are available from the Director of the session :

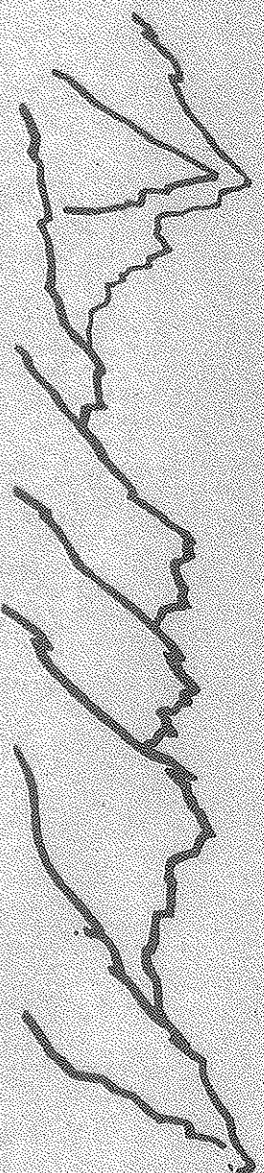
D. IAGOLNITZER

C.E.N. - Saclay

Service de Physique Théorique

BP No 2 - 91190 Gif-sur-Yvette, FRANCE





# LES HOUCHEs

**école d'été de physique théorique**

## **APPLICATION DES LASERS A LA PHYSIQUE ATOMIQUE ET MOLECULAIRE**

**30 JUIN - 26 JUILLET 1975 - SESSION A**

**Course on laser theory - W.E. LAMB, University of Arizona**

**Laser spectroscopy in frequency and time domain in 2 and 3 level systems - M.S. FELD, MIT**

**Resonant interaction of strong light beams with an atomic system - C. COHEN-TANNOUDJI,  
ENS and Collège de France**

**Coherent optical spectroscopy - R. G. BREWER, IBM San Jose**

**Time resolved spectroscopy - S. STENHOLM, University of Helsinki**

**Use of laser in molecular spectroscopy and in the studies of energy transfer - T. OKA,  
Nat. Research Council of Canada**

**Probing small molecules with lasers - J.C. LEHMANN, ENS and Univ. de Paris VI**

**Laser isotope separation; combination of laser and nuclear spectroscopy - V.S. LETHOKOV,  
Institute of spectroscopy, Moscow (to be confirmed)**

**Recent advances in high resolution spectroscopy and the related areas - A. JAVAN, MIT**

**Additional seminars will be given by other lecturers, describing new techniques or newly performed experiments in the laser field. The session is intended both for atomic and laser physicists.**

Fondée en 1951, l'Ecole occupe un ensemble de chalets de montagne entourés de prés et de bois, dans les Alpes françaises près de Chamonix, face au Mont-Blanc.

Sa situation offre des possibilités de promenade, de tourisme, d'escalade ou de méditation. Participants et conférenciers sont logés et nourris à l'école, pour un montant total de 1.100 francs environ. Des possibilités de bourse existent.

Les participants qui désirent louer pour leur famille un logement au village doivent s'adresser directement à l'Office du Tourisme, 74310 Les Houches.

Admission forms are available from

ECOLE D'ETE DE PHYSIQUE THEORIQUE  
74310 LES HOUCHEs - FRANCE

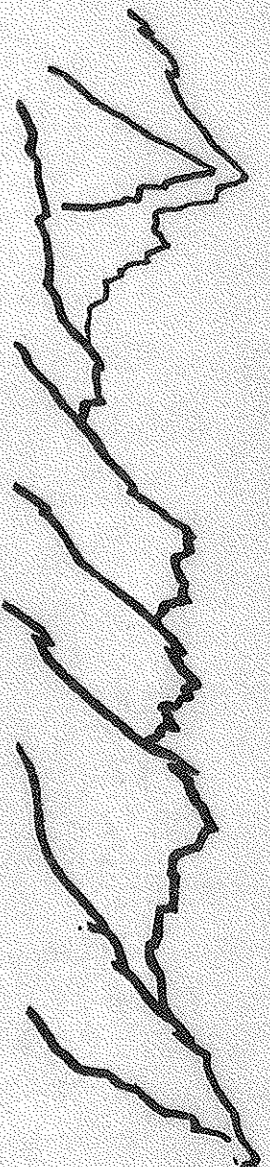
Complete files (admission forms and recommendation letters) must have reached this address **before 15 March 1975.**

Etant donné la nature des cours et le nombre des places disponibles (40), seules seront prises en considération les demandes d'admission pour la participation complète à la session.

La session B (28 Juillet - 6 Septembre 1975) portera sur les Méthodes en Théorie des Champs. Une session sur la Physique des Particules est prévue pour 1976.

**LA FORMULE DE DEMANDE D'ADMISSION EST A LA DISPOSITION DES INTERESSES A L'ADRESSE CI-DESSUS**





# LES HOUCHEs

**école d'été de physique théorique**

## **METHODES EN THEORIE DES CHAMPS**

**28 JUILLET - 6 SEPTEMBRE 1975 - SESSION B**

**Functional methods - L.D. FADDEEV, Steklov Institut Leningrad (to be confirmed)**

**Renormalization theory - C. CALLAN, Princeton University**

**Gauge theories - B.W. LEE, FNAL Batavia**

**Renormalization group - D. GROSS, Princeton University**

**Quantum theory of gravitation - M.J.G. VELTMAN, Utrecht University**

**Theory of critical phenomena - E. BREZIN, Saclay**

**Additional lectures will be given by G.'t HOOFT and K.G. WILSON. The program will be self-contained and directed towards applications. The organization of the lectures should enable physicists not necessarily familiar with field theory to follow the session.**

Fondée en 1951, l'Ecole occupe un ensemble de chalets de montagne entourés de prés et de bois, dans les Alpes françaises près de Chamonix, face au Mont-Blanc.

Sa situation offre des possibilités de promenade, de tourisme, d'escalade ou de méditation. Participants et conférenciers sont logés et nourris à l'école, pour un montant total de 1.500 francs environ. Des possibilités de bourse existent.

Les participants qui désirent louer pour leur famille un logement au village doivent s'adresser directement à l'Office du Tourisme, 74310 Les Houches.

Admission forms are available from

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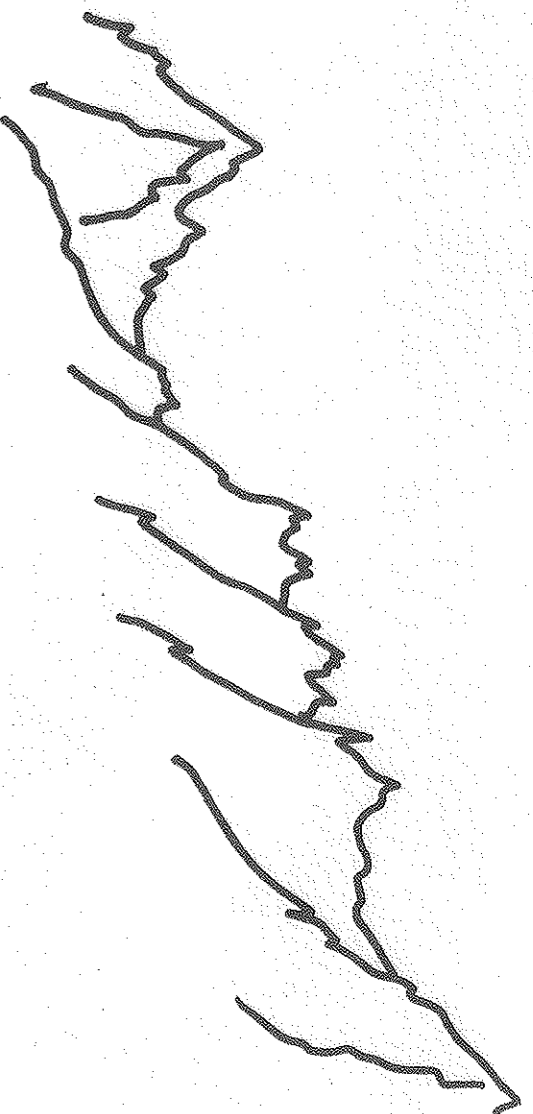
Complete files (admission forms and recommendation letters) must have reached this address **before 15 March 1975.**

Etant donné la nature des cours et le nombre des places disponibles (40), seules seront prises en considération les demandes d'admission pour la participation complète à la session.

La session A (30 Juin - 26 Juillet 1975) portera sur les Applications des Lasers à la Physique Atomique et Moléculaire. Une session sur la Physique des Particules est prévue pour 1976.

**LA FORMULE DE DEMANDE D'ADMISSION EST A LA DISPOSITION DES INTERESSES A L'ADRESSE CI-DESSUS**





# LES HOUCHES

école d'été de physique théorique

SESSION XXIX - 5 Juillet - 14 Août 1976

## INTERACTIONS FAIBLES

## ET ELECTROMAGNETIQUES A HAUTE ENERGIE

Neutrino physics — B.C. Barish, California Institute of Technology

The current weak current — A. De Rújula, Harvard University

Deep hadronic structure — J. Ellis, CERN

Gauge theories — R.P. Feynman, California Institute of Technology

Phenomenology of the new particle — H. Harari, Weizmann Institute

Quark confinement and the particle spectrum of Yang-Mills theories - L. Susskind,  
Yeshiva and Tel Aviv Universities

Electromagnetic interactions — B.H. Wiik and G. Wolf, DESY

*There will be an additional programme of seminars ; the speakers may include : J.S. Bell, J.D. Bjorken, M.K. Gaillard, J. Iliopoulos, P.V. Landshoff, B. Richter, J.J. Sakurai, S.C.C. Ting. The session is primarily intended for young theorists but some places will also be allocated to experimenters.*

Fondée en 1951, l'Ecole occupe un ensemble de chalets de montagne entourés de prés et de bois, dans les Alpes françaises près de Chamonix, face au Mont-Blanc.

Sa situation offre des possibilités de promenade, de tourisme, d'escalade ou de méditation. Participants et conférenciers sont logés et nourris à l'école, pour un montant total de 1 700 francs environ. Des possibilités de bourse existent. Les participants qui désirent louer pour leur famille un logement au village doivent s'adresser directement à l'Office du Tourisme, 74310 Les Houches.

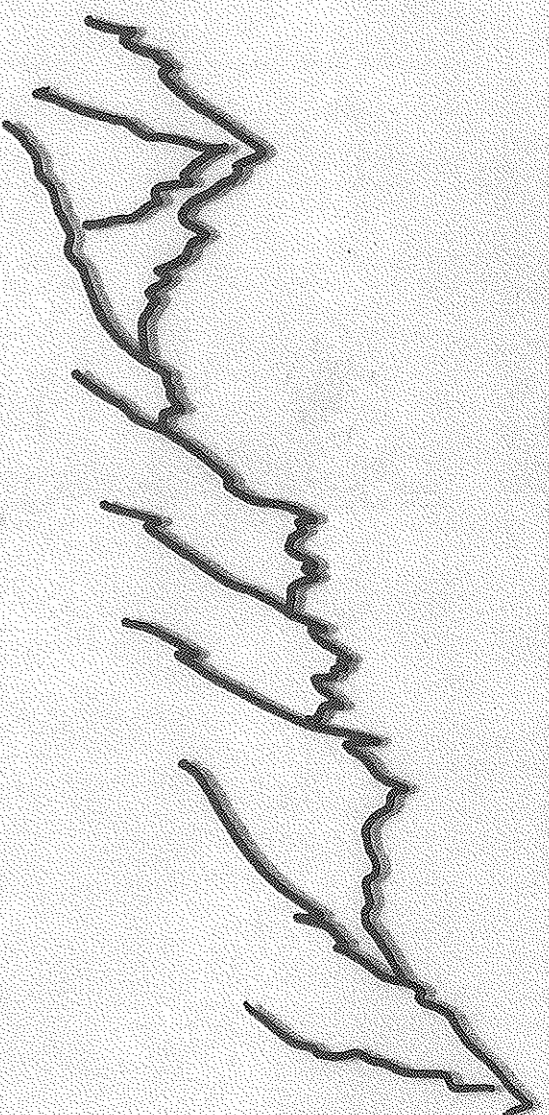
**Admission forms are available from**

**ECOLE D'ETE DE PHYSIQUE THEORIQUE  
74310 LES HOUCHES — FRANCE**

**Complete files (admission forms and recommendation letters) must have reached this address before 12 March 1976.**

Etant donné la nature des cours et le nombre des places disponibles (40), la commission d'admission ne prendra en considération que les demandes d'admission pour la participation complète à la session. Les dossiers arrivés après le 12 Mars ne pourront être examinés. L'Ecole est un Institut de l'Université de Grenoble, et reçoit un soutien de la Division des Affaires Scientifiques de l'OTAN. La session XXX (1977) portera sur la physique nucléaire avec ions lourds et courants mésiques.





# LES HOUCHEs

école d'été de physique théorique

SESSION XXX - 4 Juillet - 19 Aout 1977

## IONS LOURDS ET MESONS EN PHYSIQUE NUCLEAIRE

**Nuclear physics at high density** — G. BAYM, University of Illinois

**Fluid dynamics and shock wave phenomena** — G. BERTSCH, Michigan State University

**Weak and electromagnetic processes in nuclei** — R. BLIN-STOYLE, University of Sussex

**Theory of heavy ion collisions** — D. BRINK, University of Oxford,  
and R. SCHAEFFER, Saclay

**Meson-nuclear and N-N interactions** — G.E. BROWN, S.U.N.Y. (to be confirmed),  
and E.J. MONIZ, M.I.T.

**Relativistic heavy ions** — H. FESHBACH, M.I.T.

**Phase transitions and meson fields** — A.B. MIGDAL, Academy of Sciences, Moscow (to be confirmed)

**High angular momentum states** — Z. SZYMANSKI, Institute Badan Jądrowych, Warsaw

**Nuclei and symmetry laws** — Sir Dénys WILKINSON, University of Sussex

There will be an additional programme of seminars on specialized topics.

This school lays emphasis on aspects common to meson and heavy ion nuclear physics.

It is intended for physicists who are interested in both topics, and who are expected to follow the totality of the courses. Although the lectures will cover mainly theory, experimentalists are also welcome to apply.

Fondée en 1951, l'Ecole occupe un ensemble de chalets de montagne entourés de prés et de bois, dans les Alpes françaises près de Chamonix, face au Mont-Blanc.

Sa situation offre des possibilités de promenade, de tourisme, d'escalade et de méditation. Participants et conférenciers sont logés et nourris à l'école, pour un montant total de 2 000 francs environ. Des possibilités de bourse existent. Les participants qui désirent louer pour leur famille un logement au village doivent s'adresser directement à l'Office du Tourisme, 74310 Les Houches.

Admission forms are available from

EGOLE D'ETE DE PHYSIQUE THEORIQUE

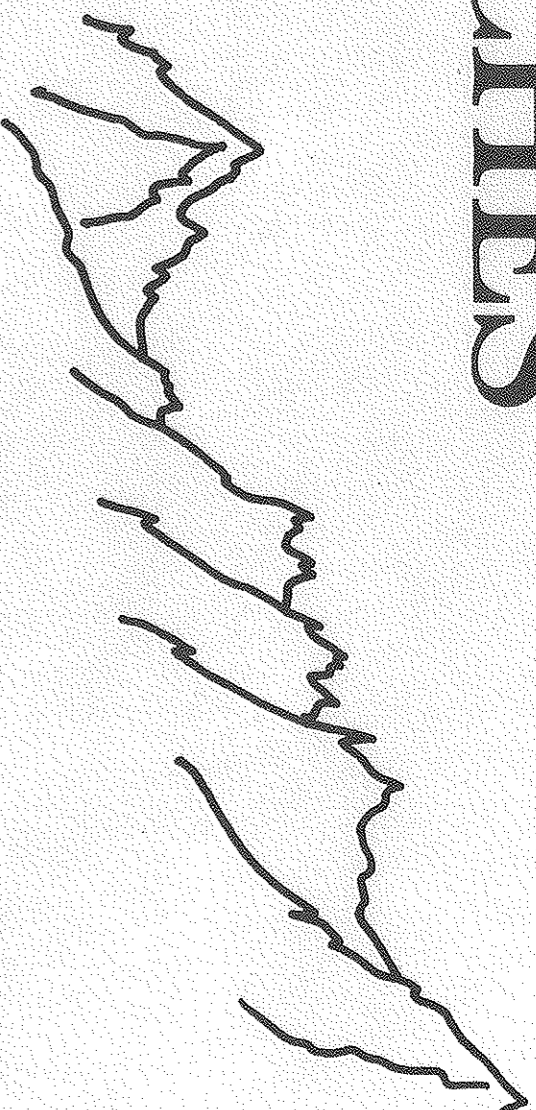
74310 LES HOUCHEs - FRANCE

Telephone (50) 54 41 33

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# LES HOUCHEs



SESSION XXXI

3 Juillet - 18 Août 1978

école d'été de physique théorique

## LA MATIÈRE MAL CONDENSÉE ILL - CONDENSED MATTER

**Percolation and localization** — D.J. THOULESS, Kingston University

**Disordered materials from an experimental viewpoint** — J. JOFFRIN, Institut Laue-Langevin, Grenoble

**Statistical physics of glassy systems** — P.W. ANDERSON, Princeton University and Bell Labs

**Elements of topology and geometry. Application to defects and textures** — V. POENARU, Université d'Orsay

**Numerical simulation and renormalization studies of disordered systems** — S. KIRKPATRICK, IBM, New York

**Solitons. Topics in probability theory** — P. VAN MOERBEKE, Université d'Orsay

**Instabilities and turbulence** — P.C. MARTIN, Harvard University

**Polymer statistics** - P.-G. de GENNES, Collège de France

There will be an additional programme of seminars on theoretical, experimental and applied topics. The lectures will start from a basic level and will progress to the recent advances in the physics of disordered systems and related topics. Theoreticians or experimentalists of condensed matter as well as physicists working in statistical mechanics are welcome to apply.

Fondée en 1951, l'École occupe un ensemble de chalets de montagne entourés de prés et de bois, dans les Alpes françaises près de Chamonix, face au Mont-Blanc. Sa situation offre des possibilités de promenade, de tourisme, d'escalade et de méditation. Participants et conférenciers sont logés et nourris à l'école, pour un montant total de 2300 francs. Des possibilités de bourse existent. Les participants qui désirent louer pour leur famille un logement au village doivent s'adresser directement à l'Office du Tourisme, 74310 Les Houches.

L'École est un Institut de l'Université de Grenoble, et reçoit le soutien de la Division des Affaires Scientifiques de l'OTAN.

Admission forms are available from

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Téléphone (50) 54 41 33

Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1978.

En 1979 se tiendront deux sessions, l'une consacrée à la cosmologie physique, l'autre à la biophysique des transmissions intercellulaires.



# LES HOUCHEES



SESSION XXXII

2 au 28 Juillet 1979

école d'été de physique théorique

## COSMOLOGIE PHYSIQUE PHYSICAL COSMOLOGY

**Cosmological models confronted with observations** — J. LEQUEUX, Observatoire de Paris-Meudon.

**The early universe** — I.D. NOVIKOV, Academy of Sciences, University of Moscow.

**Formation and evolution of galaxies and clusters of galaxies** — J.E. GUNN, California Institute of Technology.

**Masses of galaxies and clusters of galaxies** — P.J.E. PEEBLES, Princeton.

**The observational cosmological parameters** — G. TAMMANN, Université de Bâle.

**Quasistellar objects ; radiogalaxies and interstellar matter** — M. REES, Institute of Astronomy, Cambridge  
and M. LONGAIR, Mullard Observatory, Cambridge.

There will be an additional programme of seminars on theoretical and observational topics. The lectures will start from a basic level and will progress to the recent advances in physical cosmology. Emphasis will be put on the observational and physical grounds of cosmology. Cosmologists both observers and theoreticians as well as physicists working on related topics are welcome to apply.

Fondée en 1951, l'Ecole occupe un ensemble de chalets de montagne entourés de prés et de bois, dans les Alpes françaises près de Chamonix, face au Mont-Blanc. Sa situation offre des possibilités de promenade, de tourisme, d'escalade et de méditation. Participants et conférenciers sont logés et nourris à l'école, pour un montant total de 1600 francs. Des possibilités de bourse existent. Les participants qui désirent louer pour leur famille un logement au village doivent s'adresser directement à l'Office du Tourisme, 74310 Les Houches (Tél. (50) 54 40 62) L'Ecole est un Institut de l'Université de Grenoble, et reçoit le soutien de la Division des Affaires Scientifiques de l'OTAN.

Admission forms are available from

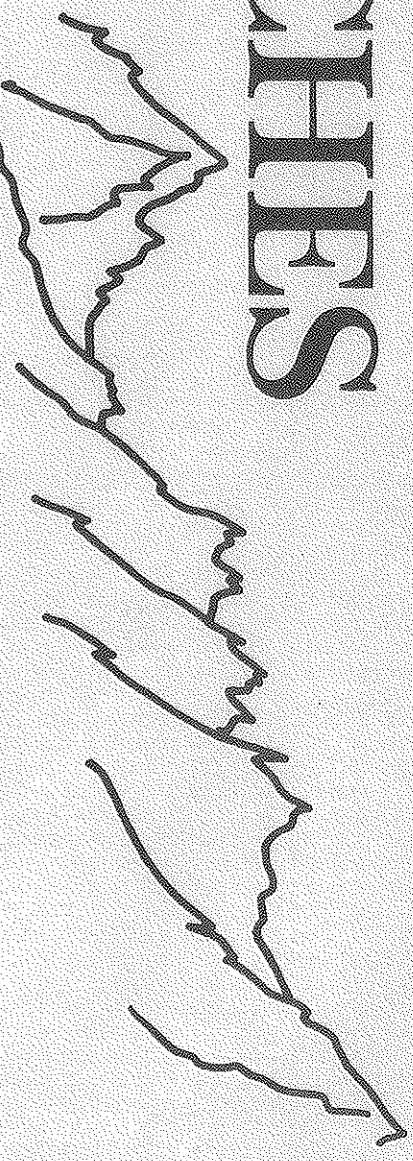
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Téléphone (50) 54 41 33

Complete files (admission forms and recommendation letters) **must** have reached this address **before 1 March 1979**.

En 1980 se tiendront deux sessions, l'une consacrée à l'interaction laser-plasma, l'autre à la physique des défauts. La session d'Août 1979 porte sur la biophysique des membranes et la communication intercellulaire.



# LES HOUCHES



SESSION XXXIII

30 Juillet - 30 Aout 1979

école d'été de physique théorique

## BIOPHYSIQUE DES MEMBRANES ET COMMUNICATION INTERCELLULAIRE BIOPHYSICS OF MEMBRANES AND INTERCELLULAR COMMUNICATION

This session will review the present knowledge on the molecular organization of the cell membrane, and the mechanisms of intercellular recognition and information transfer at the extracellular level. The analysis in terms of molecular structure and physico-chemical interaction will be emphasized. Particular attention will be paid to the common molecular aspects of the various biological fields concerned. Extended and progressive series of lectures will cover :

**The cell membrane** — S.J. SINGER, La Jolla.

**Structure and dynamics of membrane components** : Proteins — M. KARPLUS, M.I.T. and R. HENDERSON, m.r.c. Cambridge. Lipids — J. SEELIG, Basel. Carbohydrates — N. SHARON, Rehovoth.

**Lateral motion in membranes** — H.M. MCCONNELL, Stanford.

**Channels and ionophores in artificial membranes** — P. LÄUGER, Konstanz.

**Excitable membranes** — C. BERGMAN, Paris and H. MEVES, Plymouth.

**Synaptic transmission** — P. ASCHER, Paris and J.P. CHANGEUX, Paris.

**Hormonal receptors and intramembranous transduction** — S. JARD, Paris and M. RODBELL, Bethesda.

**Immunological recognition** — M. FOUGEREAU, Marseille and J.F.A.P. MILLER, Melbourne.

Other lecturers will give short courses on related topics. Scientific organizers are Marc CHABRE, Grenoble and Philippe F. DEVAUX, Paris.

The school is intended to young biologists involved in one of the domains treated, and willing to broaden their knowledge and to study the more fundamental aspects ; they should have a good understanding of modern physical and chemical methods. The courses will also interest physicists or chemists wishing to orient towards this type of biological problems, and possessing already a basic knowledge of molecular biology and biochemistry.

Fondée en 1951, l'Ecole occupe un ensemble de chalets de montagne entourés de prés et de bois, dans les Alpes françaises près de Chamonix, face au Mont-Blanc. Sa situation offre des possibilités de promenade, de tourisme, d'escalade et de méditation. Participants et conférenciers sont logés et nourris à l'école, pour un montant total de 1900 francs. Des possibilités de bourse existent. Les participants qui désirent louer pour leur famille un logement au village doivent s'adresser directement à l'Office du Tourisme, 74310 Les Houches (Tél. (50) 54 40 62) L'Ecole est un Institut de l'Université de Grenoble, et reçoit le soutien de la Division des Affaires Scientifiques de l'OTAN.

Admission forms are available from

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74310 LES HOUCHES — FRANCE

Téléphone (50) 54 41 33

Complete files (admission forms and recommendation letters) **must** have reached this address **before 1 March 1979**.

En 1980 se tiendront deux sessions, l'une consacrée à l'interaction laser-plasma, l'autre à la physique des défauts.

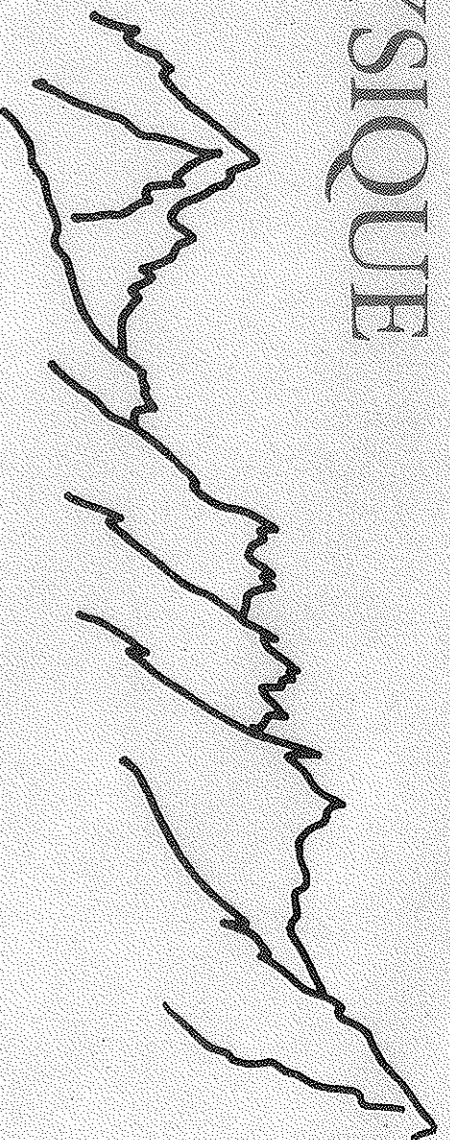
La session de Juillet 1979 porte sur la cosmologie physique.



# CENTRE DE PHYSIQUE DES HOUCHEs

école de physique théorique

74310 LES HOUCHEs  
France



## COMMON TRENDS IN PARTICLE AND CONDENSED MATTER PHYSICS

a N.A.T.O. Advanced Study Institute

February 18th to 29th 1980

A series of high level courses and seminars will be provided to confirmed researchers on concepts of common nature in the study of phase transitions in ordered media and in particle physics: order and disorder variables in field theory and statistical mechanics, string dynamics and gauge theories, localization, spin glasses.

Une série de cours de haut niveau et de séminaires, seront dispensés à des chercheurs confirmés sur les concepts communs dans l'étude des transitions de phase dans les milieux ordonnés et en physique des particules: variables d'ordre et de désordre en théorie des champs et mécanique statistique, dynamique des cordes et théories de jauge, localisation, verres de spins.

### Among the contributors:

C. Callan, J. Fröhlich, C. Itzykson, S. Mandelstam, M. Moore, A. Neveu, G. Parisi, D. Scalapino, C. Thorn,  
D. Thouless, F. Wegner, K. Wilson, E. Witten, A. Young, J. Zinn-Justin.

**Applications must reach before Nov. 20th 1979 one of the scientific directors:**

**J. L. GERVAIS and G. TOULOUSE** Laboratoire de Physique de l'ENS., 24, rue Lhomond, 75231 Paris Cédex 05, France.

**E. BREZIN** Physique Théorique, Orme des Merisiers, C.E.N. Saclay, B.P. n° 2, 91190 Gif-sur-Yvette, France.

Participants will be requested to pay a fee of 600 Frs. upon arrival covering board and lodging at the Centre.

This winter school will be part of the new activities of the Centre de Physique des Houches, in the premises of the Ecole de Physique Théorique, in the French Alps, outside the Summer School usual sessions.

Cette Ecole d'hiver fait partie des nouvelles activités du Centre de Physique des Houches, dans les locaux de l'Ecole de Physique Théorique, dans les Alpes françaises, et fonctionnant en dehors des sessions habituelles de l'Ecole d'été.

Organizing Committee of the Centre:

M.T. Béal-Monod, Physique des Solides, Université de Paris-Sud, 91405 ORSAY, France

D. Thoulouze, CRTBT, CNRS, av. des Martyrs, 166x, 38042 GRENOBLE, France



# LES HOUCHEs



SESSION XXXVI

NATO ADVANCED STUDY INSTITUTE

29 juin - 31 juillet 1981

école d'été de physique théorique

## COMPORTEMENT CHAOTIQUE DES SYSTÈMES DÉTERMINISTES

# CHAOTIC BEHAVIOUR OF DETERMINISTIC SYSTEMS

Hamiltonian systems, M. BERRY, H.H. Wills Physics Lab., Bristol

J. MOSER, Math. Seminar ETH, Zurich

Introduction to chaotic behaviour, O.E. LANFORD III, Dept. of Math.,  
Univ. of California, Berkeley

Asymptotic behaviour of dynamical systems, M. HENON, Observatoire, Nice

A. KATOK, Dept. of Math., Univ. Maryland

M. MISUREWICZ, Inst. Math. Warsaw

Bifurcations leading to chaos, D.D. JOSEPH, Dept. of Aerospace Eng. & Mechanics,  
Univ. of Minnesota

S. NEWHOUSE, Dept. of Math. Univ. of North Carolina

The program is also expected to include courses by:

Ya. G. SINAI (Landau Institute, Moscow),

V.I. ARNOLD (Moscow University),

D.V. ANOSOV (Steklov Institute, Leningrad).

The above courses cover in depth most of the aspects of non linear dynamics with special emphasis on the use of concepts of bifurcation and strange attractors. A careful equilibrium is kept between the theoretical aspects and applications to various fields of mechanics (celestial and fluid dynamics, turbulence), of physics (plasmas ergodicity, accelerator design), of engineering, meteorology, population dynamics, etc. A varied audience is expected, including participants of pre and post doctoral level working either on the theory or on applied problems in any field of science, from the mathematical, numerical, experimental or technical viewpoints.

A series of additional courses and seminars on special related topics will be contributed by J.P. ECKMANN, J.P. GOLLUB, A. LIBCHABER, R.M. MAY, S.A. ORSZAG.

*Les Houches is a village and resort of the French Alps, in the Chamonix valley, at an altitude of 1000 m. Established in 1951, the School occupies a group of mountain chalets surrounded by meadows and woods, above the village, and facing the Mont-Blanc range. It is ideally located for mountaineering, hiking or touring, as well as for intellectual work. Accommodation and meals are provided within the School for both participants and lecturers, the fee of 2350 FF covering all expenses. Some possibilities for grants exist. Participants who intend to rent lodging for their family in the village should directly inquire at: Office du Tourisme, 74310 Les Houches (tel. (50) 54 40 62). The School is affiliated with the University of Grenoble, and this session is a NATO Advanced Study Institute.*

*Admission forms and additional informations are available from*

*ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE*

*74310 LES HOUCHEs, FRANCE*

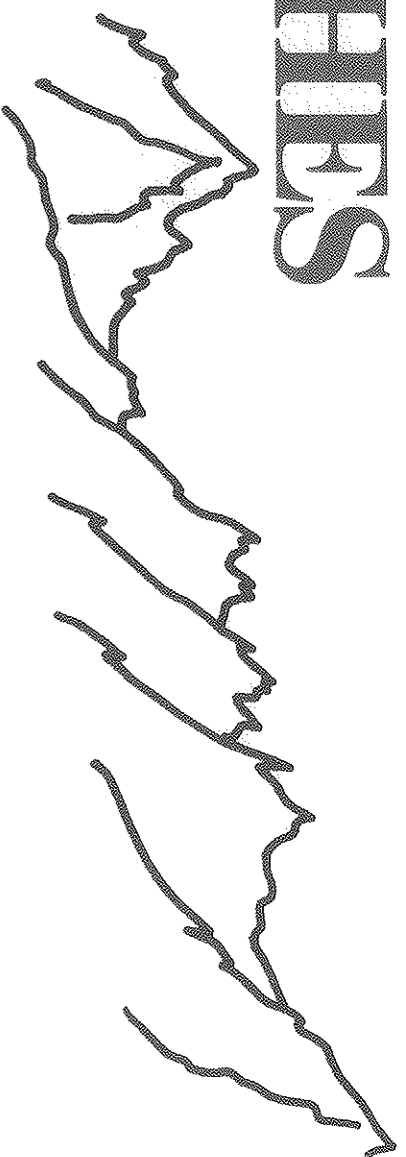
*Telephone: (50) 54 41 33 and 54 40 69*

*Complete files (admission forms and recommendations letters) must have reached this address before 1 March 1981.*

*The session of August 1981 will be devoted to Gauge theories in high energy physics. Two sessions will be held in 1982, one on Atomic physics, the other on Field theory.*



# LES HOUCHES



SESSION XXXVII  
NATO-ADVANCED STUDY INSTITUTE  
3 août - 11 septembre 1981

école d'été de physique théorique

## THÉORIES DE JAUGE EN PHYSIQUE DES HAUTES ENERGIES GAUGE THEORIES IN HIGH ENERGY PHYSICS

**Introduction to gauge theories, J. WESS, Karlsruhe**

**Perturbative quantum chromodynamics, C. SACHRAJDA, Southampton**

**Phenomenology of unified gauge theories, J. ELLIS, CERN**

**Non-perturbative quantum chromodynamics, S. COLEMAN, Harvard**

**$e^+e^-$  and lepton-nucleon interactions, B. WILK, DESY**

**Nucleon-nucleon interactions, L. LEDERMAN, Fermilab**

**Properties of hadrons, C. QUIGG, Fermilab**

The main courses listed above are concerned with the basic principles of gauge theories and their applications to high energy particle physics, as well as comparison with existing data and implications for very high energy experiments. They are mainly addressed to young theorists and experimenters working in high energy particle physics at the pre or post doctoral level but may also be of interest to astrophysicists and cosmologists. A complementary program of seminars will be devoted to connected topics ranging from the description of recent experimental results in accelerator physics, proton decay searches, and neutrino oscillations, to the recent theoretical progress in quark confinement, supergravity and unification, and the relevant aspects of astrophysics and cosmology. Seminar speakers will include G. KANE, L. SULAK, B. ZUMINO...

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*Admission forms and additional informations are available from*  
ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE  
74310 LES HOUCHES, FRANCE  
Telephone: (50) 54 41 33 and 54 40 69

*Complete files (admission forms and recommendations letters) must have reached this address before 1 March 1981.*

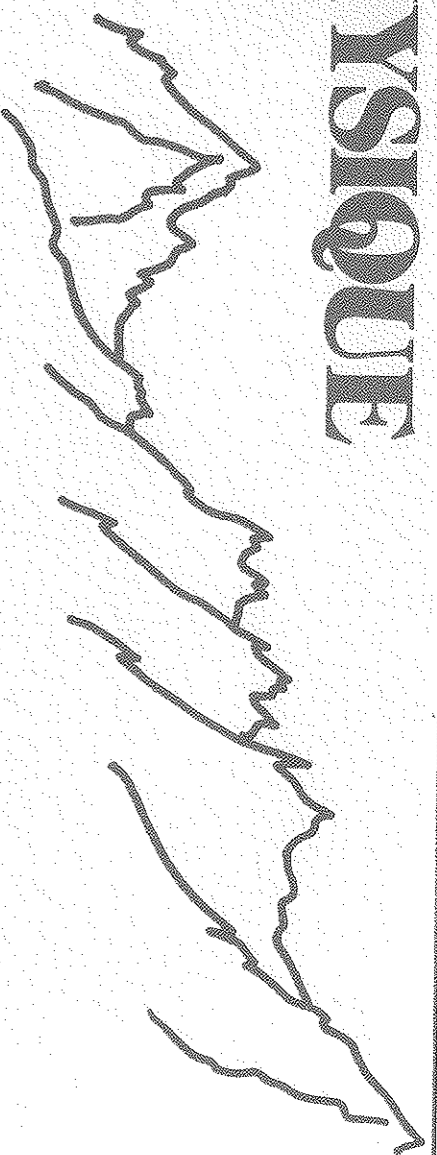
*The session of July 1981 will be devoted to Chaotic behaviour of deterministic systems. Two sessions will be held in 1982, one on Atomic Physics, the other on Field theory. The latter, which will cover functional methods, critical phenomena, two dimensional models and non perturbative gauge theories, will complement the present session from a more theoretical viewpoint.*



# CENTRE DE PHYSIQUE DES HOUCHEs

école de physique théorique

74310 LES HOUCHEs  
France



## STATISTICAL MECHANICS OF IONIC MATTER MECANIQUE STATISTIQUE DE LA MATIERE IONIQUE

A.N.A.T.O. Advanced Research Workshop

Co-sponsored by CEA (France), DRET (France), EURATOM, IUPAP and EPS  
(Complementary supports: French Ministry of Education and CNRS)

**MARCH 29th - APRIL 10th 1982**

This interdisciplinary workshop will consist of high level survey talks, seminars and round-table discussions, devoted to the Statistical Mechanics of strongly coupled charged particle fluids, encountered in Plasma physics, Chemical Physics and Astrophysics.

Cette réunion de travail comprend des exposés de synthèses et séminaires de haut niveau, ainsi que des tables rondes, consacrés à la Mécanique Statistique de systèmes coulombiens fortement corrélés intervenant en Physique des Plasmas, en Chimie Physique et en Astrophysique.

### Among the contributors :

B.J. ALDER, N.W. ASHCROFT, R. BALESCU, J.L. BOBIN, C. DEUTSCH, H. DE WITT, W. DIETERICH,  
J.W. DUFTY, R. EVANS, M. GILLAN, H. GOULD, B. JANCOVICI, G. KALMAN, R. KLEIN, W.D. KRAEFT,  
J.L. LEBOWITZ, Ph. MARTIN, I.R. MC DONALD, R. MORE, G. STELL, D. STEVENSON, M.P. TOSI,  
P. TURQ, M. VAN HORN, F.I.B. WILLIAMS

### Scientific Directors :

J.P. HANSEN, Physique Théorique des Liquides, Université P. et M. Curie, 4, pl. Jussieu,  
75230 PARIS Cedex 05 (France)

M. BAUS, Chimie Physique II, C.P. 231 Université Libre de Bruxelles, B-1050 BRUXELLES (Belgique)

**Applications should be sent to M. BAUS before January 10th 1982.**

Participants will be requested to pay a fee of 1200 FF covering board and lodging at the Centre

This workshop will be part of the new activities of the Centre de Physique des Houches, in the premises of the Ecole de Physique Théorique, in the French Alps, outside the usual summer school sessions.

Cette réunion de travail fait partie des nouvelles activités du Centre de Physique des Houches, dans les locaux de l'Ecole de Physique Théorique, dans les Alpes françaises, en dehors des sessions habituelles de l'Ecole d'Eté.

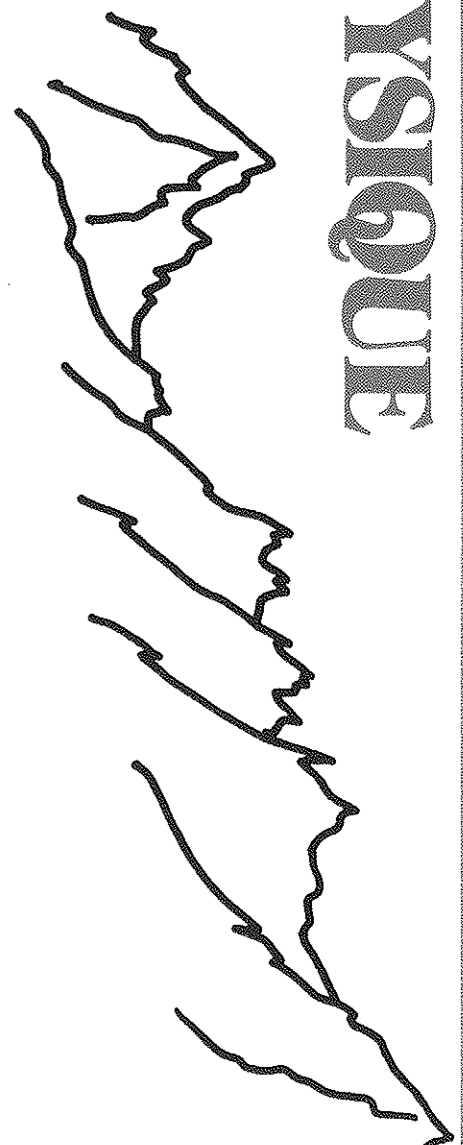
### Organizing Committee of the Centre :

M.T. BEAL-MONOD  
A. LANDESMAN  
D. THOULOZE  
Physique des Solides, Université de Paris-Sud, 91405 ORSAY (France)  
C.R.T.B.T., C.N.R.S. 25, av. des Martyrs, 38042 GRENOBLE (France).



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique



74310 LES HOUCHEES  
France

## GRAVITATIONAL RADIATION RAYONNEMENT GRAVITATIONNEL

A N.A.T.O. Advanced Study Institute  
(Complementary supports from the French Ministry of Education and C.N.R.S.)

**JUNE 2nd to 21st 1982**

A series of high level courses will include :  
the theory of gravitational radiation, equations of motion, computer calculations, asymptotic structure of space-time, dynamical approach to general relativity, the sources of gravitational radiation, bar and interferometer detectors, astrophysical sources ...

Une série de cours de haut niveau incluront :  
la théorie du rayonnement gravitationnel, les équations du mouvement, calculs sur ordinateurs, structure asymptotique de l'espace-temps, l'approche dynamique de la relativité générale, les sources de rayonnement gravitationnel, les détecteurs mécaniques et interférométriques, sources astrophysiques ...

The main courses listed above will be complemented by lectures on related topics : dynamics of gravitational fields, interaction of gravitational radiation with matter and fields, the absorption of gravitational radiation, the gravitational radiation from collapsed objects, the Doppler tracking of space-crafts, alternative detection schemes, gravitational radiation and quantum physics, quantum non demolition ...

### Among the lecturers :

T. DAMOUR, R. DREVER, D. EARDLEY, T. PIRAN, M. REES, K. THORNE, M. WALKER, J. YORK ...

### Scientific directors :

N. DERUELLE, Institut Henri Poincaré, 11, rue P. et M. Curie, 75231 Paris Cedex 05 - France.  
T. PIRAN, Racah Institute of Physics, The Hebrew University, Jerusalem, Israël, and I.A.S. Princeton (USA).

**Applications must reach N. Deruelle before February 1st 1982**

Participants will be requested to pay a fee of 2.200 F.F. upon arrival, covering board and lodging at the Centre ; partial support may possibly be obtained on request.

This spring school will be part of the new activities of the Centre de Physique des Houches, in the premises of the Ecole de Physique Théorique, in the French Alps, outside the Summer School usual sessions.

Cette école de printemps fait partie des nouvelles activités du Centre de Physique des Houches, dans les locaux de l'Ecole de Physique Théorique, dans les Alpes Françaises, en dehors des sessions habituelles de l'Ecole d'été.

### Organizing Committee of the Centre :

M.T. BEAL-MONOD      Physique des Solides, Université de Paris-Sud, 91405 ORSAY, France.  
A. LANDESMAN  
D. THOULOZE      C.R.T.B.T., C.N.R.S., 25, av. des Martyrs, 38042 GRENOBLE, France.



# LES HOUCHEES



SESSION XLI

NATO ADVANCED STUDY INSTITUTE

8 août - 2 septembre 1983

école d'été de physique théorique

## NAISSANCE ET ENFANCE DES ÉTOILES BIRTH AND INFANCY OF STARS

### Star formation on Galactic Scales

J. LEQUEUX, Meudon, P.G. MEZGER, Bonn, J.L. PUGET, ENS and Meudon  
Properties and Evolution of Molecular Clouds

M. GUELIN, IRAM, Grenoble, W.D. LANGER, Princeton, J. SILK, Berkeley  
Observations of Protostars and of their Surroundings

C.G. WYNN-WILLIAMS, Hawaii, S.T. RIDGWAY, Kitt Peak, Tucson  
Young stars and their Surroundings

G.H. HERBIG, Santa Cruz, D. DOWNES, IRAM, Grenoble  
Protostars, Planets and the Solar System

H.W. YORKE, Göttingen, W.M. TSCHARNUTER, Wien, G.E. MORFILL, Garching  
New Developments and Observational Prospects

H.J. HABING, Leiden, C.H. TOWNES, Berkeley

The above courses cover most of the aspects of the formation and of the early evolution of stars. The lectures keep a balance among the properties of interstellar clouds and of young stellar objects inferred from observations, the theoretical modelling of their evolution, and the opportunities which will be created by new observing facilities. The courses are mainly addressed to young astronomers working in the above fields at the pre- or post-doctoral level, but may also be of interest for researchers working in related fields. Although detailed studies of the formation of the Solar System will not be covered, special attention will be given to its relation to the general problem of star formation. A series of additional seminars will be organized on special objects and other related topics.

*Les Houches is a resort village in the Chamonix valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at an altitude of 1000 m. It is above the village, facing the Mont-Blanc range. It is ideally located for mountaineering, hiking or touring as well as for intellectual work. Accommodation and meals are provided within the School for both participants and lecturers, the fee of 2400 FF covering all expenses. Some possibilities for grants exist. Participants who intend to rent lodgings should directly inquire at:  
Office du Tourisme, 74310 Les Houches (tel. (50) 54 40 62). The School is affiliated with the University of Grenoble, and this session is a NATO Advanced Study Institute.*

*Admission forms and additional informations are available from:*

ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE  
74310 LES HOUCHEES, FRANCE  
Telephone: (50) 54 41 33 and 54 40 69

*Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1983.*

*The first session of 1983 will be entitled: Relativity, Groups and Topology.*

*Two sessions will be held in 1984 one on the molecular organization of genes and the programming of cellular differentiation, the other on the mathematical physics of critical phenomena.*



# LES HOUCHES



SESSION XL

NATO ADVANCED STUDY INSTITUTE

27 juin - 4 août 1983

école d'été de physique théorique

## RELATIVITÉ, GROUPE ET TOPOLOGIE RELATIVITY, GROUPS AND TOPOLOGY

**Topology with Applications to Quantum Field Theory, C.J. ISHAM,**

Imperial College, London  
**Special Topics in Quantum Field Theory of Relevance to Quantum Gravity, R. JACKIW,**  
M.I.T.

**Positive Energy Theorems, Y. CHOQUET-BRUHAT,** Université de Paris  
**Quantum Field Theoretical Methods in Quantum Gravity, B. DE WITT,**

University of Texas

**Renormalization of Gauge Theories, C. BECCHI,** Università di Genova  
**Significance and Future of Quantum Gravity, S. HAWKING,** University of Cambridge

**Supergravity: Methods, Goals and Successes, P. van NIEUWENHUIZEN,**  
S.U.N.Y. Stony Brook

**Supergravity: Group Manifold Approach, T. REGGE,** Università di Torino

By focusing on quantum gravity this session aims to display the broad theoretical setting of modern quantum field theory, embracing general relativity, group theory and topology. Quantum gravity is the most difficult of all quantum field theories. It demands the full arsenal of weapons developed in gauge theories, and more. The lectures will be pedagogically oriented and designed to help students use these weapons in research. There will also be a course on the **History of Quantum Field Theory** as well as seminars on special topics: Hidden symmetries and unusual cancellations; helicity amplitudes; nonperturbative techniques and unconventional summations; measurement theory; ... Contributions to this programme are expected from R. JOST, A. PAIS, B. ZUMINO ...

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Office du Tourisme, 74310 Les Houches (tel. (50) 54 40 62). The School is affiliated with the University of Grenoble, and this session is a NATO Advanced Study Institute.*

*Admission forms and additional informations are available from:*

ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE  
74310 LES HOUCHES, FRANCE  
Telephone: (50) 54 41 33 and 54 40 69

*Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1983.*

*The second session of 1983 will be entitled Birth and Infancy of Stars.*

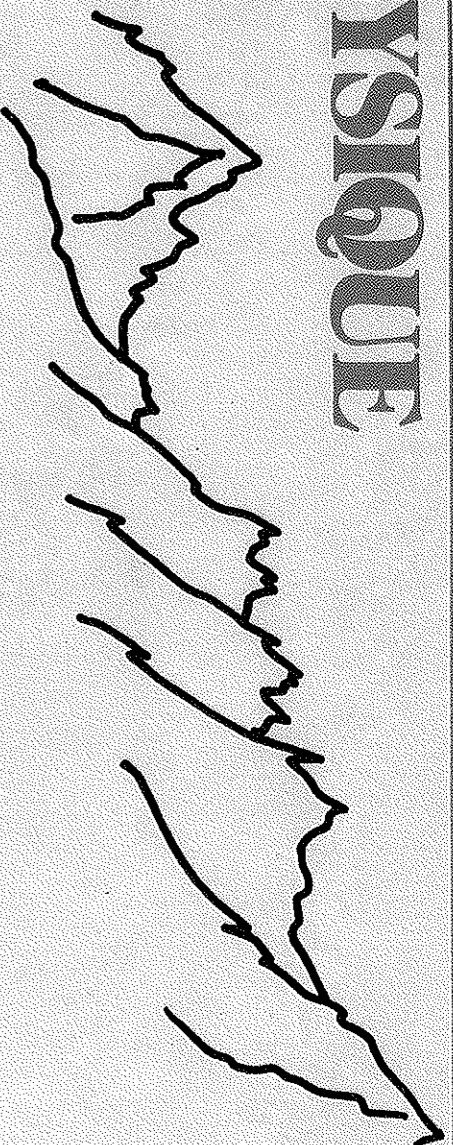
*Two sessions will be held in 1984 one on the molecular organization of genes and the pro-grammation of cellular differentiation, the other on the mathematical physics of critical phenomena.*



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique

74310 LES HOUCHEES  
France



## Cristaux colloïdaux Colloidal crystals

du 13 au 24 Février 1984  
February 13-24, 1984

This workshop will focus on systems showing translational or orientational order on colloidal scales :

- aqueous or non aqueous suspensions of polymeric, mineral or virus particles
- cholesteric (blue) phases
- lyotropic liquid crystals
- natural or synthetic opals

Topics to be discussed will include : chemistry, particle interactions, structures and phase transitions in 2 and 3 dimensions, non equilibrium phenomena, optical and mechanical properties, light scattering, crystal growth and forms.

### Organizing Committee :

S. ALEXANDER, P. CHAIKIN, P. CLADIS, N. CLARK, J. FRIEDEL, S. HACHISU,  
M. KLEMAN, R.H. OTTEWILL, P. PIERANSKI, P. PINCUS, F. ROTHEN,  
J.V. SANDERS.

### Among the Contributors will be :

B.J. ACKERSON, P.M. ADLER, J. CHARVOLIN, J. FINNEY, J.P. HANSEN,  
H. LEKKERKERKER, D.W. SCHAEFFER, A. VRIJ and the members of the  
Organizing Committee.

Participants will be requested to pay a fee of 1800 F.F. covering board  
and lodging at the Centre.

Attendance is limited to 60 participants.

The Centre de Physique will hold in 84 two other workshops :

- 1 — Combustion, flames and fires March 1-15, 1984
- 2 — Fractals March 19-30, 1984

For further information, please contact

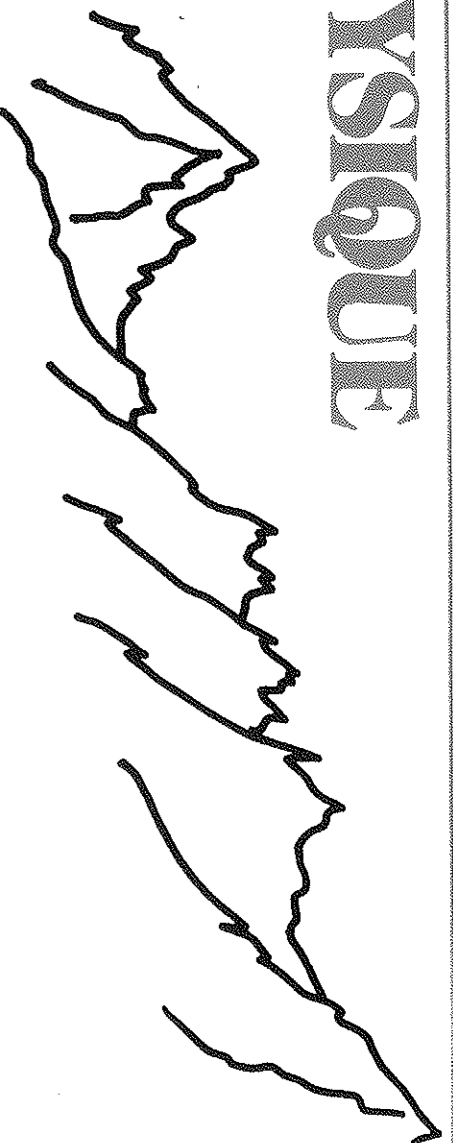
Nino BOCCARA Directeur du Centre de Physique D.PhG/PSRM  
Orme des Merisiers C.E.N.-SACLAY 91191 Gif-sur-Yvette Cedex France



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique

74310 LES HOUCHEES  
France



**Combustion, flammes et feux  
Combustion, flames and fires**

**du 1<sup>er</sup> au 15 Mars 1984**

**March 1-15, 1984**

The main objective of this workshop is to contribute to the development of combustion science and technology by bringing together specialists in fields such as :

- flame propagation
- fires and explosion
- front dynamics
- turbulent flows
- turbulent combustion
- non linear theory
- numerical methods

## **Scientific Directors :**

<b>M. BARRERE</b>	<b>ONERA - France</b>
<b>P. CLAVIN</b>	<b>Université de Provence - France</b>
<b>F.A. WILLIAMS</b>	<b>Princeton - USA</b>

## **Among the Contributors will be :**

**K. ALBINI, B. BILGER, A. CHORIN, J. CLARKE, P. FIFE, J. LEE, A. LIÑAN,  
B. NICHOLLS, S. ORZAG\*, Y. POMEAU, E. SIGGIA\*, G. SIVACHINSKY,  
B. SPALDING, Ya. ZELDOVICH\*.**

\* Conditional.

Participants will be requested to pay a fee of 1800 F.F. covering board and lodging at the Centre.

Attendance is limited to 60 participants.

The Centre de Physique will hold in 84 two other workshops :

1 — Colloïdal Crystals February 13-24, 1984

2 — Fractals March 19-30, 1984

For further information, please contact

**Nino BOCCARA** Directeur du Centre de Physique D.PhG/PSRM  
Orme des Merisiers C.E.N.-SACLAY 91191 Gif-sur-Yvette Cedex France

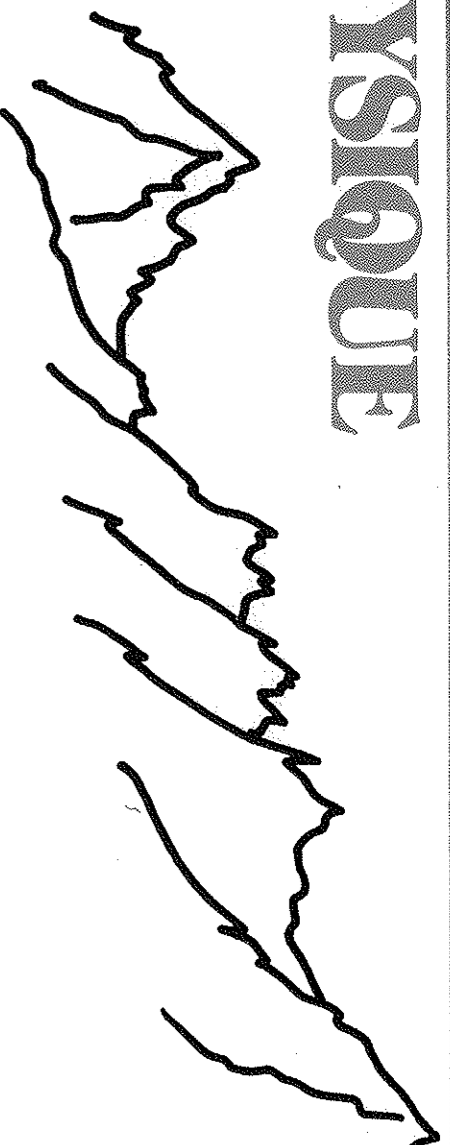


# CENTRE DE PHYSIQUE DES HOUCHEs

école de physique théorique

74310 LES HOUCHEs

France



## Les fractales dans les Sciences Physiques

### Fractals in the Physical Sciences

du 19 au 30 Mars 1984

March 19-30, 1984

Fractals are geometric shapes which have an infinite number of characteristic scales. Fractal geometry has become a unifying factor in the Physical Sciences because many complex systems of interest today involve features that span many scales. Examples include polymer shapes and dynamics, vortex structures in turbulent flows, internal waves in the ocean, intermittent currents in xerographic films, trajectories in chaotic non-linear systems, the shape of percolating clusters, etc. The purpose of this workshop is to survey new results and exchange ideas on the mathematics and the applications of fractal geometry. It proposes to bring together specialists in diverse areas of physics and in related areas of mathematics.

### Scientific Committee :

**B. MANDÉLBROT** (IBM, Yorktown), **M. MENDES FRANCE** (Bordeaux),  
**J. PEYRIÈRE** (Orsay), **M. SHLESINGER** (Washington), **G. TOULOUSE** (E.N.S.)

### Others invited and expected to contribute include :

**A. AHARONY**, **S. ALEXANDER**, **J.P. ALLOUCHE**, **S. AUBRY**, **M. BERRY**,  
**A. BRUCE**, **B. DERRIDA**, **P.G. DE GENNES**, **Y. GEFEN**, **J. GIVEN**,  
**P. GRASSBERGER**, **E. GUYON**, **C.J. ITZYKSON**, **M. KLEMAN**,  
**A. LE MEHAUTE**, **S. LOVEJOY**, **E. MONTROLL**, **R. ORBACH**, **I. PROCACCIA**,  
**R. RAMMAL**, **Y. SAWADA**, **B. SOULLIARD**, **H. STANLEY**, **D. STAUFFER**, **R. VOSS**

Participants will be requested to pay a fee of 1800 F.F. covering board and lodging at the Centre.

Attendance is limited to 60 participants.

The Centre de Physique will hold in 84 two other workshops :

- 1 — Colloidal crystals February 13-24, 1984
- 2 — Combustion, flames and fires March 1-15, 1984

For further information, please contact

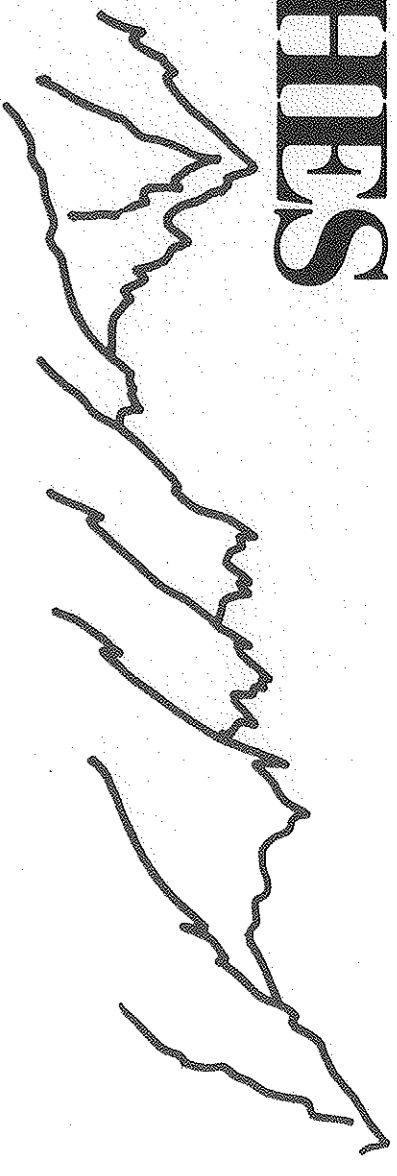
**Nino BOCCARA** Directeur du Centre de Physique D.PhG/PSRM  
Orme des Merisiers C.E.N.-SACLAY 91191 Gif-sur-Yvette Cedex France



# LES HOUCHES

SESSION XLIII  
NATO ADVANCED STUDY INSTITUTE

1<sup>er</sup> août - 7 septembre 1984



école d'été de physique théorique

## PHÉNOMÈNES CRITIQUES SYSTÈMES ALÉATOIRES THÉORIES DE JAUGE CRITICAL PHENOMENA RANDOM SYSTEMS GAUGE THEORIES

Introduction to Disordered Systems: A. THOULESS, University of Washington, Seattle  
Random Systems

Disordered Systems: Mathematical Methods  
J. FRÖHLICH, ETH Zurich, T. SPENCER, Courant Institute, N.Y.U. New York

Gauge Theories, Lattice Gauge Theories, Theoretical and Numerical Results

G. PARISI, Università di Roma

The Construction of Gauge Theory Models

D. BRYDGES, Univ. of Virginia, T. BALABAN, Harvard Univ., J. IMBRIE, Harvard Univ.

Renormalization Group Transformation, and 1/N Expansion

K. GAWEDSKI, I.H.E.S. Paris, A. KUPIAINEN, University of Helsinki

Dynamical Systems, KAM Theory: G. GALLAVOTTI, Istituto G. Castelnuovo, Roma

Stochastic Differential Equations, Large Deviations: S. VARADHAN, Courant Institute, New York

The Use of Computers in Mathematical Physics: O.E. LANFORD III, I.H.E.S. Paris

This session intends to offer a careful introduction to some of the major problems, ideas, methods, and results concerning critical phenomena, random systems, and gauge theories. Although the main emphasis will be on the mathematical physics aspects, the lectures will range from phenomenological physics to pure mathematics, and on a more technical level, from numerical model calculations to analytical and computer assisted proofs. The main purpose of the course will be to offer young scientists (less than 99 years of age), at the pre- or post-doctoral level, an introduction into the subject matter, and to guide them right to the frontier of current research. A series of seminars will be organized on special topics related to the main courses. Contributions to this program are expected from A. JAFFE, J. LEBOWITZ, E. LIEB, and others.

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Admission forms and additional informations are available from:

ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE — 74310 LES HOUCHES, FRANCE  
Telephones: (50) 54 41 33 and 54 47 65 (off season)  
54 40 69 (July 1 - September 10)

Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1984.

The first session of 1984 will be entitled Cellular and Molecular Aspects of Developmental Biology.  
Two sessions will be held in 1985 one on the Phenomenology of Elementary Processes at High Energies, the other on Imaging and Signal Processing.



# LES HOUCHES



SESSION XLII

NATO ADVANCED STUDY INSTITUTE

2 juillet - 27 juillet 1984

école d'été de physique théorique

## ASPECTS CELLULAIRES ET MOLECULAIRES DE LA BIOLOGIE DU DÉVELOPPEMENT

### CELLULAR AND MOLECULAR ASPECTS OF DEVELOPMENTAL BIOLOGY

#### BASIC BIOLOGY: Embryology, Morphogenesis, Cell Biology, Molecular Biology

F. CUZIN, Institut de Biochimie, Nice, H. EISEN, Institut Pasteur, Paris,  
N. LE DOUARIN, Institut d'Embryologie, Nogent-sur-Marne,  
B. MACH, Faculté de Médecine, Genève, D. SABATINI, School of Medicine, N.Y.U. New York

#### CELLULAR DIFFERENTIATION: SOME KEY MODELS

Primitive Eukaryotes: G. GEHRISH, Max Planck Institut, München,  
I. HIRSKOWITZ, University of California, San Francisco  
Nematodes: J. HODGKIN, University of Medical School, Cambridge

Drosophila: N.

Mouse: H. CONDAMINE, Institut Pasteur, Paris

#### ANALYSIS OF SOME INTEGRATED SYSTEMS

Neurobiology: Embryology: J. P. THIERRY, Institut d'Embryologie, Nogent-sur-Marne

Differentiation: C. GORIDS, INSERM CNRS Marseille Luminy

Synaptogenesis: J. P. CHANGEUX, Institut Pasteur, Paris

Intercellular Communications: M. LAZDUNSKI, Institut de Biochimie, Nice

Erythropoiesis: H. EISEN, Institut Pasteur, Paris

Intracellular Regulations (Endocrinology): K. R. YAMAMOTO, Univ. of California, San Francisco

#### The Immune System

Basic Elements of the Immune System: M. FOUGEREAU, INSERM CNRS Marseille Luminy

Organization of Immunoglobulin Genes: L. HOOD, Department of Biology, Caltech Pasadena

Major Histocompatibility Complex Genes: L. HOOD, Depart. of Biology, Caltech Pasadena  
B. MACH, Faculté de Médecine, Genève

Regulation Network in Immunology: J. URBAIN, Université Libre, Bruxelles

This session will focus on modern approaches in developmental biology. It will address young biologists at the post-doctoral level wishing to broaden their knowledge in biology, as well as scientists in other fields with interests in life sciences. The session will start with a short refresher course in basic biology and will proceed with the most advanced aspects of some key models that are being used to elucidate the basis of cellular differentiation. An extensive analysis of some major physiological integrated systems will also be presented. The course will consist of lectures and seminars.

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Admission forms and additional informations are available from:

ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE — 74310 LES HOUCHES, FRANCE

Telephones: (50) 54 41 33 and 54 47 65 (off season)

54 40 69 (July 1 - September 10)

Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1984.

The second session of 1984 will be entitled *Critical Phenomena, Random Systems, Gauge Theories*.

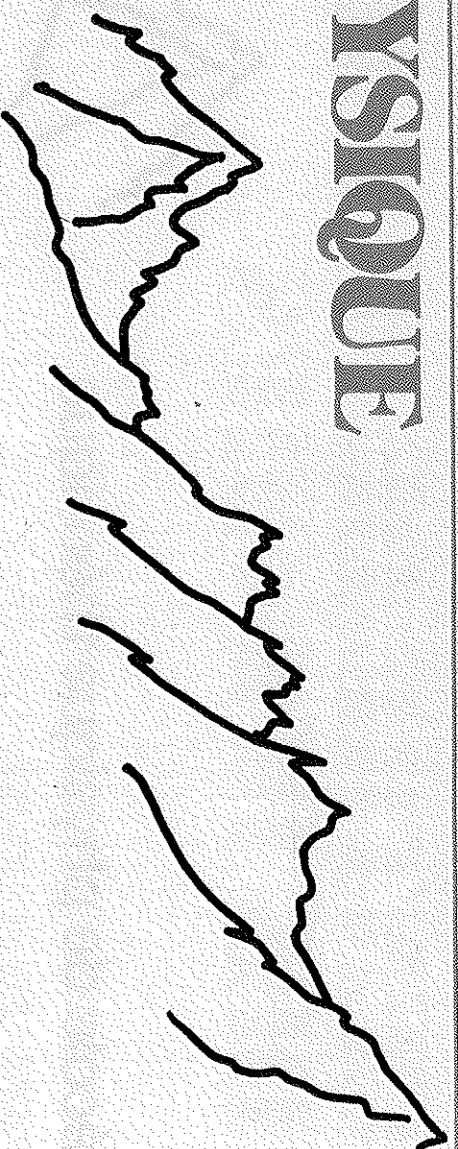
Two sessions will be held in 1985 one on the *Phenomenology of Elementary Processes at High Energies*, the other on *Imaging and Signal Processing*.



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique

74310 ESTHOUCHES  
France



## **Disordered systems and biological organization (Nato advanced research workshop) February 25 — March 8, 1985**

Recent results in dynamical systems, both discrete and continuous, and in the physics of spin glasses have led to progress in the understanding of complex systems. Such progress includes for instance the use of techniques derived from spin glass theory in combinatorial optimization, and their application to computer aided design. Learning and recognition processes, in computer science and in theoretical neurobiology, have been interpreted in terms of the convergence of dynamic processes. Similar interpretations have been proposed for the origin of life or the evolution of species. The purpose of the workshop is to exchange information about the different methods-numerical simulation, networks of automata, Markov random fields, algorithms-used by physicists, mathematicians or theoretically minded biologists, and to survey the most recent results.

### **Scientific Committee :**

**E. BIENENSTOCK (Orsay), J. DEMONGEOT (Grenoble),  
F. FOGELMAN (Paris), C. VON DER MALSBURG (Göttingen),  
G. WEISBUCH (ENS).**

### **Invited speakers :**

**P. ANDERSON, J.P. CHANGEUX, L. COOPER, S. GEMAN, E. GOLES,  
J. HOPFIELD, B. HUBERMAN, S. KAUFFMAN, S. KIRKPATRICK,  
B. LACOLLE, R. MAYNARD, L. PELITI, P. PERETTO, F. ROBERT,  
M. TCHUENTE, G. TOULOUSE, G. VICHNIAC.**

Participants will be requested to pay a fee of 3000 F.F. covering registration board and lodging at the Centre. Attendance is limited to 60 participants. Deadline for application is November 15, 1984.

The Centre de Physique will hold in 1985 three other meetings :

- 1 — Large scale transport processes in oceans and atmosphere, February 11-22, 1985.

- 2 — Heterojunctions and semiconductor superlattices, March 12-21, 1985.

- 3 — Physics of finely divided matter, March 25 - April 5, 1985.

To apply send a brief C.V. and recent publications to

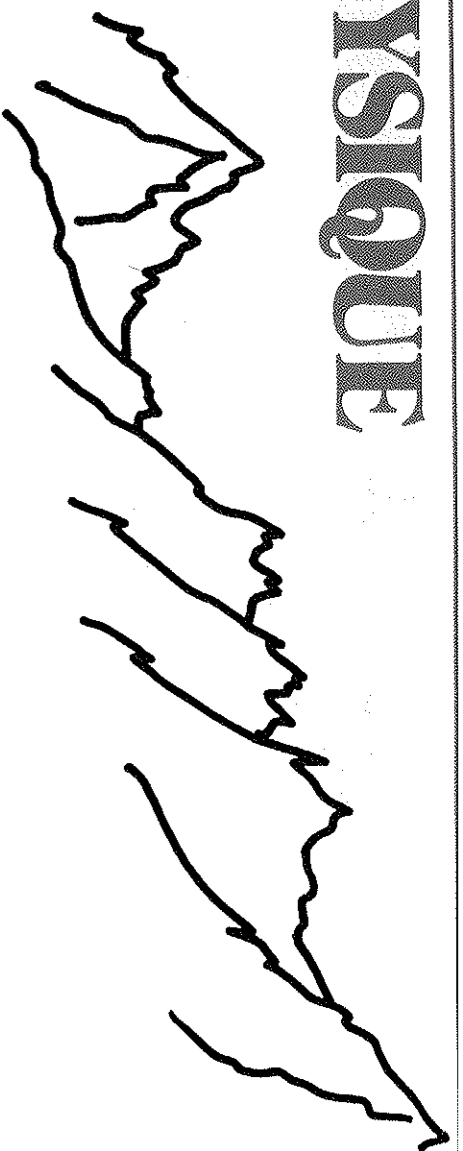
Nino BOCCARA Directeur du Centre de Physique DPhG/PSRM



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique

74310 LES HOUCHEES  
France



## Heterojunctions and semiconductor superlattices March 12-21, 1985

Recent advances in epitaxial growth and in molecular beam epitaxy have made possible the development of very thin multilayer structures of III-V compounds. These new structures include notably the semiconductor heterojunctions and superlattices. From a fundamental point of view, the modulation doped heterojunctions and superlattices are the subjects which are currently among the most important in the field of semiconductor physics. The lectures, mostly given in french, will cover the fundamental aspects of these materials, their technology and some of their applications.

### Scientific Committee :

G. ALLAN (CNRS, ISEN, Lille), G. BASTARD (CNRS, ENS, Paris),  
M. LANNOO (CNRS, ISEN, Lille), M. VOOS (CNRS, ENS, Paris)

### The lectures will be given by :

G. ABSTREITER, M. ALTARELLI, D. BOIS, F. CAPASSO, L.L. CHANG,  
B.de CREMOUX, C. DELALANDE, L. ESAKI, C.T. FOXON,  
P.M. FRILINK, E. GORNIK, Y. GULDNER, B. JUSSERAND, J.C. MAAN,  
J.-Y. MARZIN, J. MASSIES, A. MILLIÖN, J.F. PALMIER, D. PAQUET,  
B. SOULLARD, F. STERN, H.L. STÖRMER, B. VINTER, P. VOISIN

Participants will be requested to pay a fee of 3500 F.F. which includes board and lodging at the Centre.  
Attendance is limited to 60 participants.

- The Centre de Physique will hold in 1985 three other meetings :
- 1 — Large scale transport processes in oceans and atmosphere, February 11-22, 1985.
  - 2 — Disordered systems and biological organization, February 26 - March 8, 1985.
  - 3 — Physics of finely divided matter, March 25 - April 8, 1985.

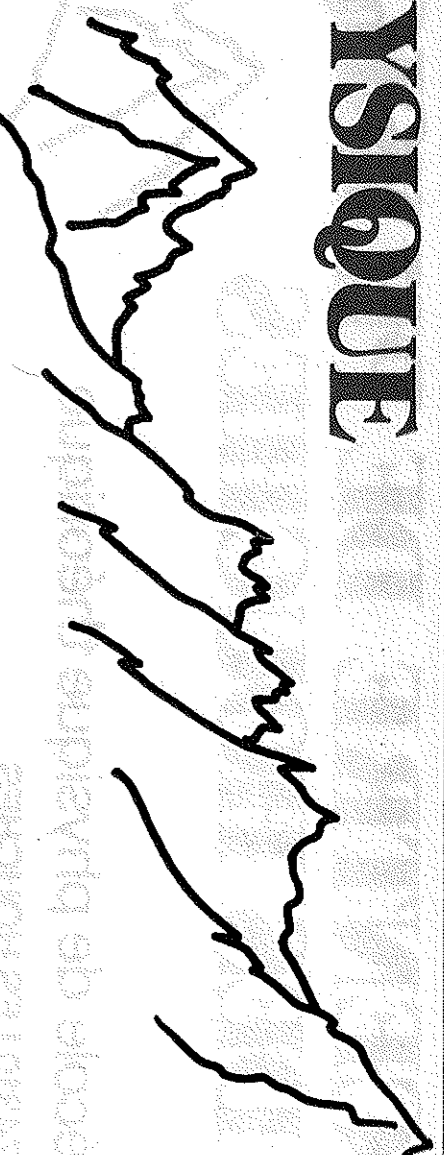
To apply send a brief C.V. and recent publications to  
Nino BOCCARA Directeur du Centre de Physique DPhG/PSRM  
C.E.N. SACLAY 91191 GIF-sur-YVETTE Cedex France



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique

74310 LES HOUCHEES  
France



## Physics of finely divided matter March 25 – April 5 1985

Polymers, aggregates and gels have many properties in common with porous media. These systems produce non homogeneous structures on a wide range of length scales. Recent advances in statistical physics have exploited their scale invariance to deduce simple hydrodynamic and diffusion properties. The purpose of the workshop is to bring together experts in different areas of physics, chemistry, geology and from industry. The following topics will be covered : structure, mono-and biphasic flows, mechanical and dielectric properties, diffusion, filtration, wetting...

### Scientific Committee :

**H. BENOIT** (Strasbourg), **S. CANDAU** (Strasbourg), **M. DAOUUD** (Saclay)  
**P.G. de GENNES** (Paris), **E. GUYON** (Paris),  
**T.A. WITTEN, Jr** (Exxon - Annandale)

### Other invited speakers :

**S. ALEXANDER**, **W. BURCHARD**, **A. CONIGLIO**, **J. DODDS**, **K. DUŠEK**,  
**M.H. ERNST**, **F. FAMILY**, **S. FENEUILLE**, **J.P. HULIN**, **C. JACQUIN**,  
**A. KELLER**, **L. LEIBLER**, **P. PINCUS**, **Y. POMEAU**, **M. RINAUDO**,  
**D. SCHAEFFER**, **D. SCHWEICH**, **H.E. STANLEY**, **D. STAUFFER**,  
**J. VANNIMENUS**, **D. WILKINSON**

Participants will be requested to pay a fee of 3 000 F.F. which includes board and lodging at the Centre during the workshop.

Attendance is limited to 60 participants.

The Centre de Physique will hold in 1985 three other meetings :

- 1 — Large scale transport processes in oceans and atmosphere, February 11-22, 1985.
- 2 — Disordered systems and biological organization, February 26 - March 8, 1985.
- 3 — Heterojunctions and semiconductor superlattices, March 12-21, 1985.

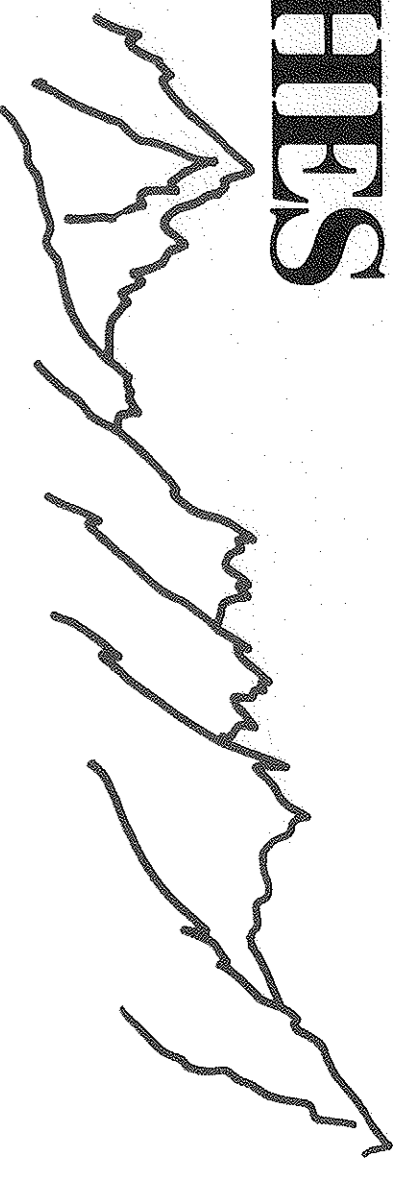
To apply send a brief C.V. and recent publications to

**Nino BOCCARA** Directeur du Centre de Physique DPhG/PSRM

C F N SACLAY 91191 GIF-sur-VALTTE Cadex France



# LES HOUCHEs



SESSION XLIV

NATO ADVANCED STUDY INSTITUTE

1<sup>er</sup> juillet – 8 août 1985

école d'été de physique théorique

## ARCHITECTURE DES INTERACTIONS FONDAMENTALES À COURTE DISTANCE

### ARCHITECTURE OF FUNDAMENTAL INTERACTIONS AT SHORT DISTANCES

**SU2 X U1 Breaking, Flavor, and other Puzzles in particle physics:**

**H. GEORGI, Harvard, USA**

**The new phenomenology:**

**I. HINCHLIFFE, Berkeley, USA**

**Supersymmetry and all that:**

**F. DYDAK, CERN, Geneva, CH**

**Physics at the pp collider:**

**M. DELLA NEGRA, LAPP, Annecy, F.; CERN, Geneva, CH**

**Recent developments in supergravity theories:**

**H. NICOLAI, CERN, Geneva, CH**

**Effective Supersymmetric theories:**

**G.G. ROSS, Oxford, U.K.**

**Superstrings:**

**L. BRINK, Göteborg, Swe.**

**Monopoles in particle physics:**

**J. PRESKILL, Caltech, USA**

**Inner space and Outer space:**

**M.S. TURNER, Chicago, Fermi Lab, USA**

**Symmetries of higher dimensional theories:**

**R. SLANSKY, Los Alamos, USA**

**Kaluza-Klein Supergravity:**

**M. DUFF, Imperial College, London, U.K.**

The aim of these courses is to examine the possible structures that might be encountered at shorter distances. The emphasis will be on the experimental consequences these theoretical constructs might have, on earth and elsewhere. The Electroweak theory will be used as the starting point of this exploration. The formulation of a phenomenological theory below Planck mass, the role of cosmology as a discriminant between possible theories are some of the topics to be covered. Since the road to better symmetries, i.e. supersymmetry, is paved in higher dimensions, the feasibility of such theories will also be explored. Several additional seminars will be organized. In particular P. Sikivie (Florida, USA) on axions. Others include D. Schramm (Chicago, USA), and E. Witten (Princeton, USA). The session is open to both high energy theorists and experimentalists who wish to familiarize themselves with current theoretical proposals and their confrontation with the evolving experimental situation.

*Les Houches is a resort village in the ChamoniX valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at an altitude of 1000 m. It is above the village, facing the Mont-Blanc range. It is ideally located for mountaineering, hiking or touring as well as for intellectual work. Accommodation and meals are provided within the School for both participants and lecturers. A financial contribution of FF4300. — is requested from each participant. Some possibilities for grants exists. Participants who intend to rent lodgings should directly inquire at: Office du Tourisme, 74310 Les Houches (tel. 50/54 40 62). The School is affiliated with the University of Grenoble. This session is a NATO Advanced Study Institute.*

*Admission forms and additional informations are available from:*

**ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE – 74310 LES HOUCHEs, FRANCE**

**Telephones: 50/54 41 33 and 54 47 65 (off season)**

**54 40 69 (July 1 – September 10)**

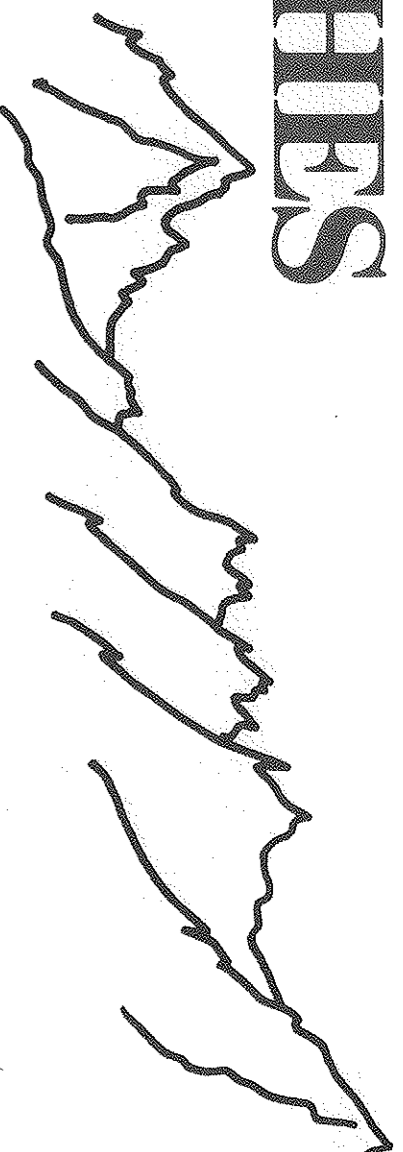
**Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1985.**

*The first session of 1985 will be entitled Architecture of Fundamental Interactions at Short Distances.*

*Two sessions will be held in 1986 one on Disordered Systems, the other on Atomic Physics of Strongly Ionized Atoms.*



# LES HOUCHES



SESSION XLV

NATO ADVANCED STUDY INSTITUTE

12 août - 6 septembre 1985

école d'été de physique théorique

## TRAITEMENT DU SIGNAL SIGNAL PROCESSING

### THEORY:

Statistical Time Series Analysis, Random Function:

B. PICINBONO, E.S.E., Paris, F.

Detection and Estimation Theory:

L. SCHARF, Rhode Island Univ., USA

Linear and Non Linear Filtering:

T. KAILATH, I.S.L., Stanford, USA

Time Frequency Representation:

non parametric representation,

W. MECKLENBRAUKER, Tech. Univ., Vienna, A.

parametric representation:

Y. GRENIER, E.N.S.T., Paris F.

### APPLICATIONS

Adaptive Systems:

T.S. DURRANI, Univ. Strathclyde, U.K.

Spectrum Estimation:

S. KAY, Rhode Island Univ., USA

Digital Signal Processing:

V. CAPPELLINI, Inst. Research

on Electromagnetic Waves, Firenze, I.

Image Processing and Reconstruction:

A. VENETSANOPOULOS, Toronto, Canada

Array Processing, Time Delay Estimation:

J.F. BOEHM, Ruhr Univ., Bochum, FRG

G.C. CARTER, N.U.S.C., New London, USA

### TECHNOLOGY

Architecture of Signal Processing Systems: S.Y. KUNG, U.C.L.A., USA;

S. REDDAWAY, I.C.L. Ltd, U.K.

Fast Algorithms for Signal Processing:

C. GUEGUEN, E.N.S.T., Paris, F.

This session intends to offer a synthetic presentation of the state of art in Signal Processing from the most recent developments of theoretical backgrounds to the most important fields of applications and the new technical aspects in system and algorithm design. The aim of the session is to allow specialists of all the areas of Signal Processing to get a clear and global view of the new challenging problems faced by the current development of signal processing taking into account the simultaneous growth of fundamental discoveries, the impulsive effect of users applications and of new hardware and software technologies. S. KAY, V. CAPPELLINI, G.C. CARTER, C. GUEGUEN and others will contribute to enlighten the new frontiers in this fast growing field.

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Admission forms and additional informations are available from:

ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE - 74310 LES HOUCHES, FRANCE

Telephones: 50/54 41 33 and 54 47 65 (off season)

54 40 69 (July 1 - September 10)

Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1985.

The first session of 1985 will be entitled Architecture of Fundamental Interactions at Short Distances.

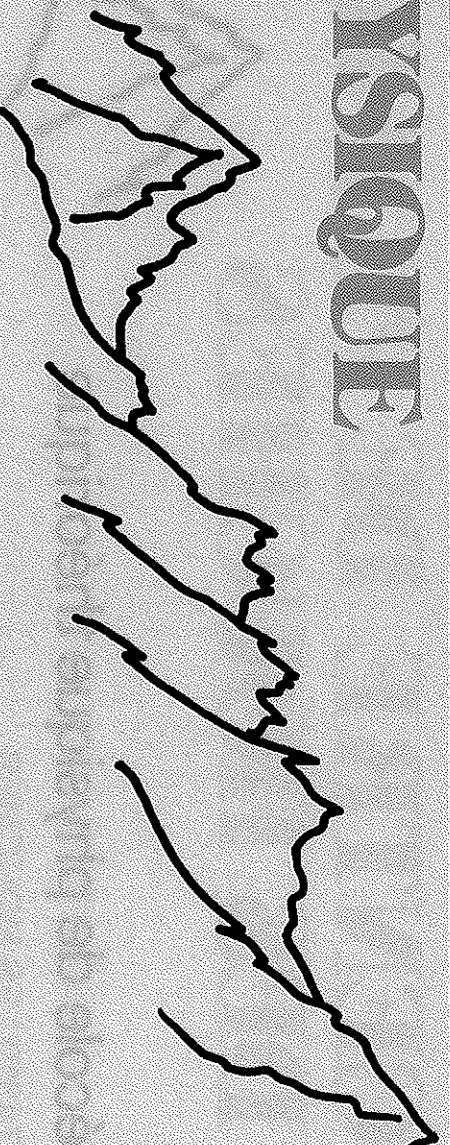
Two sessions will be held in 1986 one on Disordered Systems, the other on Atomic Physics of Strongly Ionized Atoms.



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique

74310 LES HOUCHEES  
France



## HYDROCARBURES AROMATIQUES POLYCYCLIQUES ET ASTROPHYSIQUE

Février 17 - 22, 1986

Ce séminaire est une rencontre pluri-disciplinaire entre chimistes, photophysiciens et astrophysiciens. Les thèmes sont :

- |  |  |
|--|--|
| <b>A) Hydrocarbures Aromatiques Polycycliques (HAP) et Matériaux Graphitiques</b>  | <b>B) HAP et Matériaux Graphitiques en Astrophysique</b>   |
| <ul style="list-style-type: none"><li>● Structure et chimie du graphite, propriétés de surface.</li><li>● Etudes expérimentales sur les agrégats et grains graphitiques.</li><li>● Structure et chimie des HAP.</li><li>● Photophysique et photochimie des molécules de HAP isolées.</li></ul> | <ul style="list-style-type: none"><li>● Molécules et grains interstellaires, introduction.</li><li>● Identification des HAP dans les spectres IR astronomiques.</li><li>● Rôles des HAP dans l'émission IR des galaxies.</li><li>● HAP et la courbe d'extinction interstellaire.</li><li>● Origine des bandes diffuses interstellaires ?</li></ul> |

Les orateurs de chaque communauté scientifique seront invités à rester accessibles aux autres communautés et à n'utiliser des termes et des concepts spécialisés qu'après les avoir introduits. Le séminaire comportera des papiers invités et des contributions. Une part importante du temps sera consacrée aux discussions.

### COMITÉ D'ORGANISATION

**A. BESWICK, L. D'HENDECOURT, J. FRIEDEL, S. LEACH, A. LÉGER, A. OMONT,  
N. PANAGIA, J.L. PUGET, W. SCHMIDT, M. SCHOTT.**

### PARMI LES ORATEURS :

**J. JORTNER, S. MUKAMEL, P. JOYES, P. THADDEUS, M. JURA, W.W. DULEY,  
D.A. WILLIAMS, L. ALLAMANDOLA, W. KRATCHMER, A. BORGHESI, G. VAN DER ZWET**  
et des membres du Comité d'Organisation

L'inscription et l'hébergement au Centre seront de 2200 FF.  
L'assistance sera limitée à 50 personnes.

Pour poser votre candidature, envoyer une liste de publications ayant trait à ce domaine et indiquez si vous souhaitez donner une communication, à :

**A. LÉGER - G.P.S. Tour 23 - 4 place Jussieu - 75251 Paris Cedex 5  
avant le 15 décembre 1985.**

Le Centre de Physique organise, en 1986, trois autres réunions :

- 1 — Effet biologiques des champs magnétiques statiques : 25 février - 6 mars
- 2 — Cristaux aperiodiques : 11 - 20 mars
- 3 — La physique et la fabrication des microstructures : 25 mars - 5 avril

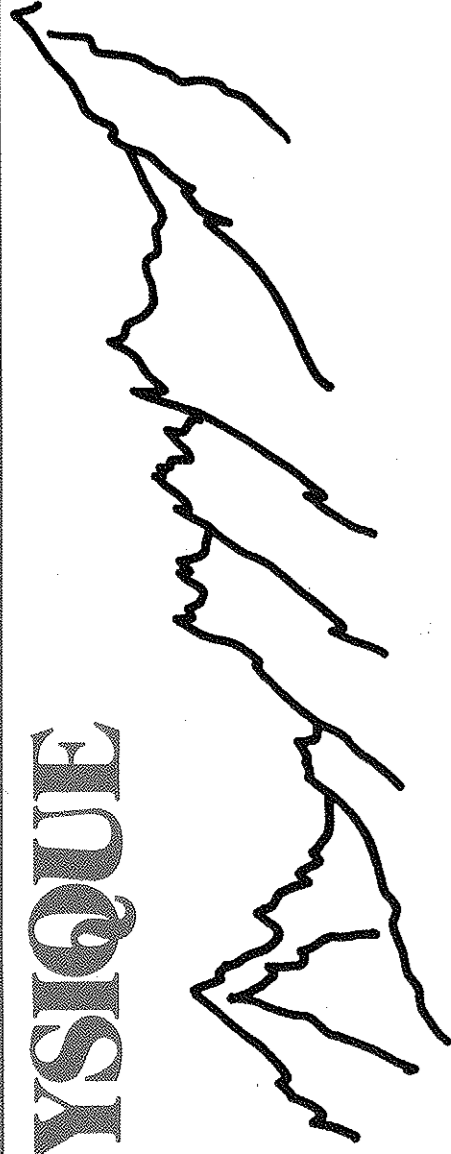
pour avoir des renseignements, écrire à : Pr. N. BOCCARA, Directeur du Centre de Physique - 74310 LESHOUCHEES - FRANCE



# CENTRE DE PHYSIQUE DES HOUCHES

école de physique théorique

74310 LES HOUCHES  
France



## BIOPHYSICAL EFFECTS OF STEADY MAGNETIC FIELDS

February 25 - March 6, 1986

The purpose of this workshop is to bring together physicists, chemists, biologists, medical scientists and representatives from industry to discuss the various aspects of interaction of steady magnetic fields with biological, macromolecular and organic matter. Topics include :

- (1) **Magnetic orientation effects of macromolecules, biological particles, membranes, micelles, organic molecules and ferrofluids in solution or in the liquid crystalline state.**
- (2) **Magnetic alignment during polymerisation, gel formation etc.**
- (3) **Magnetic separation in inhomogeneous fields.**
- (4) **Biological and chemical reactions.**
- (5) **Direct influences of magnetic fields on living systems.**
- (6) **Use of the earth's magnetic field for orientation and navigation by animals.**
- (7) **Medical applications.**

### SCIENTIFIC ADVISORY COMMITTEE

**K. DRANSFELD (Konstanz) J. KIEPENHEUER (Tübingen) G. MARET (Grenoble)  
D. MELVILLE (Preston) T.S. TENFORDE (Berkeley) C. WALCOTT (Cornell)**

### AMONG THE SPEAKERS ARE

**G. AUBERT, M. CHABRE, R. FRANKEL, M. LINDAUER, A. MAYER-HEINRICY, P. PINCUS,  
K. SCHULTEN, J. TORBET, G. WEILL**

Participants will be requested to pay a fee of 3000 F.F. which includes board and lodging at the Centre. Attendance is limited to 60 participants.

To apply send a brief c.v. and recent publications to DR. G. MARET

Hochfeld Magnetlabor, Max Planck Institut, 166x, 38042 GRENOBLE-Cedex, France

The Centre de Physique will hold in 1986 three other meetings :

- 1 — Polycyclic aromatic hydrocarbons and Astrophysics : ..... february 17-22, 1986
- 2 — Aperiodic crystals : ..... march 11-20, 1986
- 3 — The physics and fabrication of Microstructures : ..... march 25- april 5, 1986

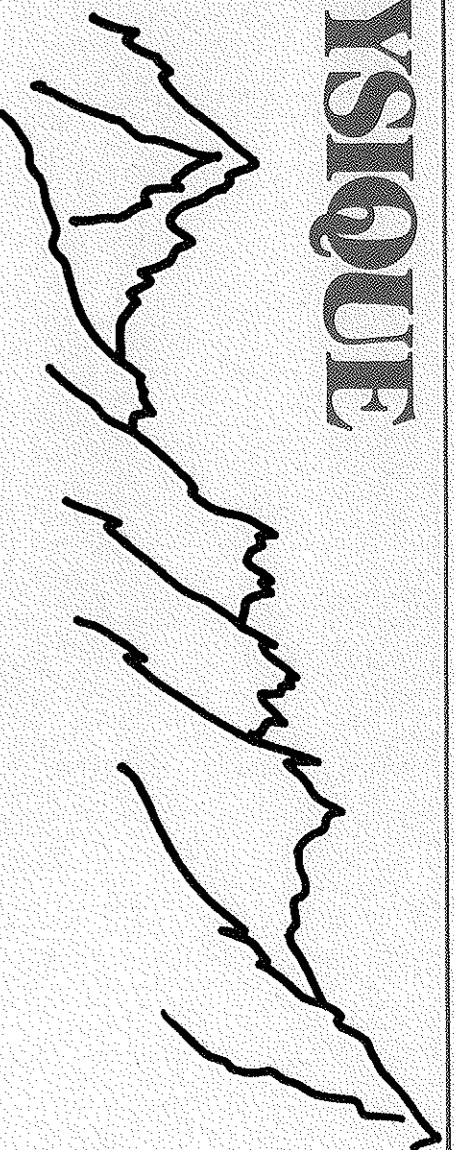
To apply write to Prof. N. BOCCARA Directeur du Centre de Physique  
74310 LES HOUCHES - FRANCE



# CENTRE DE PHYSIQUE DES HOUCHES

école de physique théorique

74310 LES HOUCHES  
France



## The physics and fabrication of microstructures March 25 - April 5, 1986

A new era in condensed matter physics is emerging with the availability of physical systems designed to, and fabricated with, nanometre precision. The transport and optical properties of such small structures will set limits to the continued miniaturisation of conventional electronic devices, will open up a new wide field of basic solid state physics and will may be offer the prospect of new qualitative device concepts.

This school aims to bring together

- i) physicists of low-dimensional structures
  - ii) engineers designing small structures
  - iii) technologists of ultra-small devices
- in order to establish and foster cross-fertilization contacts between the three groups.

### Organizing Committee :

M. AHMED (Cambridge) P. AVERBUCH (Grenoble)

M. BENSOUSSAN (Bagneux) D. BOIS (Meylan)

M. KELLY (Wembley) M. VOOS (Paris)

C. WEISBUCH (Orsay) C. WILKINSON (Glasgow)

### Invited Lecturers :

H. AHMED, J. BARKER, D. CHEMLA, R. DENNARD, C. FLYTZANNIS,

S. FURAKAWA, J. HEGARTY, A. HARTSTEIN, L.D. JACKEL, M. JAROS,

M. KELLY, R. RAMMAL, B. PANNETIER, Y. PAULEAU, J. PERROCHEAU,

G.G. ROBERTS, E. ROSENCHER, W. SKOCPOL, P. SOLOMON, W. STOBBS,

A. WEILL, D.B. Mc. WHAN, C. WILKINSON

Participants will be requested to pay a fee of 3500 F.F. which includes board and lodging at the Centre.  
Attendance is limited to 60 participants.

To apply send a brief c.v. and recent publications to Dr. C. WEISBUCH

Laboratoire Central de Recherches, Thomson CSF,  
Domaine de Corbeville - BP 10 - 91401 ORSAY France

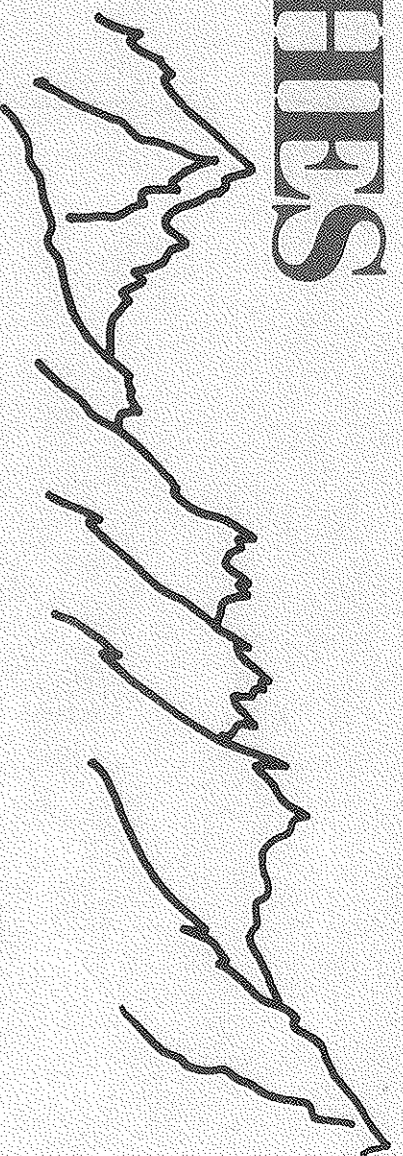
The Centre de Physique will hold in 1986 three other meetings :

- 1 — Polycyclic aromatic hydrocarbons and Astrophysics  
February 17-22, 1986
- 2 — Biophysical effects of steady magnetic fields  
February 25 - March 6, 1986
- 3 — Aperiodic crystals March 11-20, 1986

To apply write to Prof. N. BOCCARA Directeur du Centre de Physique  
74310 LES HOUCHES - FRANCE



# LES HOUCHEs



SESSION XLVI

NATO ADVANCED STUDY INSTITUTE

30 juin – 1 août 1986

école d'été de physique théorique

## LE HASARD ET LA MATIÈRE CHANCE AND MATTER

*Scientific Direction:* J. SOULETIE, C.R.T.BT.-C.N.R.S., Grenoble  
J. VANNIMENUS, E.N.S., Paris

**Applications of Percolation:** G. DEUTSCHER, Tel Aviv University  
**Random Macroscopic Media:** E. GUYON, E.P.C., Paris  
**Irreversible random aggregation:** T. WITTEN, Exxon Research, Annandale (N.J.)  
**Localization:** T.V. RAMAKRISHNAN, Banaras Hindu University  
**Waves and electrons in disordered media:** B. SOULLARD, Ecole Polytechnique, Palaiseau  
**Pattern selection:** J.S. LANGER, I.T.P., Santa Barbara  
**Non linear phenomena:** A. LIBCHABER, James Franck Institute, Chicago  
**Macroscopic quantum effects:** A.J. LEGGETT, University of Illinois, Urbana  
**Spin Glasses:** G. PARISI, Università di Roma II  
**Some applications of statistical physics:** G. TOULOUSE, E.P.C., Paris

Some of the most difficult and interesting problems set to Solid State Physicists in the last few years have arisen from questions connected with the interplay of MATTER and RANDOMNESS. These have motivated remarkable developments of the experimental and numerical simulation techniques as well as of the methods of statistical physics which appear to be theoretical tools remarkably well adapted to these problems. Far from closing the subject, these developments have opened a significant number of new avenues towards related topics of fundamental as well as of technological interest at the borderline with a number of other disciplines (Chemistry, Biology, Mechanics of random media, Computer assisted design, ...). The courses are aimed at young physicists eager to enter this very lively and competitive field, and feeling the necessity to acquire some basic knowledge or broaden their views in some of the domains where the action stands.

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Admission forms and additional informations are available from:

ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE – 74 310 LES HOUCHEs, FRANCE

Telephones: 50 54 40 69

54 41 33 and 54 47 65 (off season)

Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1986.

*The second session of 1986 will be entitled The Limits of Nuclear Stability.*

*Two sessions will be held in 1987 one on Strongly Ionized Atoms, the other on Hydrodynamics and Astrophysics.*



# LES HOUCHEs



SESSION XLVII  
NATO ADVANCED STUDY INSTITUTE  
5 août – 30 août 1986

école d'été de physique théorique

## LES LIMITES DE LA STABILITÉ NUCLÉAIRE

### THE LIMITS OF NUCLEAR STABILITY

*Scientific Direction:* H. FLOCARD, I.P.N., Orsay

**Equilibration of Collective variables:** R. BALIAN, D.Ph.T., C.E.N. Saclay  
**Nuclear dynamics at intermediate energies:** G. BERTSCH,

Michigan State University, East Lansing

**Thermodynamics of hot nuclei:** P. BONCHE, D.Ph.T., C.E.N. Saclay  
**Heavy Ion dynamics at high energies:** J. CUGNON, Université de Liège  
**Shape change and band termination in rapidly rotating nuclei:** I. RAGNARSSON,

Lund Institute of Technology

**Gamow-Teller and beta decay of proton rich nuclei in the stellar environment:** A. RICHTER,

Institut für Kernphysik, Darmstadt

**Collective vibrations at high energies:** P. RING, Technische Universität, München  
**Chaos in microscopic quantum systems:** M. ZIRNBAUER,

W.K. Kellogg Radiation Lab, Cal. Tech., Pasadena

**Trends in Heavy Ion reactions at medium energies:** H. DOUBRE, GANIL, Caen

The school is devoted to nuclear properties in the excitation energy range around 10 MeV per nucleon. These can now be investigated thanks to the new experimental facilities at Caen, Michigan and Grenoble. Their interest lies in the fact that 10 MeV is roughly the maximal energy that a nucleus can absorb without disintegrating. This energy range is thus appropriate to the study of physical phenomena accompanying the transition from a bound nucleus to a collection of evaporating nucleons and light fragments. The main mechanisms studied here concern either global or collective excitations of nuclei. A few other important mechanisms will be reviewed as well, including quarks and nuclei. We also expect contributions from B. MOTTELSON and several seminar speakers. The session is open to young researchers who intend to specialize in either theoretical or experimental work concerning this exciting and lively area of nuclear physics.

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Telephones: 50 54 40 69

54 41 33 and 54 47 65 (off season)

Complete files (admission forms and recommendation letters) must have reached this address before **1 March 1986**.

*The first session of 1986 will be entitled **Chance and Matter**.*

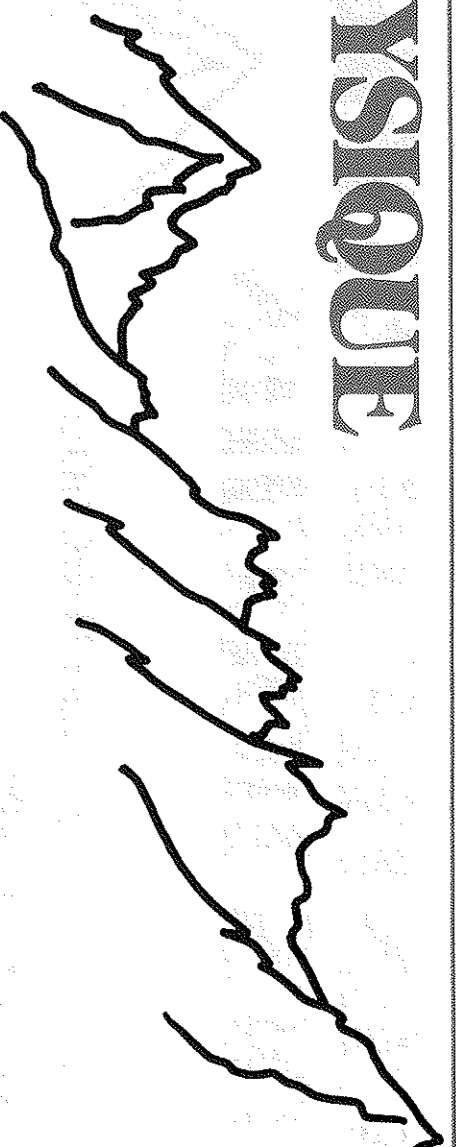
*Two sessions will be held in 1987 one on **Strongly Ionized Atoms**, the other on **Hydrodynamics and Astrophysics**.*



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique

74310 LES HOUCHEES  
France



## Physics of Amphiphilic Layers February 10-19, 1987

Amphiphilic layers play essential roles in the behavior of a great variety of disperse systems like micelles, microemulsions, vesicles. They can also exist as isolated mono or bilayers, or constitute extended liquid crystalline structures. Recent advances allow to start to unify the behaviour of these amphiphilic layers. The aim of the School is to bring together specialists in different areas of physics, chemistry biology and from industry. The following subjects will be emphasized : curvature elasticity, thermal roughening and renormalization problems, surface forces, phase transitions, critical behaviour, transport.

### Organizing Committee

P. BOTHEREL (C.R.P.P., Bordeaux), J. CHARVOLIN (Univ. Paris-Sud, Orsay)  
V. DEGIORGIO (Univ. Pavia, Italy), D. LANGEVIN (E.N.S., Paris),  
J. MEUNIER (E.N.S., Paris), S. SAFRAN (Exxon, Annandale),  
M. VEYSSIE (College de France, Paris), B. WIDOM (Baker Lab., Ithaca),  
R. ZANA (C.R.M., Strasbourg).

### Invited lecturers

B.J. ACKERSON, S. BALIBAR, L. BELLONI, G. BENEDEK, W.J. BENTON,  
P. BOTHEREL, F. BROCHARD, S.J. CANDAU, J. CHARVOLIN, S.H. CHEN,  
M. CORTI, H.T. DAVIS, P.G. DE GENNES, A. DE GEYER, V. DEGIORGIO,  
E. DICKINSON, J.M. DI MEGLIO, E. EVANS, D.F. EVANS, W. GELBART,  
E. GUYON, W. HELFRICH, M. HOFFMANN, J.S. HUANG, J.N. ISRAELACHVILI,  
M. KAHLWEIT, R. KLEIN, M. KLEMAN, S. LEIBLER, B. LINDMAN, V. LUZZATI,  
B.W. NINHAM, E. PEREZ, G. PORTE, N. PUSEY, H. RINGSDORF, D. ROUX,  
E. SACKMANN, S. SAFRAN, D. SORNETTE, J.T. TIDDY, A. VRIJ,  
J.C. WHEELER, B. WIDOM, R. ZANA.

Participants will be requested to pay a fee of 3500 F.F. which includes boards and lodging at the Center during the workshop. Attendance is limited to 60 participants.

To apply send a brief C.V. and recent publications to :  
D. LANGEVIN or J. MEUNIER  
Lab. de Physique de l'E.N.S. - Spectroscopie Hertzienne  
24, rue Lhomond - 75231 Paris Cedex 05 - FRANCE

The Centre de Physique will hold in 1987 three other winter meetings :

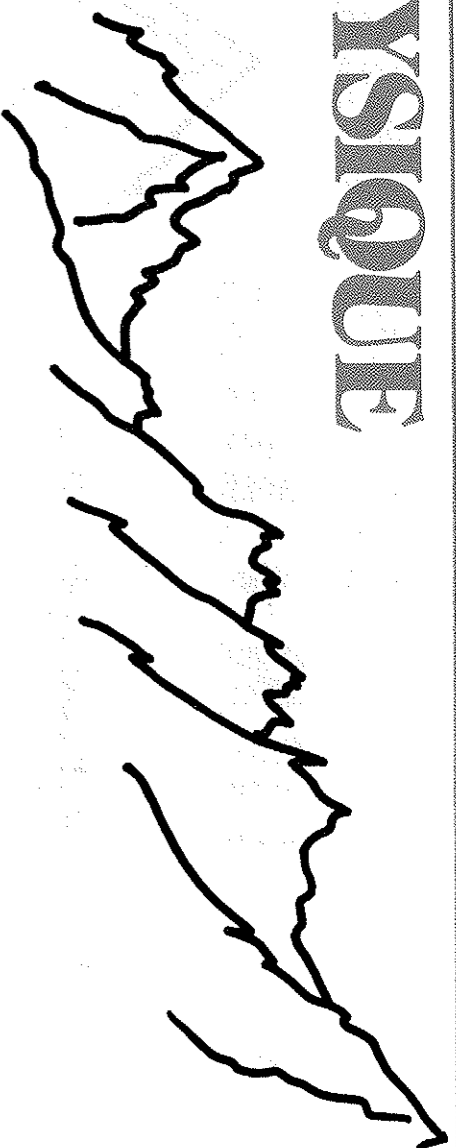
- 1 — Semiconductor interfaces : formation and properties,  
February 24 - March 6, 1987.
  - 2 — Propagation in far from Equilibrium Structures, March 10-20,  
1987.
  - 3 — Elementary Structure of Matter, March 24 - April 2, 1987.
- To apply send a brief C.V. and recent publications to :  
Professeur N. BOCCARA Directeur du Centre de Physique  
74310 Les Houches FRANCE



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique

74310 LES HOUCHEES  
France



## **Semiconductor interfaces : formation and properties** **February 24 - March 6 1987**

The trend towards the miniaturisation of microelectronic devices, the search for new exotic optoelectronic devices based on multilayers confer a crucial role to the semiconductor interfaces. Great advances have been recently achieved in the elaboration of new thin film materials and in the characterization of their interfacial properties.

The following topics will be emphasized during this school :

- i) interface formation
- ii) atomic scale characterization of the interfaces
- iii) peculiar physical properties of the interfaces and their prospective applications.

### **Organizing Committee**

**M. BENSOUSSAN (CNET, Bagnoux) J. DERRIEN (LEPES, CNRS, Grenoble)**

**G. FONTAINE (Univ. Lyon I) L. LASSABATÈRE (Univ. Montpellier)**

**G. LE LAY (CRM2, CNRS, Marseille) R. PINCHAUX (LURE, Orsay)**

**F. SALVAN (Univ. Marseille II) C. SEBENNE (Univ. P. et M. Curie, Paris)**

**M. VOOS (ENS, Paris) C. WEISBUCH (Thomson-CSF, LCR, Orsay)**

### **Invited lecturers**

**G. BASTARD, C. CALANDRA, R. CADORET, Y. CHABAL, J.P. CHEVALLIER,**

**C. COHEN, J. DERRIEN, G. FONTAINE, F. HIMPSEL, G. HOLLINGER,**

**L. LASSABATÈRE, G. LE LAY, J.M. MOISON, R. PINCHAUX, K. PLOOG,**

**E. ROSENCHER, G. ROSSI, M. SAUVAGE, F. SALVAN, C.A. SEBENNE,**

**J.B. THEETEN, C. WEISBUCH.**

Participants will be requested to pay a fee of 3 500 F.F. which includes board and lodging at the Center. Attendance is limited to 60 participants.

To apply send a brief C.V. and recent publications to Prof. G. LE LAY  
C.R.M.C.2-CNRS, Campus de Luminy, Case 913,  
13288 Marseille Cedex 09. FRANCE.

The Centre de Physique will hold in 1987 three other winter meetings :

1 — Physics of Amphiphilic Layers. February 10-19, 1987.

2 — Propagation in Far from Equilibrium Structures March 10-20,  
1987.

3 — Elementary Structure of Matter March 24 - April 2, 1987.

To apply send a brief C.V. and recent publications to  
Prof. N. BOCCARA Directeur du Centre de Physique

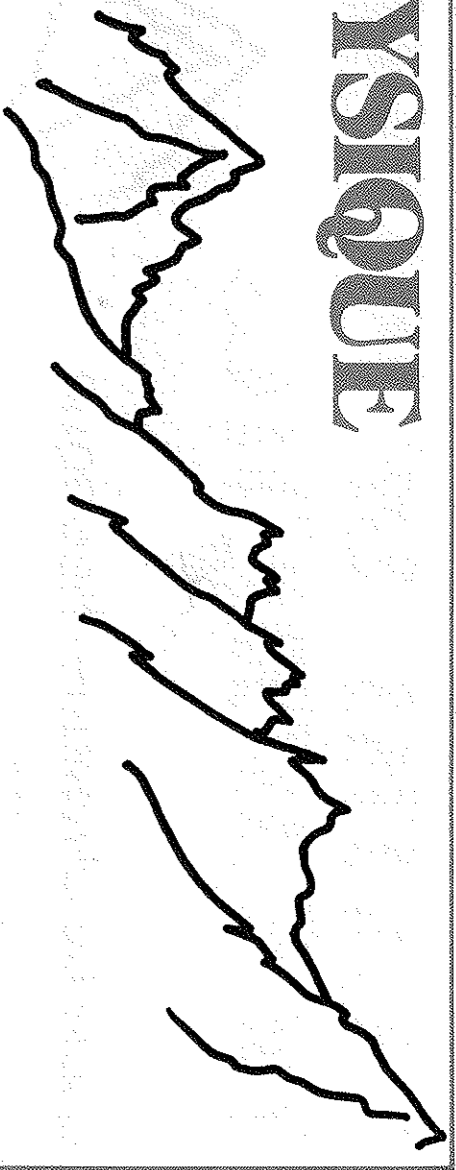
74310 Les Houches FRANCE



# CENTRE DE PHYSIQUE DES HOUCHES

école de physique théorique

74310 LES HOUCHES  
France



## “THE ELEMENTARY STRUCTURE OF MATTER” March 24 - April 2, 1987

This Workshop is devoted to the interface between Particle and Nuclear Physics : non-perturbative QCD, quark confinement, skyrmion models, quark description of hadronic interactions, strange particles, strangeness in nuclei, nucleon structure functions in nuclei, antiproton annihilation on nucleons and nuclei and quark-gluon plasmas.

Les Houches is a resort village in the Chamonix valley of the French Alps. The intent is to provide the participants with a pleasant and relaxed atmosphere in order to stimulate the discussions. The schedule will be rather flexible, so that arrangements can be made for complements, replies and round tables.

### International Advisory Committee

P. DALPIAZ (Ferrara), C.B. DOVER (Brookhaven), H. HÖGASEN (Oslo)  
M. JAMINON (Liège), G. KARL (Guelph), P.J. MULDER (NIKEHF)  
and H.J. PIRNER (CERN).

### Organizing Committee

E. ASLANIDES (Marseille), A. BOUYSSY (Orsay), B. FROIS (Saclay),  
P. GUICHON (Lyon), M. RHO (Saclay) and J.M. RICHARD (Grenoble)

### Invited speakers (already confirmed)

A.M. GREEN (Helsinki), M. JACOB (CERN), J. KUTI (La Jolla),  
H.J. LIPKIN (Rehovot), L. MAC LERRAN (Fermilab), G.A. MILLER (Seattle),  
E. MONIZ (M.I.T.), K. RITH (Heidelberg), H.R. RUBINSTEIN (Stockholm),  
J. SOFFER (Marseille), W. WEISE (Regensburg), K. YAMAZAKI (Tokyo),  
R. ZITOUN (Paris)

Participants will be requested to pay a fee of 3 100 F.F. which includes board, lodging, registration and proceedings. Attendance is limited to 60 participants.

For application, contact before October 31  
Jean-Marc RICHARD - Institut Laue-Langevin - 156X  
38042 Grenoble Cedex (France)

The Centre de Physique will hold in 1987 three other winter meetings :

- 1 — Physics of Amphilphilic Layers February 10-19, 1987.
- 2 — Propagation in Far from Equilibrium Structures March 10-20, 1987.
- 3 — Semiconductor interfaces : formation and properties February 24 - March 6, 1987.

To apply send a brief C.V. and recent publications to  
Prof. N. BOCCARA Directeur du Centre de Physique  
74310 Les Houches FRANCE



# LES HOUCHEES

SESSION XLVIII

NATO ADVANCED STUDY INSTITUTE

29 juin – 31 juillet 1987



école d'été de physique théorique

## DYNAMIQUE DES FLUIDES ASTROPHYSIQUES

### ASTROPHYSICAL FLUID DYNAMICS

*Scientific Direction: J.P. ZAHN, Observatoire de Toulouse, F*

#### GENERAL FLUID DYNAMICS:

**Introduction and Fundamentals:** E.A. SPIEGEL, Columbia University, New York, USA

**Hydrodynamical Turbulence:** M. LESIEUR, Université de Grenoble, F

**Compressible Flows:** Y. POMEAU, E.N.S. Paris, F

**Convection in the Presence of Rotation and magnetic Fields:** J. TOOMRE,

University of Colorado, Boulder, USA

**Magnetohydrodynamics:** A. POUQUET, Observatoire de Nice, F

**Rotating Fluids:** R. SALMON, University of California, San Diego, USA

**Non Linear Instabilities; Bifurcation to Chaos:** E.A. SPIEGEL,

Columbia University, New York, USA

#### ASTROPHYSICAL FLUID DYNAMICS:

**Introduction:** E.A. SPIEGEL, Columbia University, New York, USA

**Stellar Oscillations:** D.O. GOUGH, University of Cambridge, UK

**Photogas Dynamics:** E.A. SPIEGEL, Columbia University, New York, USA

**Instabilities and Turbulence in Rotating Objects:** J.P. ZAHN, Observatoire de Toulouse, F

**Dynamo Theories:** J.H. ROBERTS, U.C.L.A., USA

Most objects in the Universe are made of ionized gases whose internal motions, owing to the large dimensions of these objects, result in most cases into highly turbulent flows. Astrophysical fluid dynamics is consequently developing in quite a specific manner. It is the goal of this course to provide astrophysicists with a high level treatment of fluid dynamics adapted to their needs and review the main applications to Astrophysics. It consequently emphasizes highly turbulent phenomena. The lectures will cover in depth the main specific aspects of astrophysical fluid dynamics. Additional seminars will be mostly devoted to numerical simulations which play an increasingly important role in compensating for the lack of direct experimentation. The course addresses in particular young scientists who wish to enter this field whose present growth owes both to the improvement of observational techniques and the expectation of the new generation of supercomputers, yielding a host of new data on the dynamics of most interesting astrophysical objects and allowing for the construction of more realistic models.

*Les Houches is a resort village in the Chamoniix valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at an altitude of 1000 m. It is above the village, facing the Mont-Blanc range. It is ideally located for mountaineering, hiking or touring as well as for intellectual work. Accommodation and meals are provided within the School for both participants and lecturers. A financial contribution of FF 4100. — is requested from each participant. Some possibilities for grants exist. Participants who intend to rent lodgings should directly inquire at: Office du Tourisme, 74310 Les Houches (tel. 50 55 50 62). The School is affiliated with the University of Grenoble. This session is a NATO Advanced Study Institute.*

Admission forms and additional informations are available from:

ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE — 74310 LES HOUCHEES, FRANCE

Telephones: 50 54 40 69 / 50 54 41 33 and 54 47 65 (off season)

Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1987.

*The second session of 1987 will be entitled Highly Ionized Atoms.*

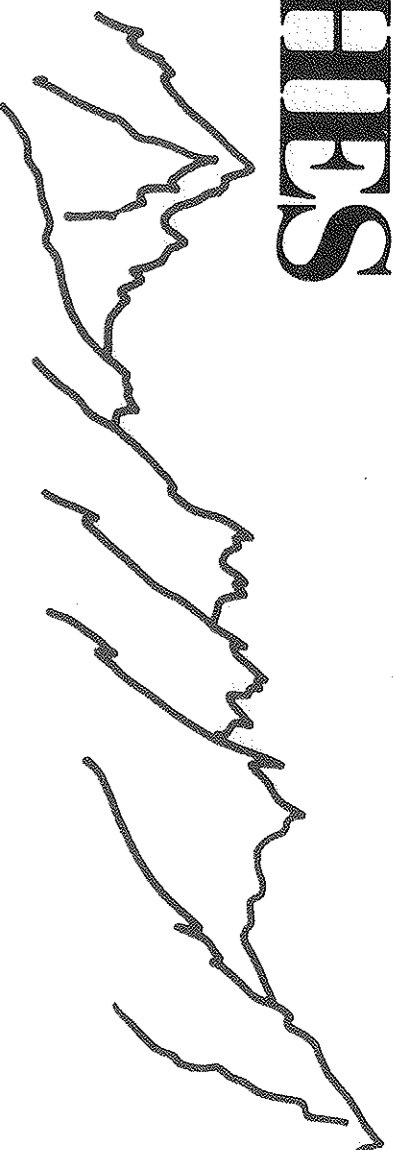
*Two sessions will be held in 1988 one on Field Theory and Statistical Mechanics, the other on Geophysical Tomography.*



# LES HOUCHES

SESSION XLIX

4 août – 29 août 1987



école d'été de physique théorique

## ATOMES TRÈS IONISÉS HIGHLY IONIZED ATOMS

*Scientific Direction:* J.P. DESCLAUX, C.E.N.G., Grenoble, F

**Relativistic Theory of Atoms:** J. SUCHER, University of Maryland, College Park, USA

**Mean Field Theory of Many Electron Systems:** K. DIETZ, University of Bonn, FRG

**Supercritical Fields:** F. BOSCH, GSI Darmstadt, J. REINHARDT, University of Frankfurt, FRG

**Atomic Collisions:** R. GAYET, A. SALIN, Université de Bordeaux I, Talence, F

**Electron Ion Collisions:** D. MOORES, P.J. STOREY, University College, London, UK

**High Energy Particles in Aligned Crystals:** J. KIMBALL, N. CUE,

University of New York, Albany, USA

Quantum electrodynamics (QED) of heavy atoms in strong fields and interactions between highly stripped ions and atoms or electrons are still challenging both theoreticians and experimentalists. Recent developments in ion sources and in the use of high energy accelerators and plasma sources for atomic physics have allowed very accurate tests of the fundamental theory of atomic structure and QED. Besides comprehensive series of lectures on these matters, the course will offer a series of seminars directed by P. JAEGLE on topics at the border line between Atomic Physics and Plasma Physics which have been stimulated by the need of atomic data for astrophysics and plasma physics. The lectures and seminars presented here aim at providing a comprehensive theoretical background for physicists willing to enter this field. Whereas the emphasis is on theory, connections with the latest experimental results will also be considered. The content of the course is such that it reaches the border of present knowledge but introductory lectures will offer young physicists the opportunity of in-depth formation.

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Admission forms and additional informations are available from:

ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE – 74310 LES HOUCHES, France

Telephones: 50 54 40 69

54 41 33 and 54 47 65 (off season)

Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1987.

*The first session of 1987 will be entitled Astrophysical Fluid Dynamics.*

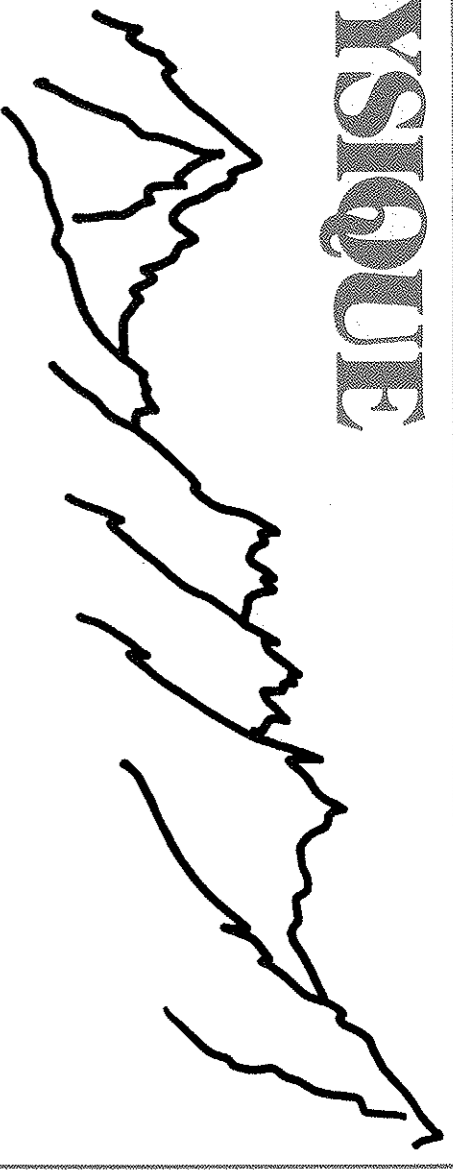
*Two sessions will be held in 1988 one on Field Theory and Statistical Mechanics, the other on Geophysical Tomography.*



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique

74310 LES HOUCHEES  
France



## “RÉSONANCE MAGNÉTIQUE NUCLÉAIRE DANS LES SOLIDES”

**3 - 16 Septembre 1987**

Les développements récents de la Résonance Magnétique Nucléaire dans les solides (haute-résolution, 2 dimensions,...) ouvrent aux physiciens et aux chimistes l'accès à tout un domaine nouveau d'informations structurales et dynamiques. Par ailleurs, pour mettre en œuvre ces méthodes, des spectromètres commerciaux sont désormais disponibles.

L'objectif de l'école est d'approfondir les bases théoriques de la RMN dans les solides, nécessaires pour :

- savoir choisir et mener le type de mesure adapté au système étudié et à l'information requise, en interpréter correctement les résultats,
- poursuivre l'étude de la dynamique des systèmes de spin et développer de nouvelles méthodes.

L'enseignement portera sur :

- les principes de la RMN et la mécanique quantique
  - les méthodes et les résultats de la RMN “large bande” (RMN continue ou par impulsions, formes de raie et relaxation)
  - la modulation cohérente des interactions et les méthodes modernes de la RMN des solides (en particulier polarisation croisée, rotation à l'angle magique, WAHUNA)
  - des applications typiques de ces méthodes en physique et en chimie.
- Une séance de posters est aussi prévue.

Cette école bénéficie de l'aide financière de la Formation Permanente ainsi que des Départements M.P.B. et de Chimie du CNRS.

### Comité scientifique

**C. BERTHIER, G. BODENHAUSEN, J. FRAISSARD, M. GOLDMAN, J. VIRLET**

### Comité d'organisation

**F. LAUPRETRE, P. SERVOZ-GAVIN, J. VIRLET, G. WEILL**

### Conférenciers principaux

**Y. AYANT, E. BELORIZKY, C. BERTHIER, B. GERSTEIN, M. GOLDMAN,  
R. HARRIS, R. KIND, A. PINES, W.S. VEEMAN**

Cette école s'adresse principalement aux chercheurs fortement impliqués dans les études mettant en œuvre les méthodes modernes de la RMN du solide, qui ont (ou auront) usuellement accès à un spectromètre de RMN pour solide.

Les frais de participation s'élèvent à 3500 F. Ils comprennent les frais de séjour en pension complète au Centre de Physique. Le nombre des participants est limité à 60.

Les demandes de participation, accompagnées d'un bref C.V. et des dernières publications sont à adresser, avant le 31 Mars 1987 à :

**J. VIRLET, Département de Physico-Chimie  
C.E.N. Saclay, 91191 Gif-sur-Yvette, Cedex**



# CENTRE DE PHYSIQUE DES HOUCCHES

école de physique théorique

74310 LES HOUCCHES  
France



## MODELLING THE OCEAN GENERAL CIRCULATION AND GEOCHEMICAL TRACER TRANSPORT

NATO Advanced Study Institute  
February 15 - 26, 1988

Ocean circulation is an essential factor for the dynamics of climate variations on time scales from months to centuries. New observation techniques and advances in modelling capabilities for the first time allow a global approach to the complex interplay of wind-driven and thermohaline circulation, and have made feasible the planning of programs such as the World Ocean Circulation Experiment. Distributions of geochemical tracers impose strong constraints on the mean ocean circulation which can be explored with inverse modelling methods.

A series of lectures will be given, with emphasis on the following topics: ocean general circulation models, parametrization of small-scale processes, properties and use of geochemical tracers, inverse models and data assimilation. The lectures are intended for young scientists who are presently interested in ocean modelling. In addition a few places may be allocated to students who would like to join the important field of ocean modelling. A strong mathematical background is required.

### Organizing committee

D. ANDERSON, University of Oxford, C. Le PROVOST, University of Grenoble,  
P. RHINES, University of Washington, J. WILLEBRAND, University of Kiel,  
C. WUNSCH, MIT, Cambridge

### Invited lecturers

K BRYAN, GFDL, Princeton ; B. BOLIN, University of Stockholm ; A. HOLLINGSWORTH,  
ECMWF, Reading ; G. HOLLOWAY, IOS Sidney ; R. KNOX, Scripps Institute, La Jolla ;  
J. MINSTER, GRGS, Toulouse ; P. RHINES, University of Washington, Seattle ;  
W. ROETHER, University of Bremen ; J. SARMIENTO, GFDL, Princeton ;  
D. WEBB, IOS Wormley ; P. WELANDER, University of Washington, Seattle ;  
C. WUNSCH, MIT, Cambridge

The costs of board and lodging is F.F. 3600 for the full period. Limited funds to support the travel costs of participants are available. Applications, including a brief C.V. and a letter of reference should be sent to :

Prof. J. WILLEBRAND, Institute for Meereskunde  
Dusternbrooker Weg. 20, D 2300 KIEL 1  
Federal Republic of Germany  
Closing date for applications : September 30, 1987.

The Centre de Physique will hold in 1988 three other winter meetings.

- 1 — Superconductivity, new models, new applications.  
March 5-11, 1988
- 2 — Universalities in condensed matter physics.  
March 15-24, 1988
- 3 — Simple molecular systems at very high density.  
March 29 - April 7, 1988

To apply send a brief C.V. and recent publications to :

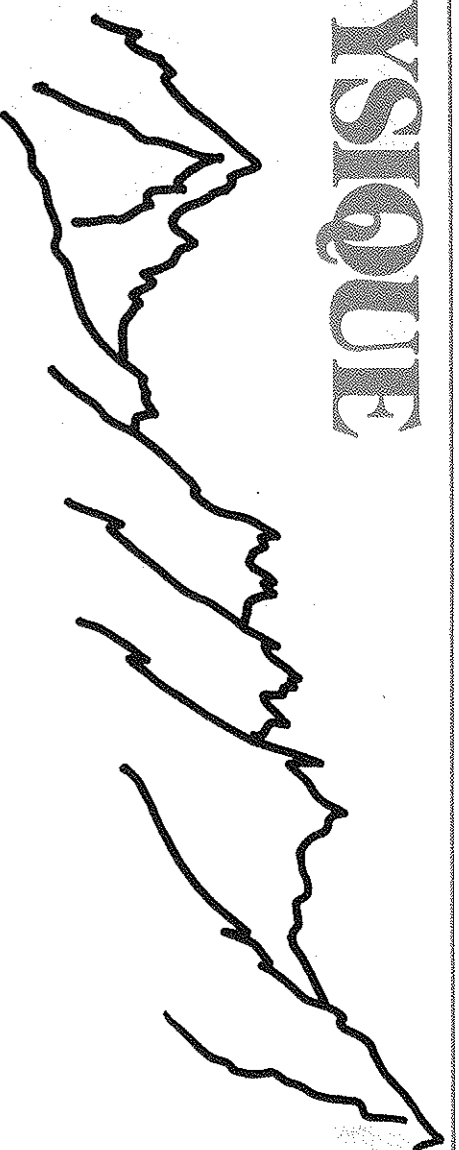
Prof. Nino BOCCARA Directeur du Centre de Physique  
74310 Les Houches France



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique

74310 LES HOUCHEES  
France



## SUPERCONDUCTIVITY NEW MODELS, NEW APPLICATIONS MARCH 5-11, 1988

The discovery that some nonstoichiometric ionic crystals show superconductivity above liquid nitrogen temperature has raised a series of exciting problems ; on one hand, the physical mechanisms involved have to be elucidated, especially if one wants further to improve the materials ; on the other hand, one may ask if some concepts in electrical engineering industry need to be revised. The purpose of this workshop is to emphasize new trends and perspectives, taking into account recent progresses in other exotic superconductors (organic, heavy fermions, ...).

### Scientific committee

P. AIGRAIN (Paris), J. FRIEDEL (Orsay), A. MIEDEMA (Eindhoven),  
K.A. MÜLLER (Zürich), M. RENARD (Grenoble), T.M. RICE (Zürich),  
R. TOURNIER (Grenoble), C.M. VARMA (Murray Hill)

### Organizing committee

P. AVERBUCH, M. AVIGNON, C. LACROIX

### Invited speakers include

P. CHAUDHARI (Yorktown Heights), I.E. DZYLALOSHINSKI (Moscow),  
A. FEVRIER (Marcoussis), J. HIRSCH (La Jolla), P. KOMAREK (Karlsruhe),  
R. MICNAS (Poznan), K.A. MÜLLER (Zürich), R. RAMMAL (Grenoble),  
C.N.R. RAO (Bangalore), B. RAVEAU (Caen), C.M. VARMA (Murray Hill)

Participants will be requested to pay a fee of 3 000 F.F. covering registration, board and lodging. Attendance is limited to 60 participants.

Applications including recent publications or preprints and a brief information on the points of interest to be discussed or presented at the workshop should be sent to :

Dr M. AVIGNON - L.E.P.E.S. - C.N.R.S. - BP 166 X - F-38042 Grenoble Cedex  
FRANCE

Deadline for applications : December 31, 1987.

The Centre de Physique will hold in 1988 three other winter meetings :

1 — Modelling the Ocean General Circulation and Geochemical Tracer Transport, February 15-26, 1988.

2 — Universalities in condensed Matter Physics, March 15-24, 1988.

3 — Simple Molecular Systems at Very High Density, March 29, April 7, 1988.

To apply send a brief C.V. and recent publications to  
Prof. Nino BOCCARA Directeur du Centre de Physique

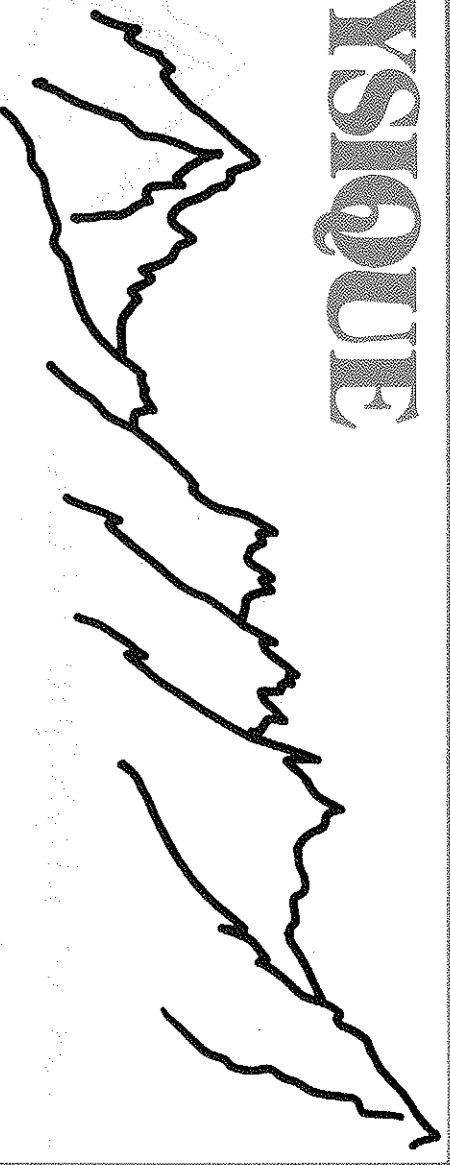
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# CENTRE DE PHYSIQUE DES HOUCHEES

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## UNIVERSALITIES IN CONDENSED MATTER PHYSICS March 15 - 24, 1988

The aim of the workshop is to review the status of the different universal laws governing systems in condensed matter physics. Geometrical, physical and dynamical behavior will be considered both from the theoretical and the experimental point of view. One will focus on the understanding of the universality classes of non conventional scale invariant phenomena : in particular on the fractal measures in turbulence, chaotic dynamical systems and disordered systems, on the statistics of random surfaces, on the universal aspect of glassy dynamics.

### Organizing committee

L. PELITI (Rome), R. RAMMAL (Grenoble), R. JULLIEN (Orsay)

### Participants include

C. ALLAIN (Paris), R. BLANC (Marseille), A. CONIGLIO (Naples),  
B. DERRIDA (Saclay), F. FAMILY (Emory), H. HERRMANN (Saclay),  
A. LIBCHABER (Chicago), P. MEAKIN (Du Pont Wilmington),  
M. MÉZARD (Paris), D. R. NELSON (Harvard), J. NITTMANN (St Etienne),  
L. PIETRONERO (Rome), I. PROCACCIA (Rehovoth), J. PROST (Bordeaux),  
S. REDNER (Boston), S.A. SOLLA (Bell Labs), H.E. STANLEY (Boston),  
A. STELLA (Rome), J. TEIXEIRA (Saclay), A. M. TREMBLAY (Sherbrooke),  
J. VANNIMENUS (Paris), A. VULPIANI (Rome)

Participants with be requested to pay a fee of 3600 F.F. which includes board, lodging and proceedings. Attendance is limited to 60 participants. To apply send a brief C.V. and recent publications to :

Prof. R. JULLIEN, Physique des Solides Bât. 510  
Université Paris-Sud  
91405 Orsay France

The Centre de Physique will hold in 1988 three other winter meetings :

- 1 — Modelling the ocean general circulation and geochemical tracer transport.  
February 15-26, 1988
- 2 — Superconductivity, new models, new applications.  
March 5-11, 1988
- 3 — Simple molecular systems at very high density.  
March 29 - April 7, 1988

To apply send a brief C.V. and recent publications to :

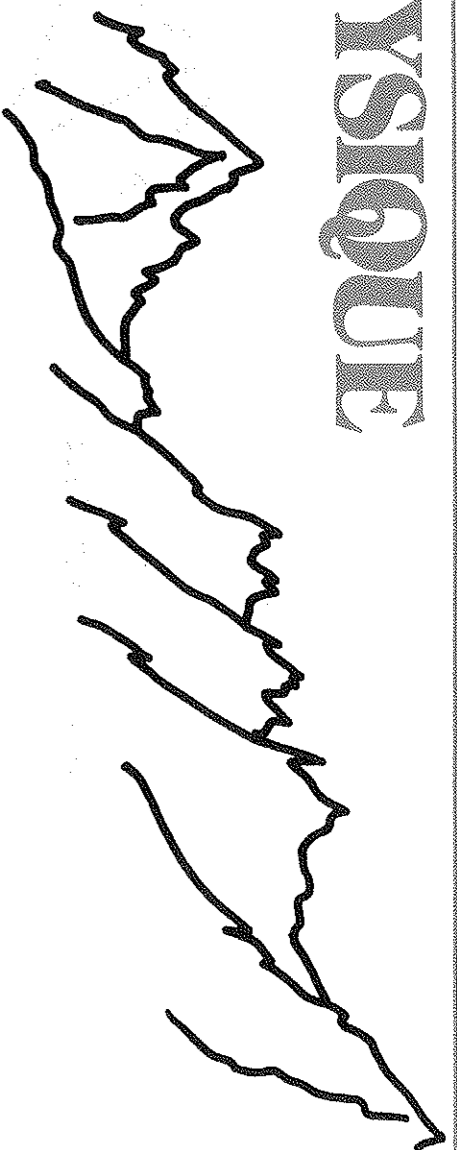
Prof. Nino BOCCARA Directeur du Centre de Physique  
74310 Les Houches France



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique

74310 LES HOUCHEES  
France



## SIMPLE MOLECULAR SYSTEMS AT VERY HIGH DENSITY March 29 - April 7, 1988

In the last decade, the study of simple molecular systems has motivated a great interest. The recent developments of the diamond anvil cell have enabled their studies above 100 GPa by x-ray, Raman, Brillouin, Infra-red,... Furthermore, since these systems are most amenable to a theoretical description, they are used as models to understand the behaviour of dense matter like the stability of new phases, the evolution of inter and intramolecular bonds, the approach to metallization,...

The purpose of the workshop is to gather these various works and to enhance the theory-experiment interactions in order to clarify the state of the field.

### Scientific committee

J.M. BESSON (Paris), R.D. ETTERS (Fort Collins), J.P. HANSEN (Paris),  
W.B. HOLZAPFEL (Paderborn), M.L. KLEIN (Ottawa), P. LOUBEYRE (Paris),  
A. POLIAN (Paris), M. ROSS (Livermore)

### Invited speakers

J.A. BARKER, J.M. BESSON, M. BULSKI, R. CAR, D. CEPERLEY,  
W.B. DANIELS, R.D. ETTERS, D. FRENKEL, M. GRIMSDITCH, J.P. HANSEN,  
W.B. HOLZAPFEL, H.D. JODL, P.G. JOHANNSON, M.L. KLEIN, P. LOUBEYRE,  
H.K. MAO, F. REE, M. ROSS, D. SCHIFFERL, J.A. SCHOUTEN, I.F. SILVERA

Participants will be requested to pay a fee of 3600 F.F. covering registration, board, lodging at the Centre and the proceedings. Attendance is limited to 60 participants.

Applications including a brief C.V. should be sent to

Drs. P. LOUBEYRE and A. POLIAN

Laboratoire de Physique des Milieux Condensés

Tour 13 E4 Université Pierre et Marie Curie

4, place Jussieu - 75252 Paris Cedex 05

Deadline for applications : November 30, 1987

The Centre de Physique will hold in 1988 three other winter meetings :

- 1 — Modelling the ocean general circulation and geochemical tracer transport.  
February 15-26, 1988
- 2 — Superconductivity, new models, new applications.  
March 5-11, 1988
- 3 — Universalities in condensed matter physics.  
March 15-24, 1988

To apply send a brief C.V. and recent publications to :  
Prof. Nino BOCCARA Directeur du Centre de Physique  
74310 Les Houches France



# LES HOUCHEs

SESSION XLVIII  
NATO ADVANCED STUDY INSTITUTE  
30 mai — 24 juin 1988



école d'été de physique théorique

## LIQUIDES AUX INTERFACES LIQUIDS AT INTERFACES

*Scientific Organizers :* **J. CHARVOLIN**, Physique des Solides, Orsay

**P.G. DE GENNES**, Collège de France, Paris

**W. HELFRICH**, Freie Universität, Berlin

**J.F. JOANNY**, Université Claude Bernard, Lyon

**Liquids and Interfacial Tensions : **R. EVANS**, Bristol, UK and **J. MEUNIER**, ENS, Paris, F**

**Wetting Transition : **M. SCHICK**, Seattle, USA and **D. BEYSSENS**, CEN Saclay, F**

**Wetting Dynamics : **P.G. DE GENNES** and **A.M. CAZABAT**, Collège de France, Paris, F**

**Interactions between Interfaces : **S. MARCELLJA**, Canberra, Australia and **J. KLEIN**, Rehovot, Israel**

**Films of Amphiphiles : **W. HELFRICH**, Berlin, FRG and **J. CHARVOLIN**, Orsay, F**

**Interfacial Instabilities : **J.S. LANGER**, Santa Barbara, USA, **P. PELCE**, Marseille, F and **A. LIBCHABER**, Chicago, USA**

This school is concerned with surface properties of liquids at solid/liquid, liquid/liquid, gas/liquid interfaces. Renewals of interests for those domains belonging to classical physicochemistry appeared rather recently. They were motivated by the industrial importance of phenomena such as wetting of solids by liquids, interactions between colloidal particles, anchoring of liquid crystals, stabilization of liquid/liquid interfaces by amphiphilic molecules, kinetics of foams. These phenomena have been analyzed along new directions taking into account ideas developed in other fields, statistical mechanics of phase transitions and polymers, molecular interactions and long range forces in liquids. Their studies have stimulated the developments of new experimental methods, observations of motion of thin films on surfaces, measurements of forces between surfaces, structures of interfacial films by neutron scattering. The courses are aimed at young researchers who intend to acquire basic theoretical and experimental knowledge in this deeply renewed field.

Les Houches is a resort village in the Chamonix valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at an altitude of 1000 m. It is above the village, facing the Mont-Blanc range. It is ideally located for mountaineering, hiking or touring as well as for intellectual work. Accommodation and meals are provided within the School for both participants and lecturers. A financial contribution of FF 3550 — is requested from each participant. Some possibilities for grants exist. Participants who intend to rent lodgings should directly inquire at: Office du Tourisme, 74310 Les Houches (tel. 50 55 50 62). The School is affiliated with the University of Grenoble. This session is under consideration by the NATO Scientific Affairs Division.

Admission forms and additional informations are available from :

ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE — 74310 LES HOUCHEs, France

Telephones : 50 54 40 69

50 54 41 33 and 50 54 47 65 (off season)

Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1988.

The two other sessions of 1988 will be entitled *Fields, Strings, Critical Phenomena and Geophysical Tomography*.

Two sessions will be held in 1989, one on *Liquids, Freezings and the Glass Transition*, the other on *Chaos and Quantum Physics*.



# LES HOUCHES

SESSION XLIX  
NATO ADVANCED STUDY INSTITUTE  
28 juin — 5 août 1988



école d'été de physique théorique

## CĤAMPS, CORDES ET PHÉNOMÈNES CRITIQUES

# FIELDS, STRINGS, CRITICAL PHENOMENA

*Scientific Director* : E. BREZIN, E.N.S., Paris, F

**Quantum Spin Chains** : I. AFFLECK, Univ. of British Columbia, Canada  
**Conformal Invariance and Statistical Mechanics** : J. CARDY, Dept. of Physics, Univ. of Calif.  
Santa Barbara, USA

**Supergravities from superstrings** : S. FERRARA, CERN, Geneva, Sw.  
**Conformal Field Theories** : D. FRIEDAN, Univ. of Chicago, USA  
**Affine Conformal Geometry** : P. GINSPARG, Harvard Univ., USA  
**Selected Problems in Lattice QFT** : M. LUSCHER, DESY, Hamburg, FRG  
**String Field Theories** : A. NEVEU, CERN, Geneva, Sw.

**Additional lectures will be given by G. PARISI (Rome II, I) and A. POLYAKOV (Landau Inst.  
Moscow) (titles to be announced)**

The realization that field theories and statistical mechanics had common aspects led in the past to spectacular advances in both fields. Non-perturbative methods in particle physics, such as lattice field theories, were inspired by statistical physics. More recently connexions between strings, conformal fields theories and critical phenomena in two dimensions have been discovered. This session of Les Houches is devoted to an introduction to these various topics with special emphasis on their mutual relations. The session is open to young theorists eager to acquire a basic knowledge or to broaden their views in these extremely active areas of physics.

Les Houches is a resort village in the Chamornix valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at an altitude of 1000 m. It is above the village, facing the Mont-Blanc range. It is ideally for mountaineering, hiking or touring as well as for intellectual work. Accommodation and meals are provided within the School for both participants and lecturers. A financial contribution of FF 5100.— is requested from each participant. Some possibilities for grants exist. Participants who intend to rent lodgings should directly inquire at : Office du Tourisme, 74310 Les Houches (tel. 50 55 50 62). The School is affiliated with the University of Grenoble. This session is under consideration by the NATO Scientific Affairs Division.

Admission forms and additional informations are available from :

ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE — 74310 LES HOUCHES, France  
Telephones : 50 54 40 69

50 54 41 33 and 50 54 47 65 (off season)

Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1988.

The two other sessions of 1988 will be entitled *Liquids at Interfaces and Geophysical Tomography*.

Two sessions will be held in 1989, one on *Liquids, Freezing and the Glass Transition*, the other on *Chaos and Quantum Physics*.



# LES HOUCHEES



**SESSION I**  
**NATO ADVANCED STUDY INSTITUTE**  
**9 août — 3 septembre 1988**

école d'été de physique théorique

## TOMOGRAPHIE GÉOPHYSIQUE GEOPHYSICAL TOMOGRAPHY

*Scientific Direction* : **Y. DESAUBIES, IFREMER, Brest, F**  
**A. TARANTOLA, Inst. de Physique du Globe, Paris, F**

### THEORY AND METHODS

**Inverse Problems, Estimation Theory** : **A. TARANTOLA, I.P.G. Paris, F**  
**Wave Propagation, Theoretical Seismology** : **P.G. RICHARDS,**

**L.D.G.O. Columbia Univ. New York, USA**

**Signal and Array Processing** : **G. DUCKWORTH, M.I.T. Cambridge, USA**  
**GEOPHYSICAL TOMOGRAPHY**

**Tomography of the Earth's Crust** : **R.W. CLAYTON, Caltech, USA**

**Three Dimensional Global Structure** : **J. WOODHOUSE, Harvard Univ., USA**

**Electromagnetic Tomography** : **T. MADDEN, M.I.T. Cambridge, USA**  
**TOMOGRAPHY IN THE OCEAN**

**Ocean Acoustic Tomography** : **Y. DESAUBIES, IFREMER Brest, F**

**Tomography and Inverse Modeling** : **C. WUNSCH, M.I.T. Cambridge, USA**

**Special Topics-Regional Processes** : **W. MUNK, Univ. of California at San Diego, USA**

Additional invited seminars will be given by **B. CORNUELLE** (Univ. of Calif. San Diego: Time Dependent Tomography in Oceanography; **G. FRISK** (WHOI, Woods Hole, USA): Inverse Methods in Ocean Bottom Acoustics; **F. JENSEN** (Saclant Center, La Spezia, I): Ocean Seismo-acoustic Modeling; **D. KOSSLOFF** (Tel Aviv Univ.): Numerical Modeling in Seismology; **P. MORA** (Stanford Univ., USA): Non Linear Elastic Inversion; **B. ROMANOWICZ** (I.P.G., Paris): Global Tomography. In geophysics tomography is a technique which deduces some physical properties of the medium from perturbations encountered by waves propagating through it. Thus tomography draws on a variety of disciplines, such as wave propagation in heterogeneous (and/or random) media, statistical estimation and inverse theory, signal processing which are common to the study of the solid earth and the oceans. These topics will be considered, as well as specific applications and experimental results in: 3 dimensional imaging of the earth mantle, the shape of convection cells, high resolution, ocean dynamics, etc.. The lectures will be aimed at a level ranging from advanced graduate students to young scientists already engaged in research in geophysics or physical oceanography.

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Admission forms and additional informations are available from :

**ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE — 74310 LES HOUCHEES, France**

Telephones : 50 54 40 69

50 54 41 33 and 50 54 47 65 (off season)

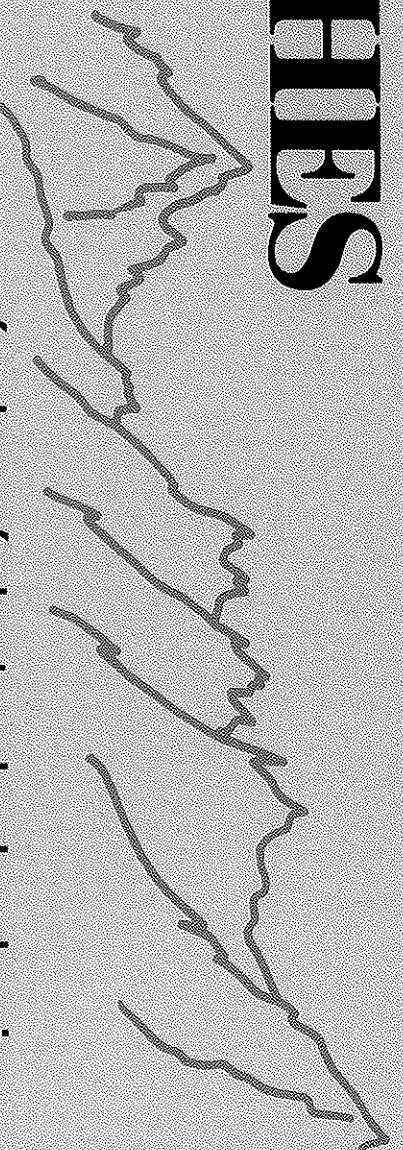
Complete files (admission forms and recommendation letters) **must** have reached this address **before 1 March 1988.**

*The two other sessions of 1988 will be entitled Fields, Strings, Critical Phenomena and Liquids at Interfaces.*

*Two sessions will be held in 1989, one on Liquids, Freezing and the Glass Transition, the other on Chaos and Quantum Physics.*



# LES HOUCHEES



**SESSION I**  
**5 — 16 septembre 1988**

école pré-doctorale de physique

EUROPEAN ASTROPHYSICS DOCTORAL NETWORK - FÉDÉRATION FRANÇAISE DES MAGISTÈRES DE PHYSIQUE

## ASTROPHYSICS SCHOOL I

### ORIGIN, STRUCTURE AND EVOLUTION OF GALAXIES      ASTRONOMICAL OBSERVATIONS : METHODS AND TOOLS

**J. BINNEY** (Oxford) - Kinematics and Dynamics of Galaxies

**H.J. HABING** (Leiden) - Interstellar Matter

**J. LEQUEUX** (Marseille) - Stellar Populations, Structure and Evolution

**M. LONGAIR** (Edinburgh) - The Origin of Galaxies

**S. D'ODORICO** (Garching) - Instrumentation of large Telescopes

**D. DOWNES** (Grenoble), **G. WEIGELT** (Erlangen)

and **P. LENA** (Paris) - Images in Astronomy

**I. APPENZELLER** (Heidelberg) - Detectors and Receivers

The European Astrophysics Doctoral Network opens a series of Summer Schools intended for students in Astrophysics or Physics, at the beginning of their Doctorate, to place them in interaction with the international community of scientists and among themselves. Students are offered this broad exposure to major fields of astronomy at an early stage of their own research in order to deepen their scientific education and gain maximum advantage from the possibilities offered by international and European collaborations.

A special pedagogical effort will be made in order that the lectures should be accessible to debutant research students. The courses are normally intended for students having already been exposed to one-year advanced courses in Astrophysics or in Physics.

The 1988 topics cover two fields of active research in Astrophysics, where important theoretical, observational and instrumental progress is expected in the coming years. The total lecture time amounts to 50 hours, distributed over 10 working days and leaving ample time for discussions and personal work. The lectures will be given in English. Each student will be asked to briefly present his research interests and plans, if any.

This 1988 Astrophysics School is jointly organized with the "Fédération Française des Magistères de Physique", a network of University Departments. It is the first of a series of "Écoles pré-doctorales de physique" that this Fédération plans to organize at Les Houches, each year on a different topic, for students at the beginning of their Doctorate period.

#### Application

The application should include a detailed curriculum, research program if already chosen, and two letters of support directly addressed to the Selection Committee by a Professor or Adviser. Application forms are available upon request. **Application closing date is April 1, 1988**, but early applications are welcomed. Students will be selected on the basis of scientific merit, irrespective of their nationality. The final selection will be notified by May 1, 1988. Selected students will be fully supported by the School for all costs except travel.

All correspondence should be addressed to Prof. LENA, Astrophysics Summer School I, Observatoire, 92190 Meudon, France. Télèx : 201571 F. Span : MELAMA :: school.

#### Organisation

Organisation Committee : **I. APPENZELLER** (Heidelberg), **H. HABING** (Leiden), **J.C. LE GUILLOU** (Paris\*), **P. LENA** (Paris), Scientific Director of the school, **R. MAYNARD** (Grenoble\*), **J.M. RICHARD** (Grenoble\*),

\*Fédération Française des Magistères de Physique

The European Astrophysics Doctoral Network federates the following representatives : **I. APPENZELLER**

(Heidelberg), **C. CHUDERI** (Firenze), **G. CONTOPoulos** (Athens), **C. DE LOORE** (Brussel),

**M.H. ULRICH** (Garching), **H. HABING** (Leiden), **J. HEVVAERTS** (Paris), **T. LAGO** (Porto),

**M. LONGAIR** (Edinburgh), **A. MAEDER** (Geneve), **C. ROCA** (Tenerife).

The School is funded by the EEC Program Erasmus, the Conseil de l'Europe and some national additional funds.

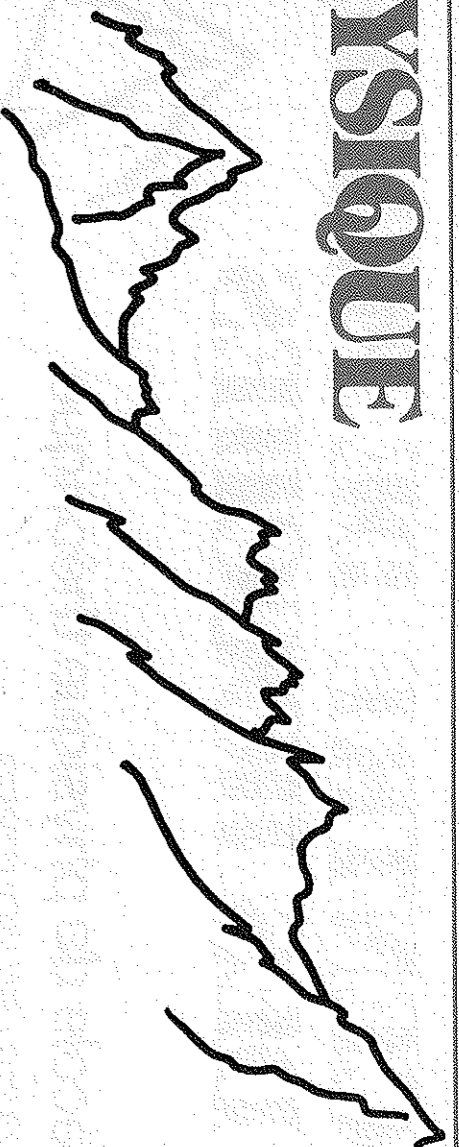
*Les Houches is a resort village in the Chamonix valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at an altitude of 1000 m. It is above the village, facing the Mont-Blanc range. It is ideally located for mountaineering, hiking or touring as well as for intellectual work. Accommodation and meals are provided within the School for both participants and lecturers. The School is affiliated with the University of Grenoble.*



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique

74310 LES HOUCHEES  
France



## “Nuclear Matter and Heavy Ion Collisions” February 7 - 16, 1989

The purpose of the School is to review our present understanding of the properties of nuclear matter at zero and finite temperature and to relate them to the data available on central heavy ion collisions at incident energies ranging from 10 MeV till a few GeV per nucleon. The emphasis will be on the formation and decay of hot nuclei (KT of the order of a few MeV) and on the dynamics of central collisions at relativistic energies ( $E/A$  of the order of 1 GeV).  
The School is intended for both experimentalists and theorists.

### International Advisory Committee

G.E. BROWN (Stony-Brook), J. CUGNON (Liège), A. GOBBI (GSI), R. MALFLIET (Groningen)

### Organizing Committee

H. FLOCARD (Orsay), M. SOYEUR (Saclay), B. TAMAIN (Caen)

### Lecturers

J. BONDORF (Copenhagen), C. GREGOIRE (GANIL), E. GROSSE (GSI),

D. GUERREAU (GANIL), K.-H. KAMPERT (GSI), P. KIENLE (GSI), D. L'HOTE (Saclay),

C. MAHAUX (Liège), R. MALFLIET (Groningen), C. NGO (SATURNE),

V. PANDHARIPANDE (Illinois), B. SEROT (Indiana), P. SIEMENS (Oregon),

H. STÖCKER (Frankfurt), M. THIES (Amsterdam)

Participants will be requested to pay a fee of 3700 FF which includes board, lodging (double occupancy) and proceedings. Attendance is limited to 60 participants.

For application, contact before October 15, 1988

Madeline SOYEUR,

CEN de SACLAY, Service de Physique Théorique,

91191 Gif-sur-Yvette Cedex (France)

Bitnet : LHN89 at FRSSAC11

The Centre de Physique will hold in 1989 three other winter meetings :

- 1 — Cellular Automata and Modeling of Complex Physical systems.  
February 21 - March 2, 1989.
- 2 — Number Theory and Physics. March 7 - 16, 1989.
- 3 — Partially Integrable Nonlinear Evolution Equations and their Physical Applications. March 21 - 30, 1989.

To apply send a brief C.V. and recent publications to

Professeur Nino BOCCARA, Directeur du Centre de Physique

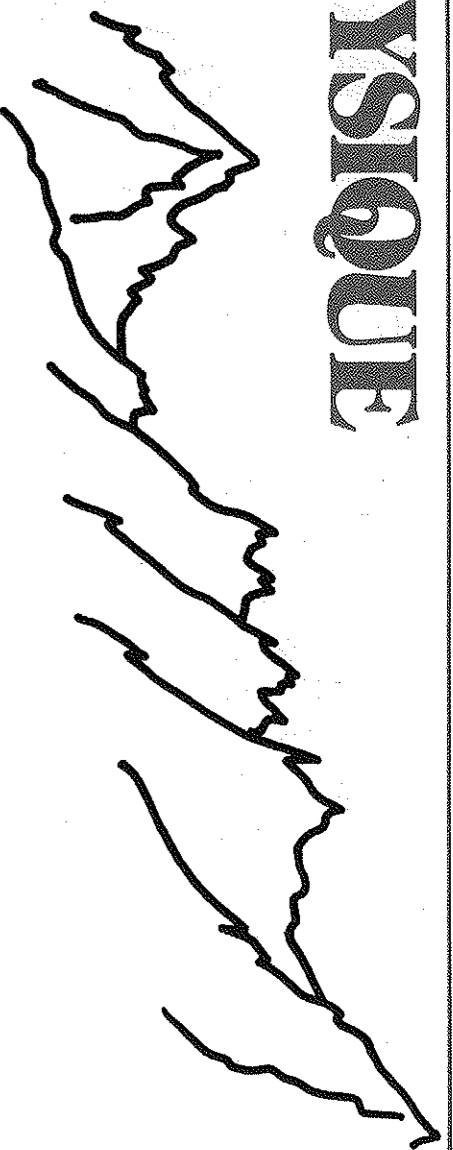
74310 Les Houches (France)



# CENTRE DE PHYSIQUE DES HOUCHES

école de physique théorique

74310 LES HOUCHES  
France



## Number Theory and Physics March 7 - 16, 1989

From dynamical systems to string theory, Physics involves more and more Number Theory. The meeting will gather physicists and mathematicians around this common theme. Several lectures will be held, starting from an elementary level, on those domains of Arithmetics which have had the most numerous applications in Physics : Approximation of irrational numbers (Diophantine properties, continued fractions, Liouville numbers, transcendence). Algebraic Number Theory (Galois theory, modular forms, p-adic numbers). Many talks by physicists will show the variety of domains of both theoretical and experimental Physics where concepts and results of Number Theory show up in a natural way : Dynamical systems (small denominators, KAM theorems). Incommensurate structures, tilings, and quasicrystals. Two-dimensional quantum field theories (role of conformal and modular invariances). Completely integrable models. String theory. Trace and determinant formulas. Quantum chaos. Anomalies. Quantum Hall effect. Symbolic dynamics, automata and substitutions. Cellular automata and complex systems. Random number generators.

### Scientific Committee

J. BELLISSARD (Marseille), C. GODRECHE (Saclay), C. ITZYKSON (Saclay), J.M. LUCK (Saclay),  
M. MENDES-FRANCE (Bordeaux), P. MOUSSA (Saclay), E. REYSSAT (Paris),  
M. WALDSCHMIDT (Paris).

### The following is a tentative list of Speakers

Y. AVRON (Pasadena), S. AUBRY (Saclay), M. BERRY (Bristol), F. BEUKERS (Utrecht),  
J.B. BOST (Paris), P. CARTIER (Palaiseau), P. CASSOU-NOGUES (Bordeaux),  
G. CHRISTOL (Paris), P. CVITANOVIC (Paris), M. DEKKING (Delft),  
M. DESHOUILLERS (Bordeaux), M. DUNEAU (Palaiseau), P. FREUND (Chicago),  
D. FRIEDAN (Chicago), A. KATZ (Palaiseau), A. KATOK (Pasadena), H. KUNZ (Lausanne),  
A. LIBCHABER (Chicago), R. MAC KAY (Coventry), Y. MANIN (Moscou), J. PEYRIERE (Orsay),  
D. RAND (Coventry), P. SARNNAK (Stanford), A. VOROS (Saclay), J.C. YOCCOZ (Orsay), D. ZAGIER (Bonn).

The fee of 3700 FF includes board and lodging at the Centre and the proceedings. Attendance is limited to 60 participants.

Applications, including a brief C.V., should be sent, before November 30, 1988, to :

Dr. Jean-Marc LUCK  
SPht, C.E.N. Saclay  
91191 Gif-sur-Yvette cedex, France

The Centre de Physique will hold in 1989 three others winter meetings :

- 1 — Nuclear Matter and Heavy Ions Collisions. February 7-16, 1989.
- 2 — Cellular Automata and Modeling of Complex Physical Systems. February 21 - March 2, 1989.
- 3 — Partially Integrable Nonlinear Evolution Equations and their Physical Applications. March 21-30, 1989.

To apply send a brief C.V. and recent publications to :

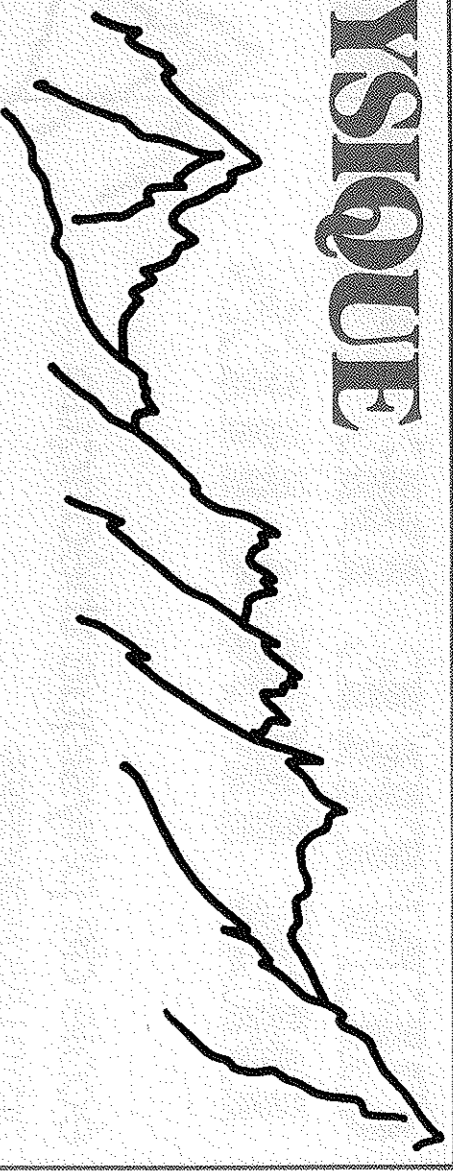
Professeur Nino BOCCARA, Directeur  
Centre de Physique  
74310 Les Houches France



# CENTRE DE PHYSIQUE DES HOUCHES

école de physique théorique

74310 LES HOUCHES  
France



## Partially Integrable Nonlinear Evolution Equations and their Physical Applications March 21 - 30, 1989

Considerable achievements have been attained in the recent years in the study of physical phenomena governed by nonlinear partial differential equations. Many fields of physics involve such nonlinearities : fluid dynamics, oceanography, Boltzmann kinetic theory, condensed matter physics, plasma physics, turbulence, etc. On the other hand, this domain has produced fruitful interactions between mathematics and physics, and powerful methods have been developed to investigate such equations, construct new solutions or establish the equivalence between different problems. Although originally developed for integrable PDE's, some of these methods can still operate in nonintegrable cases, maybe after some modifications.

The aim of this session is to cover the entire intermediate zone lying between completely integrable PDE's on one end and chaotic dynamical systems on the other, the extreme cases being excluded. This includes exact solutions, solitons, singularity structure, symmetry methods, criteria of integrability, but also qualitative and global behavior, inertial manifolds, topological defects, and of course specific applications.

### Scientific Committee

R. CONTE (Saclay), H. CORNILLE (Saclay), P. COULLET (Nice), J.-M. GHIDAGLIA (Orsay),  
J. HIETARINTA (Turku), P. MANNVILLE (Saclay), M. MUSETTE (VUB, Bruxelles),  
Y. POMEAU (École Normale), A. RAMANI (École Polytechnique), M. REMOISSENET (Dijon),  
P. SANTINI (Roma I), P. WINTERNITZ (CRM, Montréal).

### Confirmed participants include :

D. BESSIS, A. BISHOP, T. BOHR, F. CALOGERO, P. CLARKSON, N. FLYTZANIS,  
B. GRAMMATICOS, D. KAUP, Y. KOSMANN-SCHWARZBACH, M. KRUSKAL,  
M. LAKSHMANAN, F. LAMBERT, A.C. NEWELL, Y. NUTKU, P. OLVER, M. PEYRARD,  
J.-C. SAUT, B. SCHEURER, E.A. SPIEGEL, J. WEISS.

The fee of 3700 FF includes full board and lodging at the Center and the proceedings.  
Attendance is limited to 60 participants. Deadline is November 15, 1988.

To apply, send a brief C.V. and recent publications to :

Dr. Robert CONTE

Service de physique du solide et de résonance magnétique (DPhG-PSRM)

Centre d'études nucléaires de Saclay

F-91191 Gif-sur-Yvette Cedex, FRANCE

The Centre de physique will also hold in 1989 three other winter meetings :

- 1 — Nuclear Matter and Heavy Ions Collisions. February 7-16, 1989.
- 2 — Cellular Automata and Modeling of Complex Physical Systems.  
February 21 - March 2, 1989.
- 3 — Number Theory and Physics. March 7-16, 1989.

To apply, send a brief C.V. and recent publications to :

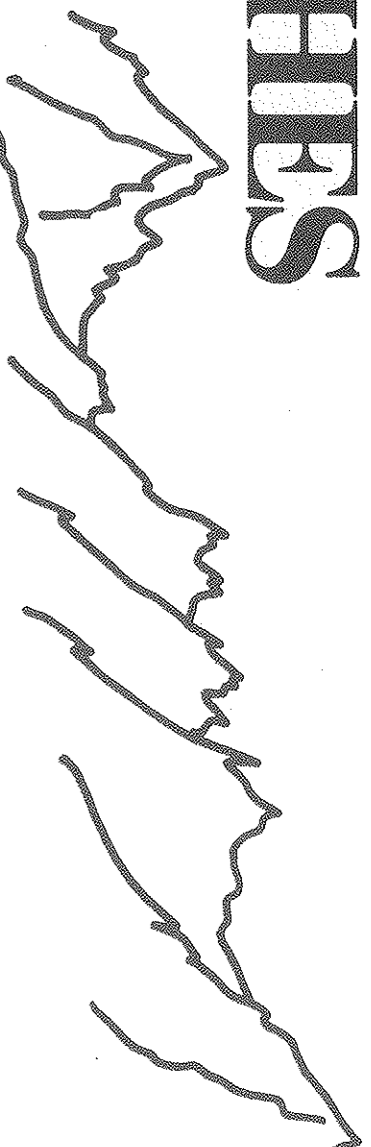
Professeur Nino BOCCARA, Directeur

Centre de Physique

74310 Les Houches, FRANCE



# LES HOUCHEs



SESSION LI  
NATO-ADVANCED STUDY INSTITUTE  
3 juillet — 28 juillet 1989

école d'été de physique théorique

## **Liquides, cristallisation et transition vitreuse** **Liquids, freezing and the glass transition**

*Scientific Direction* : J.-P. HANSEN, École Normale Supérieure de Lyon, F  
D. LEVESQUE, Univ. Paris-Sud, Orsay, F

Quantum Processes in Liquids : D. CHANDLER, Berkeley, USA  
Kinetic Theory of Dense Fluids : M. ERNST, Utrecht, Netherlands  
Statistical Mechanics of Liquid Crystals : D. FRENKEL, Amsterdam, Netherlands  
Mode Coupling Theory of the Glass Transition : W. GOTZE, München, FRG  
Molecular Liquids and Ionic Solutions : P. MADDEN, Oxford, UK  
Neutron Scattering and Collective Dynamics : F. MEZEL, Berlin, FRG  
Nucleation, Crystallization and Melting : D. OXTOBY, Chicago, USA  
Colloidal Suspensions : P.N. PUSEY, Malvern, UK  
Inhomogeneous Fluids and Interfacial Phenomena : B. WIDOM, Cornell, USA

The theoretical and experimental concepts and tools developed for the investigation of the structure and dynamics of simple liquids are now successfully extended to more complex systems, including molecular liquids, liquid crystals, colloidal suspensions and quantum processes. Density functional, kinetic and mode coupling theories are leading to a coherent picture of interfacial phenomena, nucleation, freezing and the glass transition. The present session is intended to provide a comprehensive overview of the basic concepts and of recent progress in statistical mechanics of liquids. The theoretical lectures will be illustrated by presentations of related light and neutron scattering experiments. The session is aimed at young theoreticians and experimentalists eager to acquire a good background in this rapidly growing condensed matter field.

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Admission forms and additional information are available from :

ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE, F-74310 LES HOUCHEs, France

Telephones : 50 54 40 69

Telefax : 50 55 53 25

50 54 41 33 (off season)

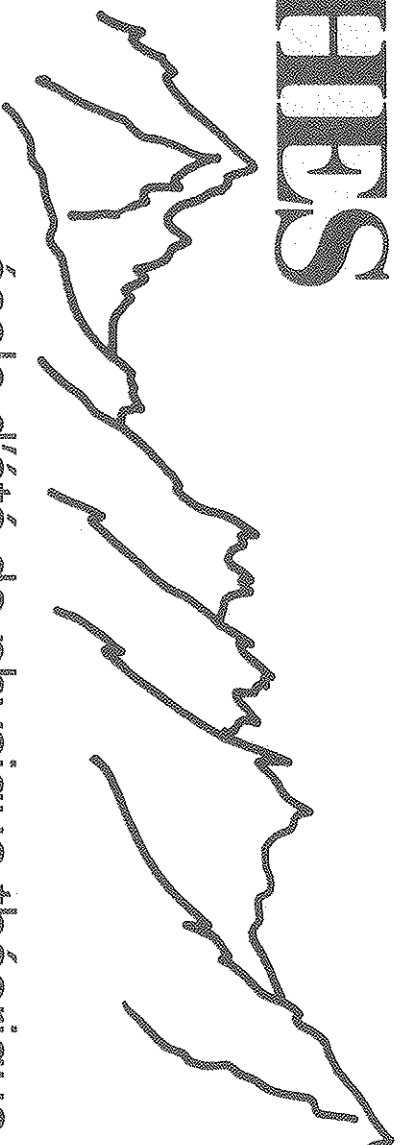
Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1989.

The second 1989 session will be entitled *Chaos and Quantum Physics*.

Two sessions will be held in 1990, one on *Quantum Optics*, the other on *Supernovae*.



# LES HOUCHEs



SESSION LI  
NATO ADVANCED STUDY INSTITUTE  
1<sup>er</sup> août — 31 août 1989

école d'été de physique théorique

## Chaos et physique quantique Chaos and quantum physics

*Scientific Direction* : M.-J. GIANNONI, I.P.N. Orsay, F  
A. VOROS, C.E.N. Saclay, F

**Recent Developments in Classical Mechanics** : I.C. PERCIVAL, London, UK  
**Semi-classical Methods** : M.V. BERRY, Bristol, UK, and M.C. GUTZWILLER, New York, USA  
**Spectral Properties and Random Matrix Theory** : O. BOHIGAS, Orsay, F  
**Time-dependent Quantum Systems** : B.V. CHIRIKOV, Novosibirsk, USSR (to be confirmed)  
**Wave Functions** : E.J. HELLER, Seattle, USA  
**Chaotic Scattering** : U. SMILANSKY, Rehovot, Israël  
**Atomic Physics** : D. DELANDE, Paris, F

Additional lectures will be given by G. CASATI (Milano), Y. COLIN DE VERDIÈRE (Grenoble), B. MÜHLSCHLEGEL (Köln) and C. SCHMIT (Orsay).

The understanding of chaotic behavior in classical dynamics has considerably advanced in the last decades. In turn, the need has arisen to understand in which ways a quantum system can feel the imprints of underlying classical stochasticity. From the growing activity upon this class of problems, an autonomous field of research has emerged, which is now in full strength. It lies at the crossroads of all branches of quantum physics, inasmuch as classical complexity is increasingly present in molecular, atomic, nuclear and solid state physics. This session of Les Houches is devoted to a theoretical coverage of the subject, illustrated by models, applications in various areas of physics, and new experimental trends. The lectures are aimed at graduate students and young researchers who intend to acquire a broad and solid theoretical knowledge in this inter-disciplinary, rapidly evolving subject.

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Admission forms and additional information are available from :

ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE, F-74310 LES HOUCHEs, France

Telephones : 50 54 40 69

50 54 41 33 (off season)

Telefax : 50 55 53 25

Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1989.

The first 1989 session will be entitled *Liquids, Freezing and the Glass Transition*.

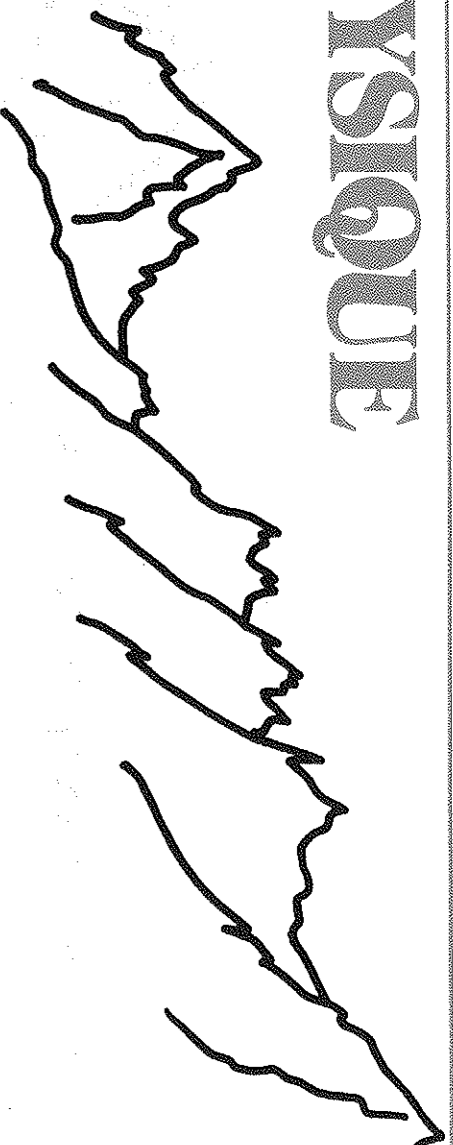
Two sessions will be held in 1990, one on *Quantum Optics*, the other on *Supernovae*.



# CENTRE DE PHYSIQUE DES HOUCHES

école de physique théorique

74310 LES HOUCHES  
France



## «HADRONIC PHYSICS WITH MULTI-GeV ELECTRONS» February 6 - 15, 1990

The School aims at giving the necessary basis for the future physics program with the new generation of electron accelerators providing multi GeV continuous beams.

The program includes :

- 1) topics of standard nuclear physics (effective degrees of freedom, relativity in nuclei, few nucleon systems, mesons in nuclei).
- 2) introduction to QCD and QCD inspired nucleon models (topological and non-topological soliton, quark and parton models) and relevance of such models for understanding nuclei.
- 3) possibilities offered by the electromagnetic probe for such a physics program.

The School is largely open and non-experts or new-comers in the field are strongly encouraged to apply. The time left for contacts and discussions with some of the best specialists in the relevant area of physics, together with a very attractive site, should provide a fruitful and relaxed atmosphere.

### International advisory committee

J. CUGNON (Liège), M. ERICSON (Lyon/CERN), S. FANTONI (Pisa), A.C. FONSECA (Lisboa),  
P.A.M. GUICHON (Saclay), E. MOYA DE GUERRA (Madrid),  
B. SCHOCH (Bonn), P.K.A. de WITT HUBERTS (NIKHEF)

### Organizing committee

B. DESPLANQUES (IPN Orsay) and D. GOUTTE (Saclay)

### Preliminary list of lecturers

C. CIOFI DEGLI ATTII (Rome), N. ISGUR (Toronto), J.F. MATHIOT (Orsay), J. MARTINO (Saclay),  
E. MONIZ (MIT), H. PIRNER (Heidelberg), E. PREDAZZI (Torino), G. RIPKA (Saclay), K. RITH (Heidelberg),  
J.A. TJON (Utrecht), V. VENTO (Valencia).

The fee of 3 700 FF includes board and lodging at the Centre and the proceedings. Attendance is limited to 60 participants.

Applications, including a brief CV should be sent before October 30, 1989 to :  
LES HOUCHES 90 - DPh-N/HE, CEN Saclay - 91191 Gif-sur-Yvette - FRANCE  
Phone : 33.1.69.08.74.54 - Telex : ENERG X 604641 F NHE+ - Fax : 33.1.69.08.75.84  
E-Mail : GOUTTE @ FRSSAC11

The Centre de Physique will hold in 1990 three other meetings :

- 1 - Physics of Granular Media - February 20/March 1, 1990
- 2 - Complexity and Evolution - March 6/15, 1990
- 3 - Coherent Detection Techniques at Millimeter Wavelengths - March 20/29, 1990

To apply send a brief C.V. and recent publications to :

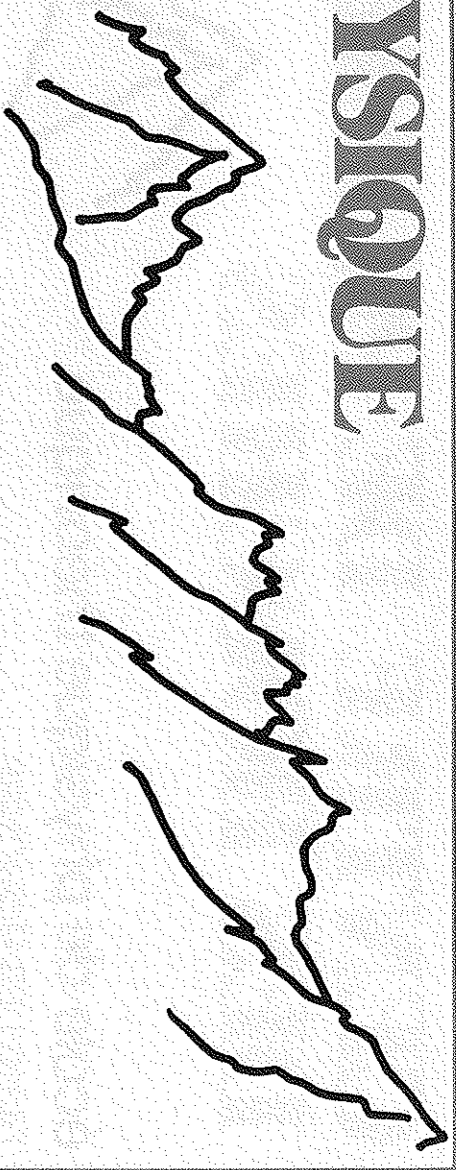
Prof. Nino BOCCARRA, Directeur - Centre de Physique - 74310 Les Houches, France - Fax : 33.50.55.53.25



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique

74310 LES HOUCHEES  
France



## « PHYSICS OF GRANULAR MEDIA » 20 February - 1 March 1990

The aim of this winter school is to lead to a better physical understanding of granular media by an exchange of views between different scientific disciplines working on «disorder and dense granular media». One important component will be from the physics of condensed matter and another will be from the engineering applications of granular media. An important part of the program will be a presentation of structural analysis of these systems in the form of disordered packings. The two main approaches for describing the properties of such heterogeneous materials are «homogenization-type» methods, which generally give effective transport coefficients, and methods which take into account heterogeneities and their different scales (e.g. percolation models). The structure and therefore the properties of such materials are very dependent on their previous history : the necessity to understand this widens the fields of the problem, and leads to the inclusion of the densification of structures (for example by sintering) but also looser structures such as involved in particle flow phenomena, thick suspensions, and sedimentation.

### International advisory committee

R. CLIFT (Guildford), S. FENEUILLE (Paris), J.L. FINNEY (Didcot), H.S. FOGLER (Ann Arbor),  
J.M. GEORGES (Lyon), E. GUYON (Paris), J. KOPLIK (New-York), M. WIDOM (Pittsburg).

### Organizing committee

D. BIDEAU, Groupe de Physique Cristalline (UA804), Université de Rennes I.  
J.A. DODDS, Laboratoire des Sciences du Génie Chimique CNRS-ENSIC (UP6811).

### The following is a tentative list of speakers

P. ACKER (Paris), D. BIDEAU (Rennes), R. BLANC (Marseille), J.A. DODDS (Nancy), S. FAUVE (Lyon),  
J.L. FINNEY (Didcot), J.M. GEORGES (Lyon), E. GUYON (Paris), P.K. HAFF (Pasadena),  
G.H. HOMSEY (Stanford), J.P. JERNOT (Caen), W. KAYSSER (Stuttgart), J. KOPLIK (New-York),  
N. RIVER (London), S. ROUX (Paris), N.G. STANLEY-WOOD (Bradford), M. WIDOM (Pittsburg).

Participants will be requested to pay a fee of 3 700 FF which includes board, lodging (double occupancy) and proceedings. Attendance is limited to 60 participants.

To apply, contact before October 30, 1989 :

D. BIDEAU - Université de Rennes I - Campus Scientifique de Beaulieu - Avenue du Général Leclerc  
35042 RENNES Cedex - FRANCE - Tél. : 33.99.28.61.23 - Fax : 33.99.28.67.00

The Centre de Physique will hold in 1990 three other winter meetings :

- 1 - Hadronic Physics with Multi-GeV Electrons - February 6/15, 1990
- 2 - Complexity and Evolution - March 6/15, 1990
- 3 - Coherent Detection Techniques at Millimeter Wavelengths - March 20/29, 1990

To apply send a brief C.V. and recent publications to :

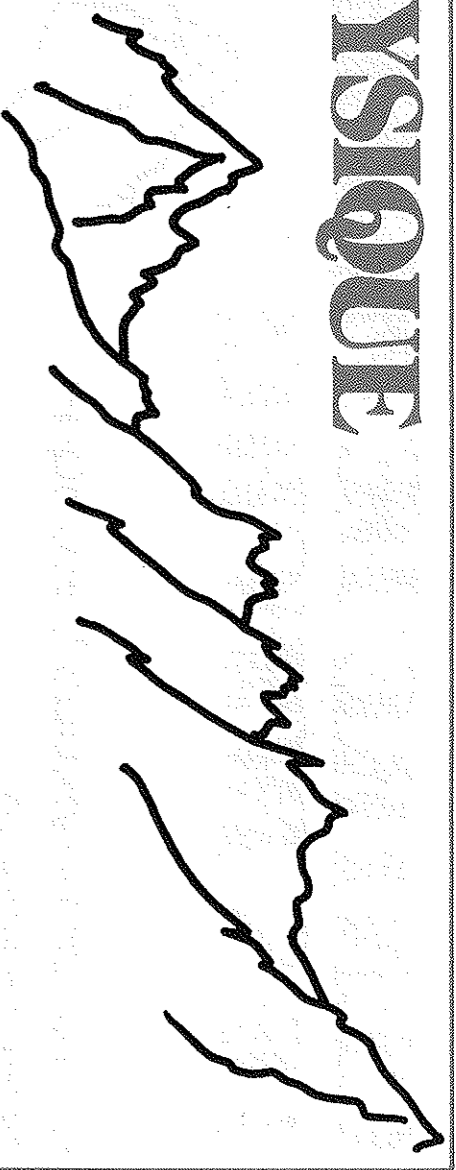
Prof. Nino BOCCARRA, Directeur - Centre de Physique - 74310 Les Houches, France - Fax : 33.50.55.53.25



# CENTRE DE PHYSIQUE DES HOUCHES

école de physique théorique

74310 LES HOUCHES  
France



## «COMPLEXITY AND EVOLUTION»

March 6 - 15, 1990

The aim of this meeting is to gather physicists, biologists, economists and other scientists interested in complex systems. The recent confluence of different sciences results in a new field with a common language. Lecturers will present the state of the art, and indicate open problems at the common frontier of the different sciences.

### Organizing committee

R. LIVI (Firenze), J.-P. NADAL (Paris), N. PACKARD (Illinois)

### Scientific committee

J.-P. AUBIN, M. DROZ, P. GRASSBERGER, S. RUFFO, G. WEISBUCH

### Lecturers

B. ARTHUR, H. ATLAN, J.-P. AUBIN, N. BOCCARA, S. CILIBERTO, B. CHOPARD, J. CRUCHFIELD,  
B. DERRIDA, D. DROZ, D. FARMER, P. GRASSBERGER, K. KANEKO, S. KAUFFMAN, M. KERSZBERG,  
P. MANNEVILLE, N. PACKARD, S. PATERNELLO, G. PARISI, L. PELITI, A. POLITI,  
R. SHAW, G. VICHNIAC, M. VIRASORO, A. VULPIANI, G. WEISBUCH

Applications, including a brief C.V., should be sent, before October 30, 1989, to :

J.-P. NADAL - Laboratoire de Physique Statistique - Ecole Normale Supérieure - 24, rue Lhomond  
F-75231 Paris Cedex 05, France - Fax : 33.1.45.87.34.89

The fee of 3 700 FF includes board and lodging at the centre and the proceedings. Attendance is limited to 60 participants.

The Centre de Physique will hold in 1990 three other meetings :

- 1 - Hadronic Physics with Multi-GeV Electrons - February 6/15, 1990
- 2 - Physics of Granular Media - February 20/March 1, 1990
- 3 - Coherent Detection at Millimeter Wavelengths and their Applications - March 20/29, 1990

To apply send a brief C.V. and recent publications to :

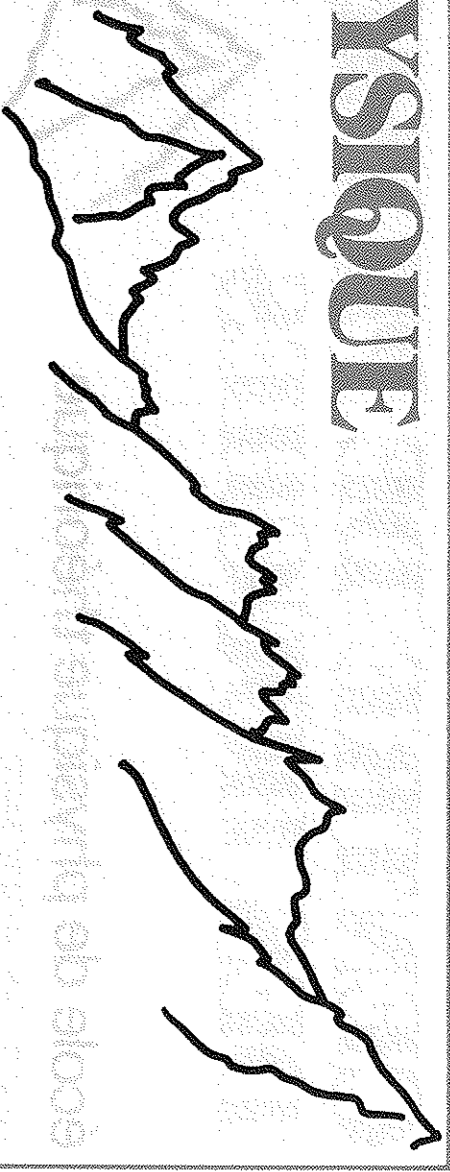
Prof. Nino BOCCARA, Directeur - Centre de Physique - 74310 Les Houches, France - Fax : 33.50.55.53.25



# CENTRE DE PHYSIQUE DES HOUCHES

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74310 LES HOUCHES  
France



## « COHERENT DETECTION TECHNIQUES AT MILLIMETER WAVELENGTHS AND THEIR APPLICATIONS » March 20 - 29, 1990

The purpose of the school is to review the present state of technology at millimeter and submillimeter wavelengths, both on the ground and in space. Emphasis will be given on new developments in critical areas (mixers, supraconductivity, local oscillators, backends, antennas). Applications of these technologies will be described : radioastronomy, limb sounding, microwave sounding of the earth and planetary atmospheres, antarctic ozone hole, plasma sounding.

The school is intended for both experimentalists and theorists. It is intended to put together young people who are working in closely related areas with the same techniques.

### Organizing committee

E. KOLLBERG (Göteborg), S. GULKIS (Pasadena), G. WINNEWISSER (Köln), P. ENCRENAZ (Paris)

### Tentative list of speakers

G. BEAUDIN (Meudon), R. BLUNDELL (Harvard), M. DEVORET (Saclay), R. GENZEL (Munich),  
S. GULKIS (Pasadena), J. GOMEZ-GONZALEZ (Granada), H. HARTFUSS (Munich),  
E. KOLLBERG (Göteborg), K. KUNZI (Bremen), D. PICK (Darmstadt), S. PNEUMATIKOS (Heraklion),  
T. PHILLIPS (Pasadena), P. SOLOMON (Stony Brook), P. SWANSON (Pasadena),  
G. WINNEWISSER (Köln)

The fee of 3 700 FF includes board and lodging at the Centre and the proceedings. Attendance is limited to 60 participants.

Applications, including a brief C.V., should be sent, before November 15, 1989, to :

P. ENCRENAZ - DEMIRM - Observatoire de Meudon - 92190 Meudon - France - Fax : 33.1.45.07.78.93

The Centre de Physique will hold in 1990 three other meetings :

- 1 - Hadronic Physics with Multi GeV Electrons - February 6/15, 1990
- 2 - Physics of Granular Media - February 20/March 1, 1990
- 3 - Complexity and Evolution - March 6/15, 1990

To apply send a brief C.V. and recent publications to :

Prof. Nino BOCCARA, Directeur - Centre de Physique - 74310 Les Houches, France - Fax : 33.50.55.53.25



# LES HOUCHES

SESSION LIII  
NATO ADVANCED STUDY INSTITUTE  
25 juin — 27 juillet 1990



école d'été de physique théorique

## SYSTÈMES FONDAMENTAUX EN OPTIQUE QUANTIQUE FUNDAMENTAL SYSTEMS IN QUANTUM OPTICS

*Scientific Direction : J. DALIBARD, ENS - CNRS, Paris, France*

*J.M. RAIMOND, ENS - Université Paris VI, France*

**Quantum Optics and Relativity :** CH.J. BORDE, Univ. Paris Nord, France  
**Laser Cooling :** C. COHEN-TANNOUDJI, Collège de France and ENS, Paris, France  
**Cavity Quantum Electrodynamics :** S. HAROCHE, ENS Paris and Yale Univ., USA  
**Noise in Quantum Optics :** H.J. KIMBLE, Cal. Tech., Pasadena, USA  
**Multi Stability and Chaos :** L.A. LUGIATO, Politecnico di Torino, Italy  
**Non Linear Optics :** Y.R. SHEN, Berkeley, USA  
**Cold Atomic Hydrogen and Collective Quantum Effects :** J.T. WALRAVEN, Amsterdam, Netherlands  
**Trapped Ions Crystallization :** H. WALTHER, Max Planck Inst., Garching, FRG

Additional lectures will be given by **D. KLEPPNER**, MIT (USA), **W. PHILLIPS**, NIST (USA),  
**S. REYNAUD**, ENS (F), **W. SCHLEICH**, MPO (FRG)

The Quantum Optics of simple systems placed in a carefully controlled environment has evolved considerably in the past few years. Many new perspectives have been opened in various fields of fundamental Quantum Physics including the control of atomic motion, single atom radiation, new non linear effects, modifications of quantum noise. This session of Les Houches is devoted to a comprehensive discussion of these topics with a complementary program of seminars covering related fields such as low energy tests of gauge theories, semi classical methods, quantum chaos, atomic aggregates... The lectures are aimed at graduate students and young researchers who wish to acquire a broad and solid knowledge in this very active field.

*Les Houches is a resort village in the Chamoniix valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at an altitude of 1000 m. It is above the village, facing the Mont-Blanc range. It is ideally for mountaineering, hiking or touring as well as for intellectual work. Accommodation and meals are provided within the School for both participants and lecturers. A financial contribution of FF 3900 — is requested from each participant. Some possibilities for grants exist. Participants who intend to rent lodgings should directly inquire at : Office du Tourisme, 74310 Les Houches (tel. 50 55 50 62). The School is affiliated with the University of Grenoble. This session is a NATO Advanced Study Institute.*

Admission forms and additional informations are available from :

ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE — 74310 LES HOUCHES, FRANCE

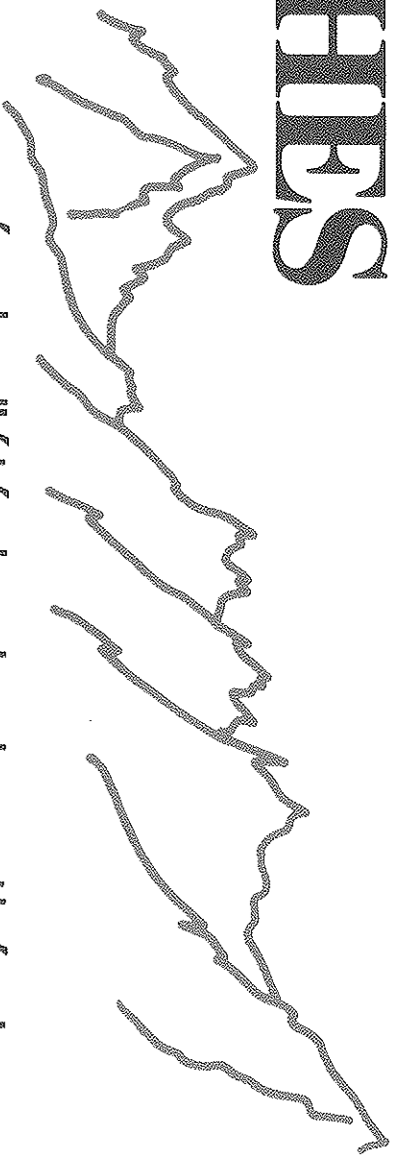
Telephone : (33) 50 54 40 69 / Fax : (33) 50 55 53 25

Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1990.

*The second 1990 session will be entitled Supernovae. Two sessions will be held in 1991, one on Phenomenology of Particles, the other on High T<sub>c</sub> Supraconductors.*



# LES HOUCHEs



SESSION LIV  
NATO ADVANCED STUDY INSTITUTE  
31 juillet — 1<sup>er</sup> septembre 1990

école d'été de physique théorique

## SUPERNOVAE

*Scientific Direction : J. AUDOUZE, IAP, Paris, France*  
*S. BLUDMAN, University of Pennsylvania, USA*

**Observations of Supernovae : R.P. KIRSHNER, CfA, Cambridge, USA**  
**Spectra, Light Curves and Cosmological Implications : D. BRANCH, Univ. of Oklahoma, USA**  
**Supernova Statistics : G.A. TAMMANN, Astronomical Inst., Basel University, CH**  
**Models for Type I Supernovae : K. NOMOTO, University of Tokyo, Japan,**

**R. CANAL, University of Barcelona, Spain**

**Models for Type II Supernovae : W. HILLEBRANDT, MPI, Garching, FRG**  
**Evolution of Massive Stars : S.E. WOOSLEY, University of California, Santa Cruz, USA**

**Final Stages of Stellar Evolution : Z. BARKAT, Hebrew Univ. of Jerusalem, Israël**  
**Nucleosynthesis in Supernovae : F.K. THIELEMANN, CfA, Cambridge, USA**

**Gamma Ray Line Emission from Supernovae : M. CASSE, CEN Saclay, France**  
**Equation of State of Dense Matter : D. VAUTHERIN, IPN Orsay, France**

**Emission from Supernovae in Early Stages : D. NADYOZHIN, ITP, Moscow, USSR**  
**Emission from Supernovae in Late Stages : C. FRANSSON, Stockholm Observatory, Sweden**  
**Supernovae and the Interstellar Medium : R.A. CHEVALIER, Univ. of Virginia, USA**

An additional programme of seminars will be organized by **R. MOCHKOVITCH, IAP, Paris, F**

Supernova explosions are among the most violent events occurring in the Universe. Their general understanding involves many different and exciting fields (hydrodynamics, radiation and neutrino transport, properties of matter in extreme physical conditions, general relativity...). Supernovae are also at the cornerstone between stellar and galactic evolution. They deeply affect the structure of the interstellar medium, accelerate cosmic rays and contribute to the enrichment of the Galaxy in heavy elements. These different aspects will be considered in a series of lectures and seminars. The observational properties of supernovae will be reviewed in detail and the theoretical framework for their description will be presented in a progressive and pedagogical way. Naturally, the emphasis will be given to the fascinating results obtained from SN 1987 A, which have confirmed several basic theoretical predictions but also have led to some new and unexpected developments. The content of the course is such that it will provide a comprehensive background for young astrophysicists wanting to enter the supernova field.

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Admission forms and additional informations are available from :

ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE — 74310 LES HOUCHEs, FRANCE

Telephone : (33) 50 54 40 69 / Fax : (33) 50 55 53 25

Complete files (admission forms and recommendation letters) must have reached this address before 15 March 1990.

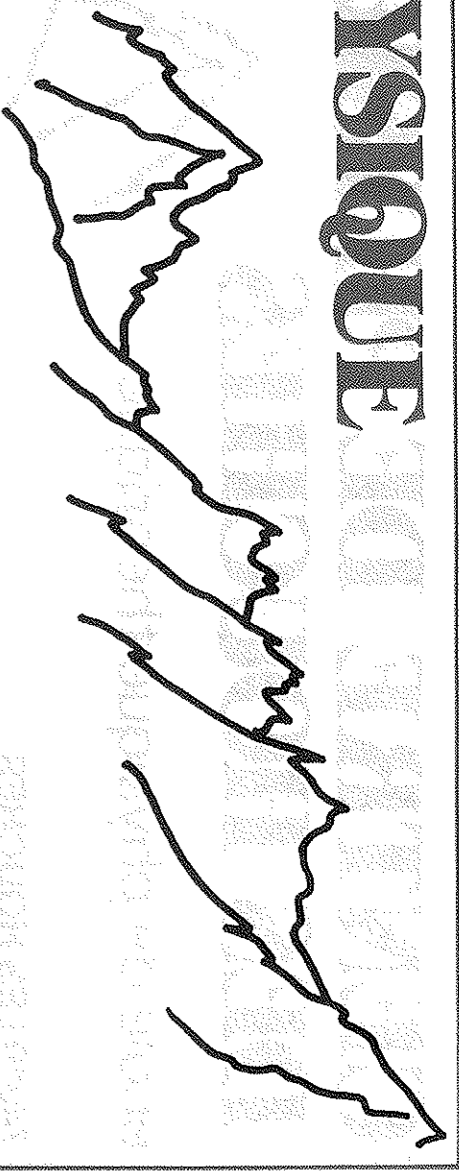
*The second 1990 session will be entitled "Fundamental systems in Quantum Optics". Two sessions will be held in 1991, one on Phenomenology of Particles, the other on High Tc Superconductors.*



# CENTRE DE PHYSIQUE DES HOUCHES

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74310 LES HOUCHES  
France



## DYNAMICAL PHENOMENA AT INTERFACES, SURFACES AND MEMBRANES 19-28 February 1991

Dynamical processes at interfaces, surfaces and membranes play an essential role in a great variety of fundamental phenomena and at the same time exhibit characteristic features of reduced dimensionality. In the present workshop physicists and chemists will be exposed to the phenomenology of complex biological systems with specific properties distinct from those normally encountered in model condensed matter systems. Biologists will benefit from recent advances in statistical mechanics of interfacial dynamics.

The workshop will present a forum for truly interdisciplinary research. Special emphasis will be put on the following topics: hydrodynamic effects, dynamics of wetting, physical mechanisms of cell motion and their role in morphogenetic changes, theoretical models of interfaces.

### Organizers

D. BEYSENS (CEN-Saclay, France), G. FORGACS (Clarkson Univ., Potsdam, USA)

### Advisory Committee

E. BREZIN (ENS, Paris), F. BROCHARD (Collège de France, Paris), Y. COUDERC (ENS, Paris),  
S.A. NEWMAN (New York Medical College, Valhalla), P. NOZIERES (Collège de France, Paris),  
M.S. STEINBERG (Princeton Univ., Princeton), B. WIDOM (Cornell Univ, Ithaca),  
M. WORTIS (Simon Fraser Univ., Vancouver)

### Among the invited lecturers

D. ABRAHAM, D. BARTHES-BIESEL, J-J BENATTAR, F. BROCHARD, W.D. COMPER, Y. COUDERC,  
J. COOKE, H.L. FRISCH, C. FRANCK, I. GIAEVER, A. GIERER, D. HUSE, M. KARDAR, S. LEIBLER, L. LEGER,  
R. LIPOWSKY, J.E. MITTENTHAL, H. MULLER-KRUMBHAR, S.A. NEWMAN, M. SCHICK, M.S. STEINBERG,  
M. ZUCKERMANN, M. TELO DA GAMA, R.L. TRELSTAD, B. WIDOM, J. VILLAIN, M. WORTIS.

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Participants will be requested to pay a fee of 3 800 F.F. which includes boards and lodging at the Center during the workshop. Attendance is limited to 60 participants.

To apply send a brief C.V. and recent publications to :

Professeur N. BOCCARA Directeur du Centre de Physique - 74310 LES HOUCHES, France.

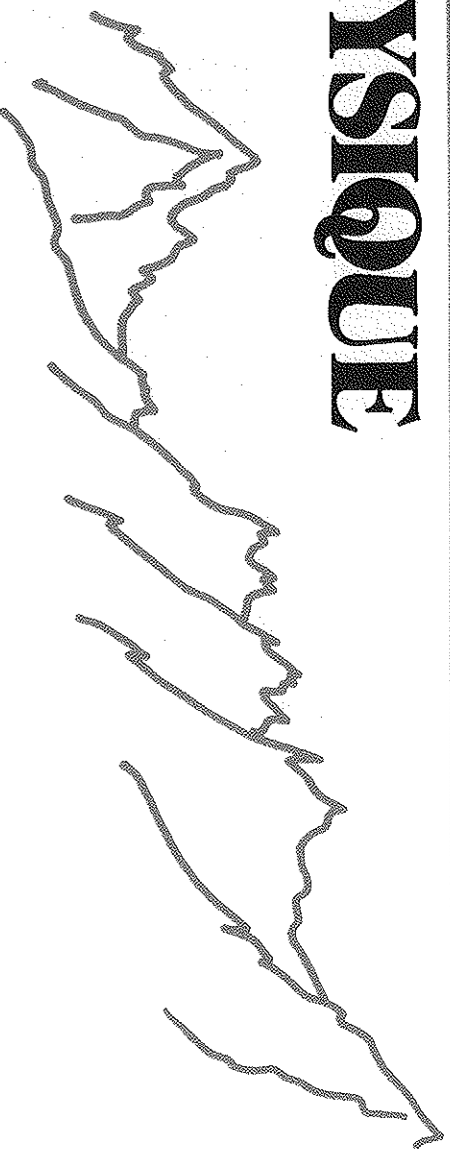
*For information on the other five meetings to be held in the Centre de Physique in 1991 contact the Directeur du Centre.*



# CENTRE DE PHYSIQUE DES HOUCCHES

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74310 LES HOUCCHES  
France



## NATO ADVANCED STUDY INSTITUTE ON

# SINGLE CHARGE TUNNELING

## March 5-15, 1991

The purpose of the school is to review the present state of our understanding of single charge tunneling and Coulomb effects in ultrasmall junction circuits, both normal and superconducting. Emphasis will be put on basic issues such as the effect of traversal time, normal state conductance and temperature, and of the electromagnetic environment, as well as on elaborate phenomena like correlated charge transfer in junction arrays. The school will also cover fabrication techniques and potential applications. It will bring together leading scientists and young researchers, both experimentalists and theoreticians.

### Organizing Committee

M. DEVORET (Saclay), H. GRABERT (Director, Essen), J. MARTINIS (Boulder)

### Preliminary list of speakers

A. BARATOFF (Zürich), M. BÜTTIKER (Yorktown Heights), T. CLAESON (Göteborg), J. CLARKE (Berkeley),  
G.J. DOLAN (Philadelphia), D. ESTEVE (Saclay), Y. IMRY (Rehovot), G.L. INGOLD (Essen),  
A.J. LEGGETT (Urbana), K.K. LIKHAREV (Moscow), J.E. MOOIJ (Delft), G. SCHÖN (Delft),  
M. TINKHAM (Cambridge), F.I.B. WILLIAMS (Saclay)

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**The fee of 3 800 FF includes board and lodging at the Centre. Attendance is limited to 60 participants.**

To apply, send a brief C.V. and recent publications to :  
Professor Hermann GRABERT, Fachbereich Physik, Universität-GHS Essen - D-4300 ESSEN 1  
(Federal Republic of Germany). Fax : (201) 183 2120.  
Applications must have reached this adress before December 1, 1990.

*For information on the five winter meetings to be held in the Centre de Physique in 1991 contact :*  
Professeur N. BOCCARA, Directeur du Centre de Physique - 74310 LES HOUCCHES, France.  
Telephone : (33) 50.54.40.69/Fax : (33) 50.55.53.25.

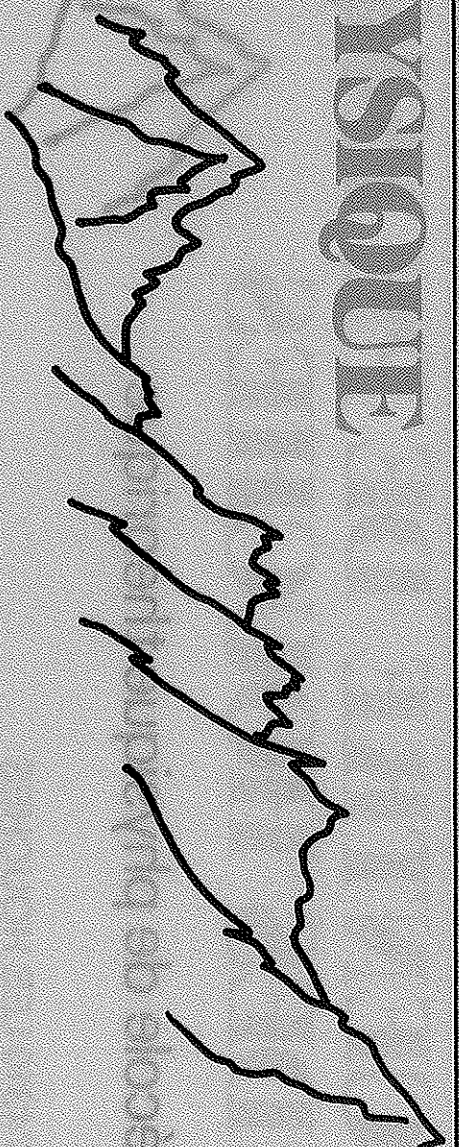


# CENTRE DE PHYSIQUE DES HOUCHES

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74310 LES HOUCHES

France



## THE INFRARED AND SUBMILLIMETRE SKY AFTER COBE March 20-30, 1991

In November 1989, NASA launched the Cosmic Background Explorer (COBE) satellite. During one year, the three instruments onboard COBE (FIRAS, DMR, and DIRBE) will be mapping the sky at wavelengths from 1  $\mu\text{m}$  to 1 cm, with the aims of (i) measuring the relic radiation of the primeval Universe back in redshift to  $z \approx 10^6$ , and (ii) studying the large-scale infrared and submillimetre emission of the Galaxy. As a first result, COBE has already found the Cosmic Microwave Background (CMB) to display the spectrum of a black body of temperature  $2.735 \pm 0.06$  K between 500  $\mu\text{m}$  and 1 cm within one percent of its peak intensity, and to be angularly featureless. In addition to the precise measurement of the spectrum and large-scale anisotropy of the CMB, COBE will attempt to detect a possible Cosmic Infrared Background (CIB) due to the cumulative emission of objects formed since the decoupling of matter and radiation ( $z \approx 10^3$ ). With its full set of maps of the Galaxy from 1-3  $\mu\text{m}$  up to 300  $\mu\text{m}$ , COBE will also significantly help us study the composition of the interstellar medium and better understand the energy budget of our Galaxy.

Nearly six months after the end of the observing period, that might take place in October 1990, time will be ripe to allow all physicists concerned with the CMB, CIB and infrared emission of the Galaxy and their fundamental implications, to meet with the aim of reviewing achievement problems and prospects in these fields. The Session will therefore bring together experimentalists-either belonging to the COBE Science Team or scientists in charge of balloon launches and ground-based telescopes -, and theoreticians - both astrophysicists and particle physicists. It is also intended for young people who are working in closely related areas. The ultimate goal of the School is to help answer the question :

*How are the Universe and our Galaxy to be understood after COBE?*

### Organizing committee

**M. HAUSER** (Greenbelt), **F. MELCHIORRI** (Roma), **D. SCIAMA** (Trieste), **M. SIGNORE** (Paris)

### Tentative list of speakers

**X. BARCONS** (Santander), **A. BLANCHARD** (Meudon), **F. BOUCHET** (Paris), **F. BOULLANGER** (Paris)/  
**F.-X. DÉSERT** (Meudon), **B. CARR** (London), **R. CHINI** (Bonn), **P. DE BERNARDIS** (Roma),  
**E. DWEK** (Greenbelt), **S. GULKIS** (Pasadena), **J.-M. LAMARRE** (Orsay), **A.N. LASENBY** (Cambridge, UK),  
**E. MARTÍNEZ-GONZÁLEZ** (Santander), **F. MELCHIORRI** (Roma), **G. RAFFELT** (München),  
**P. SALATI** (Annecy), **N. SÁNCHEZ** (Meudon)/**G. VENEZIANO** (Genève), **J. SILK** (Berkeley),  
**G. SMOOT** (Berkeley), **I.A. STROUKOV** (Moscow), **M. TURNER** (Batavia, USA), **N. VITTORIO** (L'Aquila),  
**E.L. WRIGHT** (Los Angeles)

The fee of 3 800 FF includes board and lodging at the Centre, and the proceedings. Attendance is limited to 60 participants.

Application, including a brief C.V. and recent publications, should be sent before December 15, 1990 to :  
**M. SIGNORE** and **C. DUPRAZ** - École Normale Supérieure - 75231 PARIS Cedex 05 - France -  
Fax : 33 (1) 45.87.34.89.

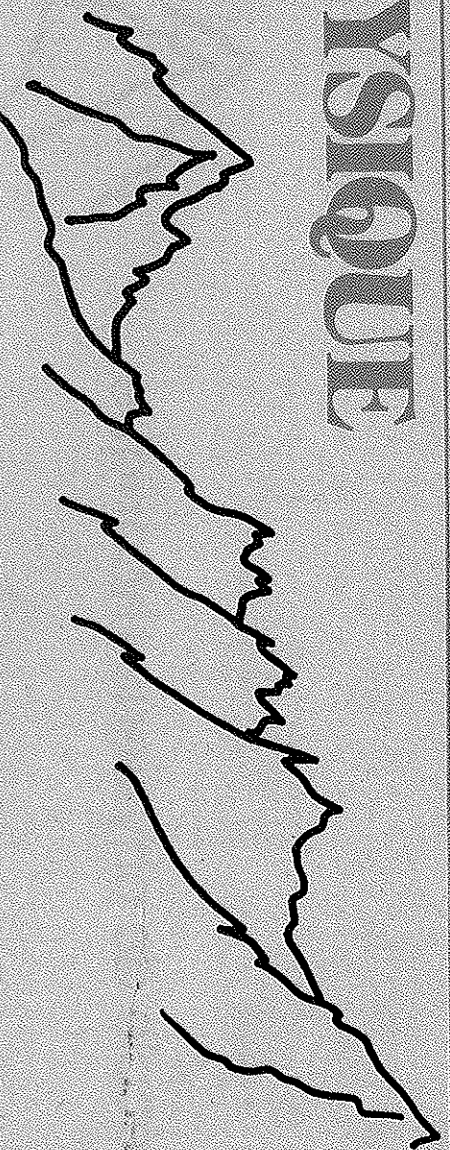
The Centre de Physique des Houches organizes other meetings in 1991. For more information, please contact :  
Prof. Nino BOCCARA, Directeur - Centre de Physique - 74310 LES HOUCHES - France - Fax : 33.50.55.53.25.



# CENTRE DE PHYSIQUE DES HOUCHEES

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74310 LES HOUCHEES  
France



## INFRARED ASTRONOMY WITH ISO 13-27 June, 1991

This workshop is designed to help the astronomical community in the preparation of the ISO (Infrared Space Observatory) mission. ISO, funded by ESA, will be an Earth-orbiting infrared observatory, with four focal plane instruments funded by ESA member states. It will explore the infrared sky during a 18 months mission (1993-1995). It will be one of the major projects of space astronomy in this decade. Observations will be performed on the basis of individual proposals, as for the IUE and HST missions. This workshop is planned to ensure good preparation of the scientific community and to encourage cooperation among various groups. A specific aim of this workshop will be to stimulate and to help young scientists to make the best use of ISO. The workshop will be organized around 8 main courses, with approximately 4 hours per course, and a large number of seminars of 1h-1.5h each (20 to 30). The main courses will give background information on infrared astronomy in various disciplines (Cosmology, Extragalactic astrophysics, Stellar Physics, Interstellar medium, Solar System). A description of the ISO mission and its capabilities will also be given. The seminars will address more specific questions: recent infrared results, coordination ISO/SIRTF, coordination between ISO and ground-based observations, coordination ISO/VLT, need for laboratory and theoretical work...

### Organizing Committee

Th. Encrenaz (Meudon), H. Habing (Leiden), M. Harwit (Washington), M. Kessler (Noordwijk), A. Omont (Paris)

### List of lecturers

M. ANDEREGG (Noordwijk), C. CESARSKY (Saclay), P. CLEGG (London), L. D'HENDECOURT (Paris),  
T. DE GRAAUW (Groningen), M. DE MUIZON (Leiden), P. ENCRENAZ (Paris), T. ENCRENAZ (Meudon),  
R. GENZEL (Garching), H. HABING (Leiden), M. HARWIT (Washington), M. HAUSER (Maryland),  
M. KESSLER (Noordwijk), R. JOSEPH (Hawaii), D. LEMKE (Heidelberg), J. LEQUEUX (Paris),  
M. LONGAIR (Edinburgh), A. MOORWOOD (Garching), A. OMONT (Paris), J.L. PUGET (Orsay),  
D. ROUAN (Meudon), E. VAN DISHOECK (Leiden), M. WERNER (Pasadena), P. WESSELLIUS (Groningen),  
G. WINNEWISSER (Köln).

The fee of 3 800 FF includes board and lodging at the Centre, and the proceedings. Attendance is limited to 60 participants.

Applications, including a brief C.V., should be sent before January 15, 1991 to

Therese ENCRENAZ, Département de Recherches Spatiales, Observatoire de Paris - F-92195 Meudon Cedex.  
E-mail: MEGASA::ENCRENAZ or "THENCRE at FRMEU51".

The Centre de Physique des Houches organizes other meetings in 1991. For more information, please contact :  
Prof. Nino BOCCARA, Directeur - Centre de Physique - 74310 LES HOUCHEES - France - Fax :33.50.55.53.25.



# LES HOUCHEs



SESSION LV  
NATO ADVANCED STUDY INSTITUTE  
30 juin — 26 juillet 1991

école d'été de physique théorique

## LA PHYSIQUE DES PARTICULES DANS LES ANNÉES QUATRE VINGT DIX PARTICLES IN THE NINETIES

*Scientific Direction : J. ILIOPoulos, ENS-CNRS, Paris, France*

The Standard electroweak model : G. ALTARELLI, CERN, Geneva, CH and L. MAIANI, Univ. di Roma I, I  
Q.C.D. confronts experiment : A. MUELLER, Columbia, New-York, USA

Beyond the standard model : P. FAYET, ENS, Paris, F  
Superstrings : D. GROSS, Princeton, USA

Lattice gauge theories : G. PARISI, Univ. di Roma II, I

$e^+e^-$  experimental results : M. DAVIER, L.A.L., Orsay, F and A. WAGNER, Heidelberg, F.R.G.

$p\bar{p}$  experimental results : M. SHOCHET, Chicago, USA

Additional lectures will be given by S. COLEMAN (Harvard, USA), S.L. GLASHOW (Harvard, USA),  
G. 't HOOFT (Utrecht, the Netherlands), K. KOUNNAS (ENS, France), D.V. NANOPoulos (Texas, USA)

In the physics of elementary particles the coming years may turn out to be decisive. LEP has already provided the answers to some outstanding questions of particle physics. We know the exact number of light neutrino species and we have improved limits on new particles. With high precision measurements we shall be able to test the theory at the level of radiative corrections. But also these years will be those of preparation for the next generation of supercolliders. They will open the way to the TeV scale, which is expected to be the scale of new fundamental physics. Questions such as the origin of spontaneous symmetry breaking, the elementary or composite nature of quarks and leptons or the existence of new interactions may be answered at this scale. The purpose of the School will be twofold : on the one hand it will teach young scientists the physical ideas and the powerful techniques of modern elementary particle physics. On the other hand it aims at bringing young theorists in contact with the latest experimental results.

*Les Houches is a resort village in the Chamornix valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at an altitude of 1000 m. It is above the village, facing the Mont-Blanc range. It is ideal for mountaineering, hiking or touring as well as for intellectual work. Accommodation and meals are provided within the School for both participants and lecturers. A financial contribution of FF 3300 — is requested from each participant. Some possibilities for grants exist. Participants who intend to rent lodgings should directly inquire at : Office du Tourisme, 74310 Les Houches (tel. 50 55 50 62). The School is affiliated to the University of Grenoble. This session is a NATO Advanced Study Institute.*

Admission forms and additional information are available from :

ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE — 74310 LES HOUCHEs, FRANCE

Telephone : (33) 50 54 40 69 / Fax : (33) 50 55 53 25

Complete files (admission forms and recommendation letters) must have reached this address before March 1, 1991. The second 1991 session will be entitled "STRONGLY INTERACTING FERMIONS AND HIGH Tc SUPERCONDUCTIVITY". Two sessions will be held in 1992, one on Gravitation and Quantification, the other on Image Processing.



# LES HOUCHES



SESSION LVI  
NATO ADVANCED STUDY INSTITUTE  
30 juillet — 31 août 1991

école d'été de physique théorique

## FERMIONS EN FORTÉ INTERACTION ET SUPRACONDUCTIVITÉ A HAUTE TEMPÉRATURE STRONGLY INTERACTING FERMIONS AND HIGH T<sub>c</sub> SUPERCONDUCTIVITY

*Scientific Direction* : B. DOUCOT, CRTBT - CNRS, Grenoble, F  
R. RAMMAL, CRTBT - CNRS, Grenoble, F

**Introduction to strongly correlated systems** : T.M. RICE, ETH Zürich, CH  
**Experimental properties of low dimensional electron gases in organic and high T<sub>c</sub> Superconductors** :  
D. JEROME, Université d'Orsay, Paris, F

**Fermi Liquid Theory** : W. KOHN, Univ. of California, Santa Barbara, USA  
**Fermionic Methods for elementary statistical systems** : C. ITZYKSON, CEA, Saclay, F  
**Quantum Monte Carlo for Interacting Fermions** : D. CEPERLEY, Univ. of Illinois, USA  
**Numerical Methods for Quantum spin systems** : A.P. YOUNG, Santa Cruz, USA  
**Phenomenology and Modelling of high T<sub>c</sub> Superconductors** : P. LITTLEWOOD, Bell Labs. Murray Hill, USA  
**Strongly interacting Fermions in one dimension** : F.D.M. HALDANE, Princeton University, USA  
**Questions, Controversies and frustration in Quantum Antiferromagnetism** : P. COLEMAN, Rutgers Univ., USA  
P. CHANDRA, NEC, Princeton, USA  
**Exotic Excitations and their interactions in strongly coupled Fermion systems** : R. SCHRIEFFER,  
Univ. of California, Santa Barbara, USA

Since its discovery in 1986, high temperature superconductivity has stimulated a tremendous research activity, on both experimental and theoretical sides. The physical properties of these systems are beginning to be established on solid grounds from the wealth of experimental results. At this point, it seems quite clear that these materials belong to the class of strongly correlated fermion systems, for which doped Mott insulators appear as a paradigm. Analogies with other fields such as heavy fermions, quantized Hall effect, fractional statistics are blossoming and provide new insights since conventional perturbative methods break down. The school is intended to provide a clear exposition of these new concepts which are deeply changing the research in condensed matter physics. Among others, a complete review on experimental properties of these materials will be given. The lecture on Fermi Liquid. Theory is aimed to provide a better understanding of this quite successful theory, in order to identify the dramatically new features of high T<sub>c</sub> superconductors compared to conventional Fermi Liquids. Similarities with other systems and key concepts such as Luttinger liquids, heavy fermions, fractional statistics, flux phases will be discussed. And since now, numerical techniques (Quantum Monte Carlo, exact diagonalization) have become a major source of information on lattice models, pedagogical reviews on these methods are included. As usual, seminars given by the participants and study groups on specific topics will be organized.

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Telephone : (33) 50 54 40 69 / Fax : (33) 50 55 53 25

Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1991. The second 1991 session will be entitled "Particles in the nineties". Two sessions will be held in 1992, one on Gravitation and Quantification, the other on Image Processing.

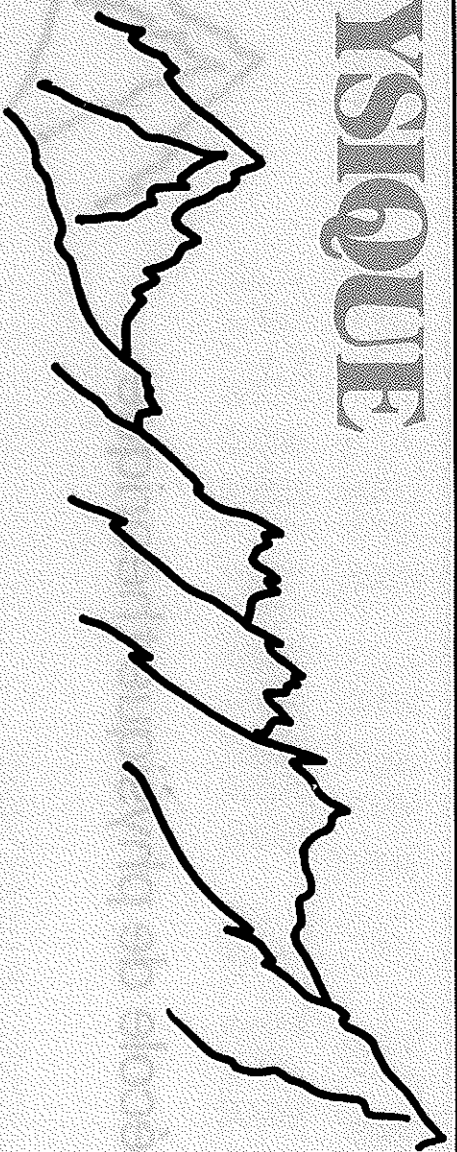


# CENTRE DE PHYSIQUE DES HOUCHEs

école de physique théorique

74310 LES HOUCHEs

France



## TURBULENCE IN SPATIALLY EXTENDED SYSTEMS January 21 - 30, 1992

The school is intended to review new ideas in the field of chaotic systems described by many scales of motion. In particular the relevant topics of the school are :

turbulence;  
spatio temporal chaos;  
multifractals;  
coherent structures;  
lattice gases, cellular automata and lattice Boltzmann equation;  
high resolution two and three dimensional numerical experiments;  
laboratory experiments for turbulent flows;  
renormalization group approach to turbulence.

In these subjects there has been a growing number of new ideas introduced in the fast few years. It is time to review these ideas and to clarify the open problems likely to be studied in the forthcoming future. New experimental techniques and laboratory experiments which allow to test the recent theoretical approaches will be studied. A particular emphasis will be given on theoretical approaches based on field theory and statistical mechanics rather than on the theory of dynamical systems of few degrees of freedom. Also non standard numerical modelling, like cellular automata and lattice gases, will be discussed in order to understand their relevance in getting new physical insight in the problems. Finally, the geometry of both two and three dimensional turbulence will be studied through numerical and laboratory experiments.

### Organizing Committee

R. BENZI (Roma), C. BASDEVANT (Paris), S. CILIBERTO (Lyon).

### Tentative List of Speakers

B. CASTAING (Grenoble), Y. COUDER (Paris), P. COULLET (Nice), S. DOUADY (Paris), S. FAUVE (Lyon),  
U. FRISCH (Nice), G. GALLAVOTTI (Roma), J. GOLLUB (Haverford), P. HUERRE (Paris), B. LEGRAS (Paris),  
A. LIBCHABER (Princeton), B. NICOLAENKO (Los Alamos), E. NOVIKOV (Stanford), S. ORSZAG (Princeton),  
G. PALADIN (l'Aquila), G. PARISI (Roma), Y. POMEAU (Paris), S. RUFFO (Firenze), E. SIGGIA (Cornell),  
K. SREENIVASAN (Yale), S. SUCCI (Roma), H. SWINNEY (Austin), A. VULPIANI (l'Aquila).

The fee of 4 700 FF includes board and lodging at the Centre, and the proceedings.  
Attendance is limited to 70 participants.

Applications including a brief C.V. and a list of recent publications should be sent before October 15, 1991 to  
C. BASDEVANT - L.M.D. - École Normale Supérieure - 24, rue Lhomond - 75231 Paris Cedex 05 - France -  
Fax : 33 (1) 43 36 83 92 - e-mail basdevan@berlioz.ens.fr.

The Centre de Physique des Houches organizes other meetings in 1992. For more information, please contact :  
Prof. Nino BOCCARA, Directeur - Centre de Physique - 74310 LES HOUCHEs - France - Fax : 33.50.55.53.25.

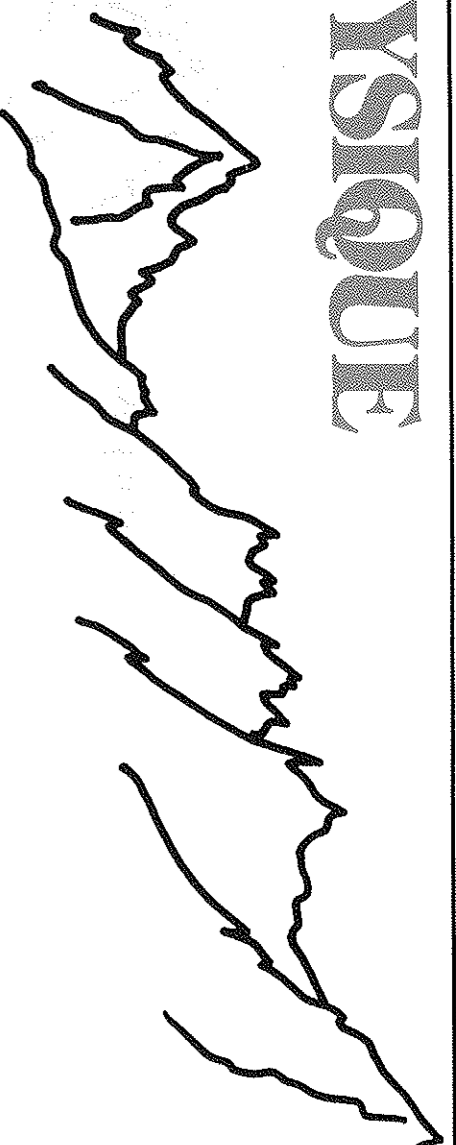
The school is a **NATO** Advanced Study Institute.



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique

74310 LES HOUCHEES  
France



## REGULATION OF NONLINEAR SYSTEMS WITH STATE CONSTRAINTS

March 09 - March 12 1992

The topic of this meeting is to survey and to confront methods to tackle the issues dealing with the evolution of controlled systems evolving under state constraints (controlled invariance) and subject to state-dependent controls.

The point is to compare several techniques used to tackle these problems, including differential algebra and geometry, set-valued and nonsmooth analysis, viability theory.

Among the questions under investigation, the following topics are emphasized : stabilization around an equilibrium or an attractor, asymptotic observability, tracking problems, evolution under uncertainty, resilience and robustness with respect to perturbations, differential games (against nature), Hamilton-Jacobi equations, descriptor systems.

*This meeting follows a graduate course on the same topic of the MATARI (Mathematical Toolkit for Artificial Intelligence and Regulation of Macro-systems) programme of the European programme COMETT, taught by Jean-Pierre Aubin et Hélène Frankowska, which is held in the Centre de Physique from March 3 to March 7 1992.*

### Organizing committee

A. BENSOUSSAN (INRIA), C. BYRNES (Washington University of Saint-Louis),  
G. DA PRATO (Scuola Normale di Pisa), H. FRANKOWSKA (Université de Paris-Dauphine),  
A. ISIDORI (Università di Roma)

### Tentative list of speakers

BANKS H.T., CANNARSA P., FLIESS M., JAKUBCZYK B., KRENER A., LUNARDI A., MORSE S.,  
PUEL J.-P., QUINCAMPOIX M., RESPONDEK W., ROCKAFELLAR R. T., RZEUZUCHOWSKI T., SALLET G.,  
SAMSON C., VINTER R., WETS R., ZOLESIO J.-P.

The fee of 1 900 FF includes board and lodging at the Centre. Attendance is limited to 60 participants.

Application, including a brief CV and recent publications, should be sent before December 15, 1991 to :  
Professeur Jean-Pierre AUBIN, École Doctorale de Mathématiques de la Décision,  
Université de Paris-Dauphine, 75775 PARIS CEDEX 16 France, Fax : 33 (1) 43.25.58.45.

This session is supported by "la Formation Permanente du CNRS".

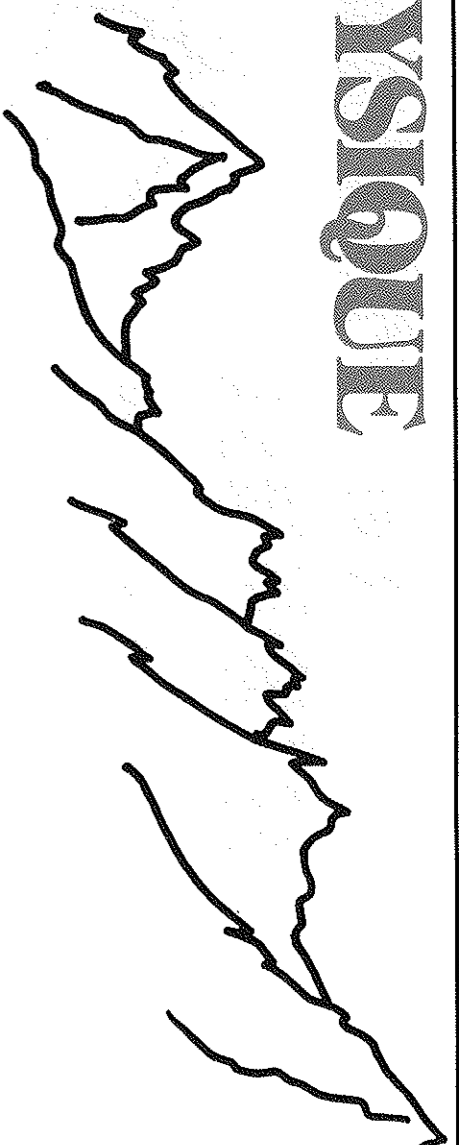
The Centre de Physique des Houches organizes other meetings in 1992. For more information, please contact :  
Prof. Nino BOCCARA, Directeur, Centre de Physique, F-74310 LES HOUCHEES, France, Fax : (33) 50.55.53.25.



# CENTRE DE PHYSIQUE DES HOUCHEs

école de physique théorique

74310 LES HOUCHEs  
France



## MATHEMATICAL METHODS MOTIVATED BY NEURAL NETWORKS AND LEARNING PROCESSES March 23 - March 26 1992

The purpose of this meeting is to survey and to confront the different mathematical and physical problems motivated by the learning processes of neural networks and parallel distributed systems, used both in classification problems, temporal series and pattern recognition, the learning of regulation laws (or feedbacks, closed loop controls) regulating controlled systems evolving under (nonholonomic) state constraints and cognitive systems able to act and adapt to the environment, closer to neurobiological considerations.

*This meeting follows a graduate course on the same topic of the MATARI (Mathematical Toolkit for Artificial Intelligence and Regulation of Macro-systems) programme of the European programme COMETT, taught by Jean-Pierre AUBIN et Nicolas SEUBE, which is held in the Centre de Physique from March 16 to March 20 1992.*

### Organizing committee

S. AMARI (Tokio), M. ARBIB (USC, Los Angeles), J.-P. HATON (INRIA),  
J.-P. NADAL (École Normale Supérieure), D. POTIER (Thomson LCR),  
D. SHERRINGTON (University of Oxford), M. VIRASORO (Università di Roma)

### Tentative list of speakers

AGUR Z., AMARI S., AMIT D., AN DER HEIDEN U., AZENCOTT R., BLUME E., BUHMANN J., CAMPBELL J.,  
COSNARD M., COTTRÉL M., DOMANY E., DOYAK K., DREYFUS G., MACKAY D., MARDER E., NATOWICZ R.,  
NISHIMORI H., RUGET G., SATO M., SCHULTEN K., SEUBE N., SHINOMOTO S., TOULOUSE G.,  
WEINFELD M., WILLIAMS T., ZIPPELIUS A.

The fee of 1 900 FF includes board and lodging at the Centre. Attendance is limited to 60 participants.

Application, including a brief CV and recent publications, should be sent before December 15, 1991 to :  
Professeur Jean-Pierre AUBIN, École Doctorale de Mathématiques de la Décision,  
Université de Paris-Dauphine, 75775 PARIS CEDEX 16 France, Fax : 33 (1) 43.25.58.45.

This session is supported by "la Formation Permanente du CNRS".

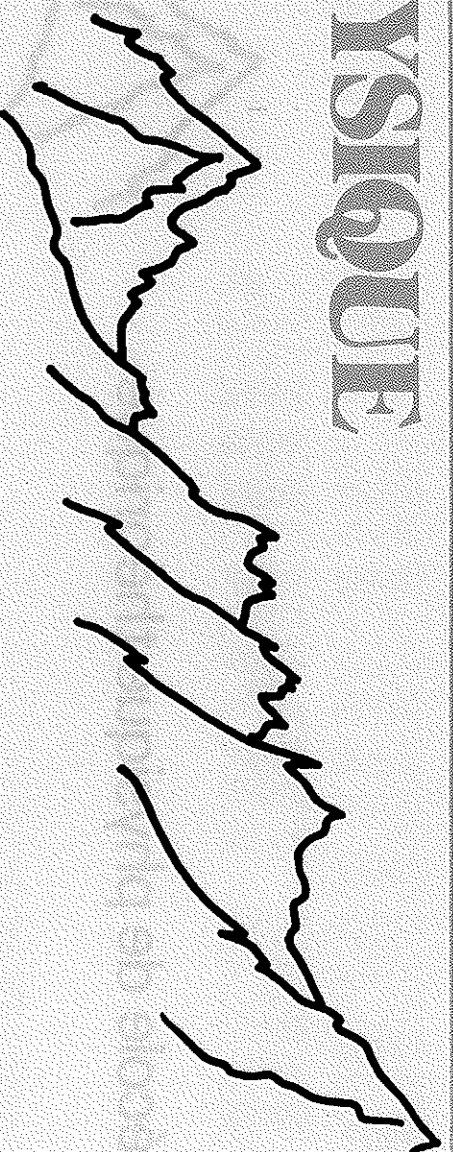
The Centre de Physique des Houches organizes other meetings in 1992. For more information, please contact :  
Prof. Nino BOCCARA, Directeur, Centre de Physique, F-74310 LES HOUCHEs, France, Fax : (33) 50.55.53.25.



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique

74310 LES HOUCHEES  
France



## SURFACE DISORDERING : GROWTH, ROUGHENING AND PHASE TRANSITIONS

March 31 - April 9, 1992

Surfaces and interfaces play an essential role in many advanced technological processes and they are, at the same time, in the focus of basic research. The present workshop will contribute on recent developments in the statistical physics of surfaces far from equilibrium, where nonlinearities lead to novel dynamical critical phenomena. The fruitful application of new theoretical concepts and techniques like fractals, field theory and computer modelling has contributed to a deep understanding of surface growth. Advanced experimental methods have been increasingly used in this field. This workshop attempts to emphasize the interdisciplinary aspects and to present a forum for interaction among experimentalists, theoreticians and computational physicists.

Main topics :

Computer simulations, theoretical models and experimental realizations of kinetic roughening, scale invariant surfaces, morphological transitions, molecular beam epitaxy, vapour deposition, fluid displacement in porous media and biological growth.

### Organizing committee

Rémi JULLIEN Université Paris Sud, Orsay	János KERTÉSZ Universität zu Köln	Paul MEAKIN Du Pont Wilmington	Dietrich WOLF Forschungszentrum Jülich
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### Tentative list of invited speakers

E. BAUER, D. DERRIDA, D. DHAR, F. FAMILY, J. FEDER, M. KARDAR, M. LAGALLY, J. LAPUJOLADE,  
R. LIPOWSKY, B.B. MANDELBROT, M. MATSUSHITA, T. NATTERMANN, G. PARISI, L. SANDER,  
B. SAPOVAL, H.E. STANLEY, T. VICSEK, J. VILLAIN, Y.C. ZHANG

The fee of 3 900 FF includes board and lodging at the Centre, and the proceedings. Attendance is limited to 60 participants. Application, including a brief C.V. and recent publications, should be sent before October 31, 1991 to : R. JULLIEN - Bât. 510 - Physique des Solides - Université Paris Sud - 91405 ORSAY - France -  
FAX : 33 (1) 69.41.60.86

This session is supported by "la formation permanente du CNRS".

The Centre de Physique des Houches organizes other meetings in 1992. For more information, please contact :  
Prof. Nino BOCCARA, Directeur - Centre de Physique - 74310 LES HOUCHEES - France - FAX : 33 50.55.53.25.

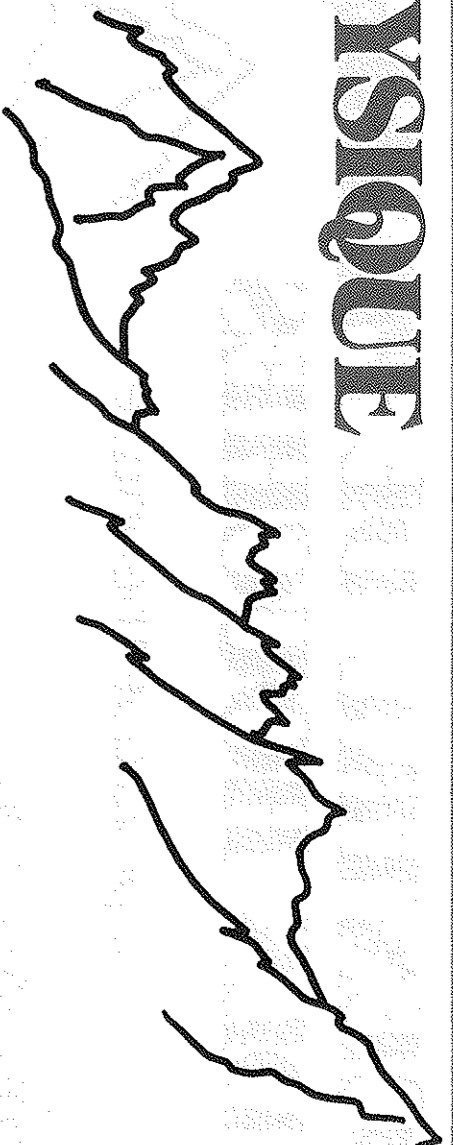


# CENTRE DE PHYSIQUE DES HOUCHES

école de physique théorique

74310 LES HOUCHES

France



## CELLULAR AUTOMATA AND COOPERATIVE SYSTEMS June 22 - July 2, 1992 NATO Advance Study Institute (910820)

The goal of this conference is to bring together Mathematical Physicists, Theoretical Physicists and Mathematicians working in various fields related to local interacting systems.

These models are used to describe collective phenomena in Physics (systems of particles, avalanches, image restoration, spin glasses and percolation), Ecology (population discrete dynamics), and Mathematical Immunology.

Main Themes :

Systems of Particles, Self-Organised Criticality, Percolation, Spin Glasses, Cellular Automata, Probabilistic Cellular Automata.

### Organising committee

Pierre PICCO (Directeur, Marseille), Nino BOCCARA (Saclay), Anton BOVIER (Bochum),  
Errico PRESUTTI (Roma)

### Scientific committee

Nino BOCCARA (Saclay), Éric GOLES (Santiago), Servet MARTINEZ (Santiago), Pierre PICCO (Marseille)

### Tentative list of invited speakers.

M. AIZENMAN (Princeton), N. BOCCARA (Paris), A. BOVIER (Bochum), M. CASSANDRO (Roma),  
K. CULIK (Columbia), A. DEMASI (L'Aquila), B. DERRIDA (Saclay), R. DOBRUSHIN (Moscow),  
G. GALLAVOTTI (Roma), A. GALVES (Sao Paulo), M. GARZON (Memphis), E. GOLES (Santiago),  
G. GRIMMETT (Bristol), R. KOTECKY (Praha), T. LIGGETT (Los Angeles), R. LIVI (Firenze),  
S. MARTINEZ-AGUILERA (Santiago), G. MARTINEZ-MEKLER (Mexico), F. MARTINELLI (Roma),  
M. MENDES-FRANCE (Bordeaux), M. MEZARD (Paris), C. NEWMAN (New York), E. OLIVIERI (Roma),  
E. ORLANDI (Roma), P. PICCO (Marseille), E. PRESUTTI (Roma), L. RUSSO (Roma),  
R. SCHONMANN (Los Angeles), E. SCOPPOLA (Roma), S. SHLOSMAN (Moscow), Y. SINAI (Moscow)

The fee of 3 900 FF includes board and lodging at the Center, and the proceedings.

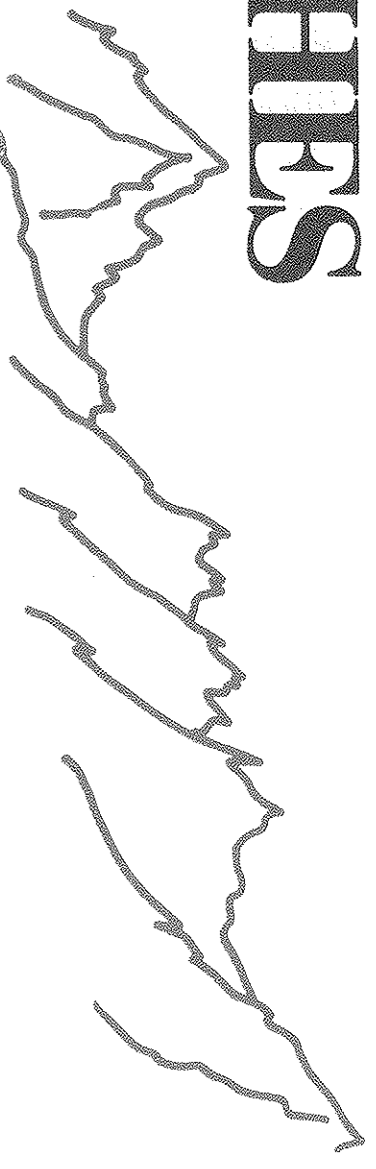
Applications including a brief C.V. and some recent publications should be sent before May 1, 1992 to  
Pierre PICCO - Courant Institute of Mathematical Sciences  
251 Mercer Street-New York NY 10012 USA. Fax 1-212-995 41 21.  
e-mail Picco @acf3.nyu.edu.

The Centre de Physique organizes other meetings in 1992-1993. For more information, please contact :  
Prof. N. BOCCARA, Director, Centre de Physique, 74310 LES HOUCHES, France. Fax (+33) 50.55.53.25.

This session is supported by "la Formation Permanente du CNRS".



# LES HOUCHEs



SESSION LVII  
NATO ADVANCED STUDY INSTITUTE  
5 juillet — 1<sup>er</sup> août 1992

école d'été de physique théorique

## GRAVITATION ET QUANTIFICATIONS GRAVITATION AND QUANTIZATIONS

*Scientific Direction : B. JULIA, ENS - CNRS, Paris, France*

Experimental constraints on Gravitation theories : T. DAMOUR, I.H.E.S. France  
Quantization Methods : G. ZUCKERMANN, Yale, USA

Non perturbative Canonical Gravity : A. ASHTEKAR, Syracuse, USA  
Quantum Mechanics for closed systems and spacetimes : J. HARTLE, UCSB, USA  
Quantum Gravity and String theories : L. ALVAREZ-GAUME, CERN, CH

Quantization in curved spacetimes : R. WALD, Chicago, USA

Two-dimensional Quantum Gravity and String theory : F. DAVID, CEA, Saclay and E. BREZIN, ENS, France

Two-dimensional Quantum Geometry : A. POLYAKOV, Princeton, USA

Non-commutative Geometry : A. CONNES, Collège de France, France

Colloquium lectures will be given by B. de WITT (Austin, USA), T. REGGE (Torino, Italy), G. 't HOOFT (Utrecht, Netherlands), P. van NIEUWENHUIZEN (Leiden, Neth. and Stony Brook, USA), (G. WILKOVISKY Lebedev Ph. Institute, USSR, to be confirmed)...

In the coming years we shall hopefully discover and study classical gravitational waves, emitted during the collapse of supernovae or close binaries for example. The theoretical understanding of the corresponding quantum theory remains one of the main challenges of Physics. The School will be a thorough preparation for young scientists interested in this problem but also for all those who will use advanced methods of quantization. It is also addressed to physicists and mathematicians interested in the recent developments in string theory and quantum geometry and to cosmologists. Seminars by participants and study groups will be organized on the latest developments.

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Admission forms and additional informations are available from :

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Telephone : (33) 50 54 40 69 / Fax : (33) 50 55 53 25

Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1992

*The second 1992 session will be entitled "Progress in Picture Processing".*

*Two sessions will be held in 1993, one on Computational fluid dynamics, the other on Cosmology and large scale structure.*



# LES HOUCHEES



SESSION LVIII  
NATO ADVANCED STUDY INSTITUTE  
10 août — 4 septembre 1992

école d'été de physique théorique

## LES PROGRÈS DU TRAITEMENT DES IMAGES PROGRESS IN PICTURE PROCESSING

*Scientific Direction : H. MAITRE, TELECOM-Paris, France*

**Discrete Representations :** G. BORGEFORS, Swed Def. Res. Est. Sweden  
**Feature Extraction :** P. ZAMPERONI, Univ. Braunschweig, Germany  
**Restoration and Filtering :** J. BIEMOND, Univ. Delft, Netherland  
**Scene Analysis :** R. NEVATIA, Univ. South. California, USA  
**Markov Random Fields :** R. AZENCOTT, Univ. Paris XI, France  
**Mathematical Morphology :** F. PRETEUX, Telecom-Paris, France  
**3D Object Processing :** T. KASVAND, Concordia Univ., Canada

Additional lectures will be given by **S. MALLAT** (New-York Univ., USA), **F. SCHMITT** (Telecom-Paris), **N. FARVARDIN** (Univ. Maryland, USA).

In the 90s, digital picture processing enters a period of maturity which makes it one of the most powerful and most reliable tools in the field of computer sciences. In the domains of robot vision, quality control, autonomous vehicle guidance, for aerial and satellite image interpretation as well as for the medical diagnosis, digital picture processing appears as an unavoidable stage. Fundaments of picture processing are now well established : they collect techniques issued from signal processing, mathematics, cognitive sciences, psychophysis and neurophysiology, but they also encompass novel and original methods originated from an exceptionally rich experience in the service of industry and research. The purpose of the Summer School is to provide an up-to-date review of the fundamentals of picture processing, starting from the very beginning (sampling theorem, filtering, Fourier transform, etc.), focusing on the mature topics : (mathematical morphology, markov random fields, scale space decomposition), and addressing the newly emerging techniques : wavelets, 3D representations and recognition. The attendees will be non-specialists of picture processing, having a good knowledge of signal processing, mathematics and computer science.

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Telephone : (33) 50 54 40 69 / Fax : (33) 50 55 53 25

Complete files (admission forms and recommendation letters) **must** have reached this address **before March 1, 1992.**

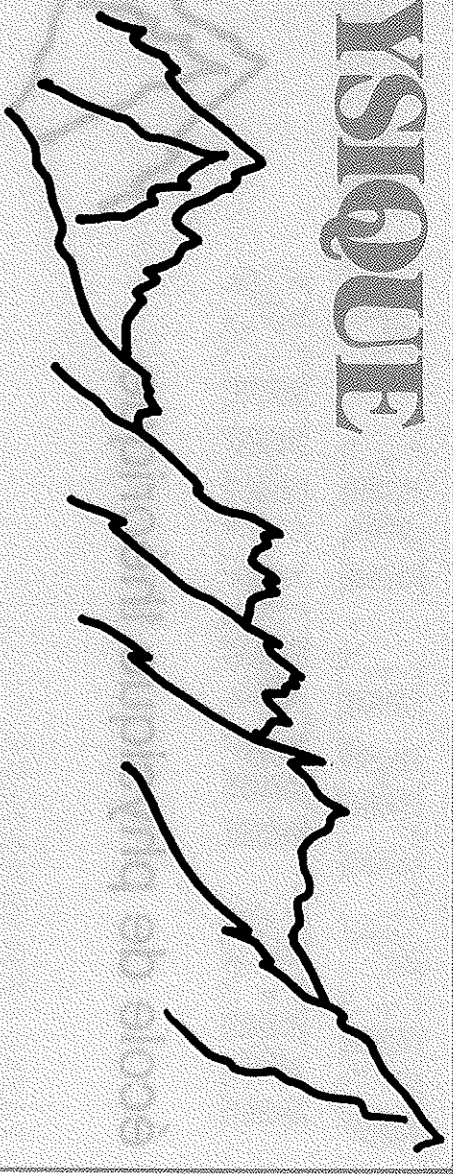
*The second 1992 session will be entitled "Gravitation and Quantizations".*

*Two sessions will be held in 1993, one on Computational fluid dynamics, the other on Cosmology and large Scale Structure.*



# CENTRE DE PHYSIQUE DES HOUCHES

école de physique théorique



74310 LES HOUCHES

France

## INTERDISCIPLINARY WORKSHOP ON

“Statistical Description of Transport in Plasma,  
Astro- and Nuclear Physics”

February 2 - 11, 1993

The aim of this workshop is to get together physicists of different fields concerned with problems of kinetic theory and transport.

In **hot-plasma physics** the description of particle and energy transport remains a central problem for thermonuclear fusion. Among the subjects to be discussed are: binary and collective collisions, anomalous transport in Tokamaks, heating, electrostatic turbulence, transport in chaotic magnetic fields, filamentation, percolation.

Kinetic theory is also an important tool in modern **astrophysics**. Two domains are concerned: the statistical theory of gravitational interactions (cosmology, stellar clusters, ...) and the kinetic theory of high energy plasmas (cosmic rays transport, particles in strong shocks, environment of black holes).

Transport problems in **nuclear physics** concern heavy ion collisions implying energies ranging from several tens of MeV/particle to ultrarelativistic ones (hundreds of GeV/particle). Important subjects are: Meanfield dynamics, two body collisions, transport including meson degrees of freedom, particle correlations, fluctuations and fragmentation, quark gluon plasma (mean free path and hadronisation).

## Organizing committee

J. MISGUICH (Cadarache), G. PELLETER (Grenoble), P. SCHUCK (Grenoble).

## Scientific committee

R. BALESCU (Bruxelles), R. BALLIAN (Saclay), J.-P. BLAIZOT (Saclay), P. DANIELEWICZ (Michigan S.U.),  
P. GOLDRICH (Pasadena), J.-P. HANSEN (Lyon), G. LAVAL (Palaiseau), A. MOREL (Saclay),  
J.-E. PEEBLES (Princeton), R. PELLAT (Palaiseau), B. REMAUD (Nantes), J.-B. TAYLOR (Culham).

## Tentative list of speakers

R. BALLIAN (Saclay), J.-P. HANSEN (Lyon), J. RAMMER (Trondheim).

Plasma Physics: R. BALESCU (Bruxelles), G. GIRUZZI (Cadarache), A.-V. GRUSINOV (Moscow),  
A. HIROSE (Saskatchewan), P. MORA (Palaiseau), J.-B. TAYLOR (Culham), P. TERRY (Madison),  
R.-B. WHITE (Princeton).

Astrophysics: E. BERTSCHINGER (M.I.T.), G. HENRI (Grenoble), J. KIRK (Heidelberg), J. KUIPERS (Utrecht),  
D. LE QUÉAU (Paris), P.-Y. LONGARETTI (Toulouse), R. PELLAT (Palaiseau), R. SCHLICKEISER (Bonn),  
H.-J. VÖLK (Heidelberg).

Nuclear Physics: G. BERTSCH (Michigan S.U.), J.-P. BLAIZOT (Saclay), W. CASSING (Giessen),  
P. DANIELEWICZ (Michigan S.U.), M. MIROWCZYNSKI (Warsaw), C. PETHICK (Nordita),  
J. RANDRUP (Berkeley), B. REMAUD (Nantes).

The fee will be about 4 700 FF and will include board and lodging at the Centre, and the proceedings. Attendance is limited to 66 participants. A few grants are possible for students.

Applications including a brief C.V. and a list of recent publications should be sent before October 15, 1992 to P. SCHUCK - I.S.N. - 53 avenue des Martyrs, F-38026 GRENOBLE Cedex - France - Fax: (33) 76.28.40.04.

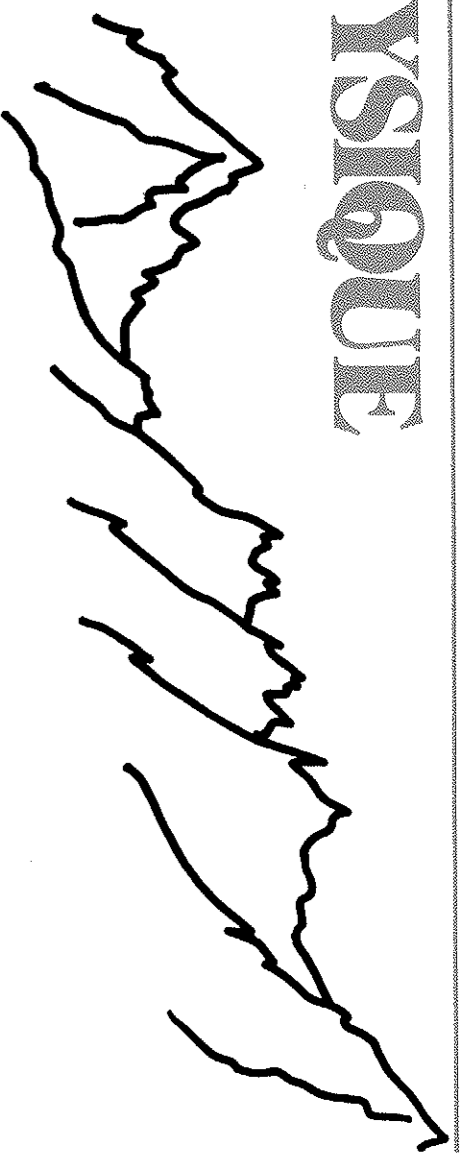
The school is supported in part by the Commission of the European Communities, C.N.R.S., C.E.A., patronized by Société Française de Physique, and organized in partnership with the industrial companies Electricité de France, Société Européenne de Propulsion and Victor Technologies.



# CENTRE DE PHYSIQUE DES HOUCHES

école de physique théorique

NATO ADVANCED RESEARCH WORKSHOP  
74310 LES HOUCHES  
France



## SOFT ORDER in Physical Systems

LES HOUCHES (France) - 16 February - 25 February 1993

*in honor of Shlomo ALEXANDER*

### Under the auspices of the French Academy of Sciences

Ill condensed matter and disordered media have been the focus of intense activity in recent years. Introduction of new concepts like fractals, fractons, reptation like dynamics, etc. increased our understanding from a fundamental point-of-view. Moreover, those new concepts are strongly coupled with current applied research of new and innovative materials. It is the purpose of this conference to bring together scientists working in several sub-fields of "soft-order" systems. An unifying state-of-the-art picture hopefully will emerge. It is also an opportunity to honor Shlomo Alexander from the Weizmann Institute who has played an important role in the development of this entire field of research.

### Topics

- Random media, disordered solids
- Elasticity of gels and composites
- Exotic phases: liquid crystals, quasi crystals
- Crystal growth morphologies
- Polymers
- Colloids
- Granular flow, sand, powder.

### Preliminary list of invited speakers

BASTIDE J. (Strasbourg), BROKMAN A. (Hebrew), BRUINSMA R. (UCLA), CABANE B. (Saclay),  
CATES M. (Cambridge), CHAIKIN P. (Princeton), GOUYET J.F. (Palaiseau), GREST G. (Exxon),  
HALPERIN A. (UCSB), HAVLIN S. (Bar Ilan), JOANNY J.F. (Strasbourg), KANTOR Y. (Tel-Aviv),  
KLEMAN M. (Orsay), KOHN W. (Santa Barbara), KREMER K. (Jülich), LEVINE D. (Technion),  
MARET G. (Grenoble), NAKAYAMA (Sapporo), PIERANSKY P. (Orsay), RABIN I. (Bar Ilan),  
REICH S. (Weizmann), SAFRAN S. (Weizmann), VACHER R. (Montpellier).

### Organising committee

P.G. de GENNES, (Paris) Chairman  
D. ANDELMAN, (Tel-Aviv), E. COURTENS, (Zürich), G. DEUTSCHER, (Tel-Aviv), R. MAYNARD, (Grenoble),  
P. PINCUS, (Santa-Barbara), I. PROCCACCIA, (Weizmann).

Attendance is limited to 60 participants.

Applications, including a brief C.V., should be sent before December 15, 1992 to:  
Pr. R. MAYNARD or Mme M. PERETTO (secrétariat de la Conférence sur l'"Ordre Doux"), Maison des Magistères,  
UJF/CNRS, BP 166 - 38042 GRENOBLE Cedex 9, FRANCE (Fax: (33) 76 88 79 81).

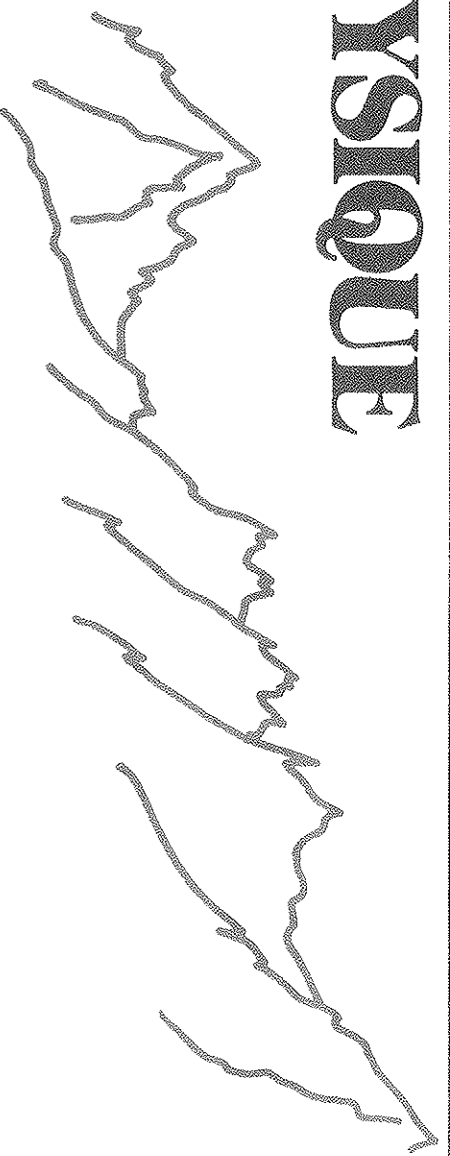
For information on the other meetings to be held in the Centre de Physique in 1993, please contact Pr. N. BOCCARA,  
Directeur, 74310 LES HOUCHES FRANCE, Fax: (33) 50 55 53 25.



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique

74310 LES HOUCHEES  
France



## FRAGMENTATION PHENOMENA 12-17 April 1993

Fragmentation covers a wide range of phenomena in science and technology. Fragmentation studies are developing very rapidly in many areas such as subatomic particles, soft matter and materials.

Fragmentation processes are in most cases very complex and ill understood. The researchers in many fields are confronted with the need to characterize the data in a meaningful way and to determine the dynamical processes that cause fragmentation.

The aim of the workshop is to gather practitioners of fragmentation, experimentalists as well as theorists to promote interactions by many oral contributions and discussions.

The workshop will be organized around general subjects, such as dynamics of fragmentation, kinetic equations, fracture, percolation and fluctuations. Emphasis will be given to phenomena in atomic nuclei and clusters, colloids, polymers, gels, drops and jets, powders and cements, meteoroides and planetary fragments. The proceedings will be published.

### Scientific committee

R. ENGLMAN (Yavne), P. ÉVÈQUE (Paris), H. HERRMANN (Jülich), J. HÜFNER (Heidelberg),  
P. LALLEMAND (Paris), P. MEAKIN (Oslo), Y. POMEAU (Paris), S. REDNER (Boston), N. RIVIER (London).

### Among the speakers

C. ALLAIN, A. BRAHIC, C. BRECHIGNAC, M. DAOUD, C. DEUTSCH, R. ENGLMAN, P. ÉVÈQUE, D. GROSS,  
H. HERRMANN, J. HÜFNER, P. MEAKIN, A. MENCHACA-ROCHA, J. MEUNIER, C. PEREZ-GARCIA,  
R. PESCHANSKI, E. PLAGNOL, Y. POMEAU, S. REDNER, J. RICHERT, N. RIVIER, S. ZALYESKI.

### Organizers

D. BEYSENS (Saclay), X. CAMPI (Orsay) et E. PEFFERKORN (Strasbourg)

*Les Houches is a resort village in the ChamoniX valley of the French Alps. Established 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at 1000 m elevation. It is ideally located for mountaineering, skiing or touring as well as for intellectual work.*

Participants will be requested to pay a fee of 2000 FF which includes boards, lodging at the Center during the workshop, and the proceedings. Attendance is limited to 60 participants. This session is supported by "La formation permanente du CNRS".

To apply send a brief C.V. to: Mme F. DYKSTRA, Atelier Fragmentation, IPN, F-91 406 ORSAY-Cedex (FRANCE) -  
fax: (33) 1 69 28 58 97.

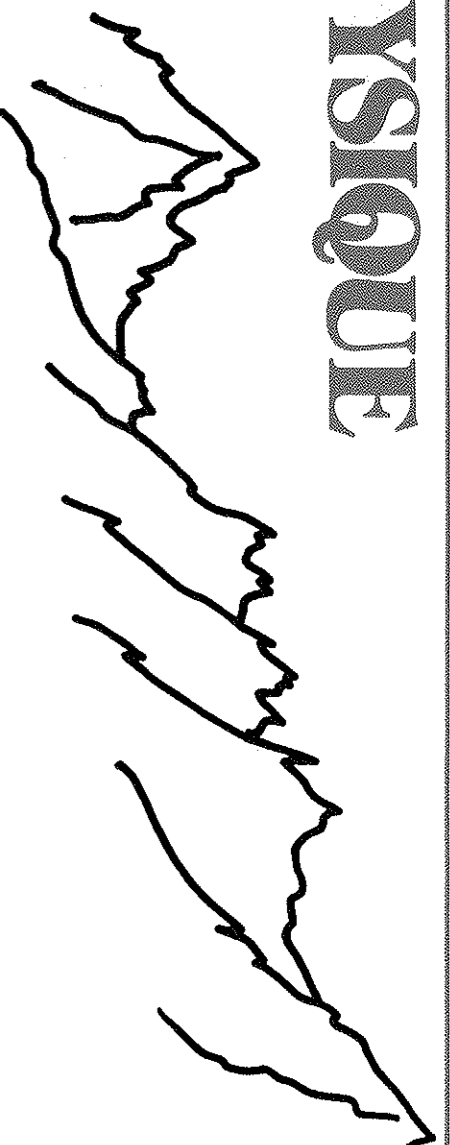
*For information on the other meetings to be held in the Centre contact the Directeur du Centre, N. Boccara, Centre de Physique des Houches, F-74310 LES HOUCHEES (FRANCE).*



# CENTRE DE PHYSIQUE DES HOUCHES

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NATO ADVANCED RESEARCH WORKSHOP  
74310 LES HOUCHES  
France



## WORKSHOP

### High performance computing in the geosciences

June 21 - 25 1993

The aims of this workshop are:

- Survey the state of the art of scientific programs presently being developed and which require high performance computing for their implementation.
- Provide a guide of decision making in what concerns computing directions in future numerical models.
- Provide an ensemble view of future developments of Massively Parallel Processors (MPP's) and their implications for numerical modeling in the geosciences.

#### Invited Speakers

P. BUDGELL (IBM, Norway), K. DROGENMEIER (University of Oklahoma),  
A. GRIEWANK (Argonne National Laboratory), G. MCRAE (MIT, USA), G. MEURANT (CEA, France),  
A. SIMMONS (ECMWF, Reading, UK), P. SWARZTRAUBER (NCAR, USA).

#### Sessions (Provisional list)

Performance of numerical models on MPP's  
Tools of development on parallel machines  
Domain decomposition methods  
Future developments of operational models  
Data assimilation, sensitivity analysis  
Automatic differentiation  
Coupled models  
Management of large data bases  
Performing graphic tools  
Performing optimization methods.

#### Participants

The number of participants is limited to 65 persons. We encourage the participation of meteorologist, oceanographers, geophysicist, astrophysicist, mathematicians and computer scientist.

#### Publications of Communications

The communications will be published in a book in 1993.

#### Scientific Committee

P. BUDGELL (IBM, Norway), K. DROGENMEIER (U. of Oklahoma), M. GARBEY (U. de Lyon),  
A. GRIEWANK (Argonne National Laboratory), F.-X. LE DIMET (U. de Grenoble),  
L.M. NAVON (Florida State U.), R. ROSSET (U. de Toulouse), D. TRYSTRAM (U. de Grenoble).

The "Centre de Physique des Houches" is located in a group of mountain chalets, near Chamorix in the heart of French Alps, in a magnificent site facing the Mont-Blanc range. It is an ideal site for mountaineering, hiking, and site seeing tours. Established in 1951 the École de Physique des Houches is worldwide known (25 Nobel's prize winners taught at the École).

#### Fees

Fees will be FF 2 000 (about US \$ 400) and will include food and lodging at "Centre de Physique des Houches".

#### Contributed papers

Extended abstract (1 page) should be submitted **before March 15.**

#### Deadlines

March 15, 1993, Deadline for reception of extended abstracts and registration forms.

April 1, 1993, Notification for acceptance of contributed papers.

April 5, 1993, Notification of the program of the workshop.

#### Admission form and additional informations are available from:

François-Xavier LE DIMET - Laboratoire de Modélisation et Calcul, IMAG - Université Joseph Fourier - B.P. 53 X  
38041 GRENOBLE Cedex, France - Phone (33) 76 51 46 75 - Fax (33) 76 63 12 63 - e-mail: ledimet@imag.fr

The School is affiliated with Université Joseph Fourier (Grenoble). This session is granted by Centre National de la Recherche Scientifique, Institut "Informatique et Mathématiques Appliquées" de Grenoble (IMAG), and by la "Formation Continue du CNRS".



# LES HOUCHES



école d'été de physique théorique

## SESSION LIX

NATO ADVANCED STUDY INSTITUTE

28 juin — 30 juillet 1993

## MÉCANIQUE DES FLUIDES NUMÉRIQUE COMPUTATIONAL FLUID DYNAMICS

*Scientific Direction: M. LESIEUR, Institut de Mécanique de Grenoble, France*

**Incompressible Turbulent Flows:** J. FERZIGER, Stanford, USA

**Vortex Dynamics:** A. CHORIN, Berkeley, USA

**Spectral Methods:** C. CANUTO, Torino, Italy

**Turbulence and Coherent Vortices:** M. LESIEUR, Grenoble, France

**Compressible and Reacting Flows:** J. RILEY, Seattle, USA

**Viscous Flows and Non-Linear Hyperbolic Problems:** R. GLOWINSKI, INRIA, France

**Atmospheric Phenomena:** D. LILLY, Univ. Oklahoma, USA

**Oceanic Circulation Modelling:** W. HOLLAND, NCAR, USA

**Industrial Flows Modelling:** B. LAUNDER, Manchester, Great Britain

**Massively Parallel Computations:** R. RANNACHER, Heidelberg, Germany

The unprecedented increase of computer power, combined with the development of efficient visualization tools, has irreversibly changed the landscape of fluid dynamics in its fundamental and applied aspects. Precise and fast numerical algorithms provide accurate solutions for the equations of fluid motion, in particular for phenomena which are rapidly changing in time and space, such as turbulence, vortices and shock waves. The applications of Computational Fluid Dynamics (CFD) are immense, e.g. in hypersonic aerodynamics, combustion and propulsion, meteorology, oceanography, climate studies, pollution in the environment, internal geophysics or astrophysics. From a more theoretical standpoint, these new numerical tools are bringing a revolution in the understanding of continuous media physics, and shed new light on instability, vortices, deterministic chaos, intermittency and fractal geometry. The programme will give a broad presentation of all the principal aspects of CFD, combining discussion of the various numerical methods with examples from physical, environmental or industrial applications. It is intended in particular for selected graduate students and young scientists and engineers. Additional lectures given by leading experts will present recent results in CFD as well as from the laboratory. Practical CFD work will be also carried out by students, in a CFD laboratory specially settled for the duration of the programme.

Additional lecturers: confirmed participation of C. BEGUIER, R. BILGER, J.P. BONNET, M. BRACHET, J.P. CHOLLET, P. COMTE, P. COULLET, Y. GAGNE, M. GASTER, E. HOPFINGER, B. LEGRAS, M. MENEGUZZI, O METAIS, A. MORICE, J. PEREIRA, J. PERIAUX, J. SOMMERIA, A. TSINOBER, J. VERRON.

*Les Houches is a resort village in the Chamornix valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at an altitude of 1000 m. It is above the village, facing the Mont-Blanc range. It is ideal for mountaineering, hiking or touring as well as for intellectual pursuits. Accommodation and meals are provided within the School for both participants and lecturers. A financial contribution is requested from each participant (FF 4600 - for Academic, FF 8000 - for Industrial). Some possibilities for grants exist. Participants who intend to rent lodgings should directly inquire at: Office du Tourisme, 74310 Les Houches (tel. 50 55 50 62). The School is affiliated to the University Joseph Fourier of Grenoble. This session is a NATO Advanced Study Institute, and organized with the support of ERCOFTAC. It is granted by: "la formation permanente du CNRS", CISI-Ingénierie, DRET, Kubota Pacific and HEWLETT-PACKARD.*

Admission forms and additional informations are available from:

ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE — 74310 LES HOUCHES, FRANCE

Telephone: (33) 50 54 40 69 / Fax: (33) 50 55 53 25

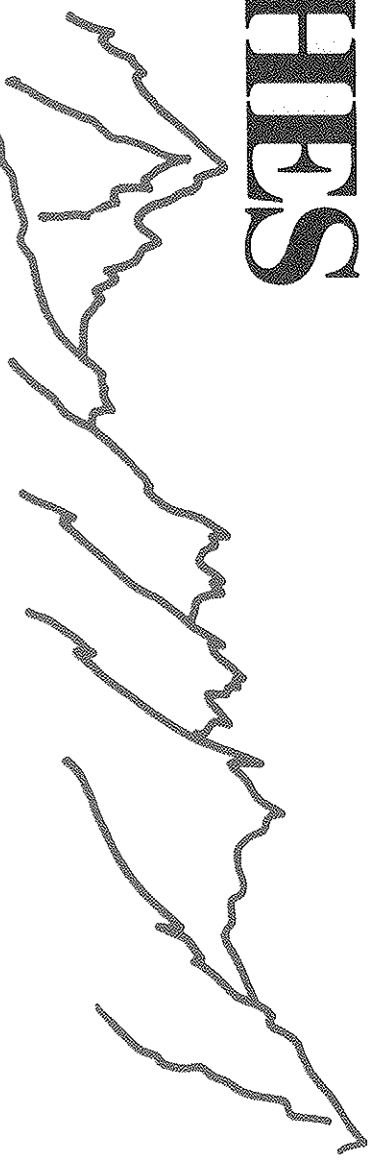
Complete files (admission forms and recommendation letters) must have reached this address before 1 March 1993.

*The second 1993 session will be entitled "Cosmology and large scale structure".*

*Two sessions will be held in 1994, one on "Fields Theory and statistical mechanics of extended objects, the other on "Mesoscopic Systems".*



# LES HOUCHEs



école d'été de physique théorique

## SESSION LX

NATO ADVANCED STUDY INSTITUTE

1<sup>er</sup> Août — 28 Août 1993

## COSMOLOGY AND LARGE SCALE STRUCTURE

*Scientific Direction:* **R. SCHAEFFER** (Saclay, France), **J. SILK** (U.C. Berkeley, USA),  
**M. SPIRO** (Saclay, France).

Standard Cosmological Models (Th): **A. BLANCHARD**, Meudon, France  
Standard Cosmological Models (Obs): **G. TAMMANN**, Basel, Switzerland  
Dark Baryonic Matter (Obs): **K. FREEMAN**, MSSSO, Australia  
Dark Baryonic Matter (Th): **J. SILK**, Berkeley, USA  
Very Early Universe: **J. ELLIS**, CERN, Switzerland  
Microwave Background: **R. BOND**, CITA, Canada  
Large Scale Structure (Obs): **G. EFSTATHIOU**, Oxford, England and **V. DE LAPPARENT**, IAP, France  
Large Scale Structure (Th): **E. BERTSCHINGER**, MIT, USA and **A. SZALAY**, Budapest, Hungary  
Direct Detection of Dark Matter: **B. SADOULET**, Berkeley, USA  
Galaxy Formation and Evolution: **S. WHITE**, Cambridge, England  
Deep Galaxy Counts: **A. TYSON**, Bell Labs, USA

Colloquium lectures will be given by: **J. BERGERON\*** (IAP, France), **F. BOUCHET** (IAP, France), **A. BOUQUET** (Paris, France), **C. CESARSKY** (Saclay, France), **M. PIERRE\*** (MPE, Garching), **R. JUSZKIEWICZ** (N. Copernicus, Poland), **P. LENA** (Meudon, France), **G. RAFFELT** (MPI, Munich), **J. RICH** (Saclay, France), **V. RUBAKOV\*** (Moscow), **B. ROCCA-VOLMERANGE** (IAP, France), **G. SMOOT\*** (Berkeley, USA), **N. VITTORIO** (Un. Roma, Italy).  
Evening talk: **J. AUDOUZE** (France).  
\*to be confirmed.

Over the last few years, galaxy counts in 2 and 3 dimensions and numerous velocity field surveys have become available to provide a unique view of the present universe on large scales. Deep galaxy counts now allow one to tackle the problem of galaxy formation. The discovery of the cosmic microwave background fluctuations and the searches for dark matter in our neighborhood give us for the first time a probe of the conditions prevailing in the very early universe. This school will provide a comprehensive review of these discoveries, their interrelations and their cosmological implications. It is aimed towards young scientists working on these problems, but also towards more experienced astrophysicists and physicists interested in getting a broader view of the field. Seminars by participants and study groups will be organized around the latest developments.

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Admission forms and additional information are available from:

ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE - 74310 LES HOUCHEs, FRANCE

Telephone: (33) 50 54 40 69 / Fax: (33) 50 55 53 25.

Complete files (admission forms and recommendation letters) must have reached this address **before 1 March, 1993**.

*The second 1993 session will be entitled "Computational Fluid Dynamics".*

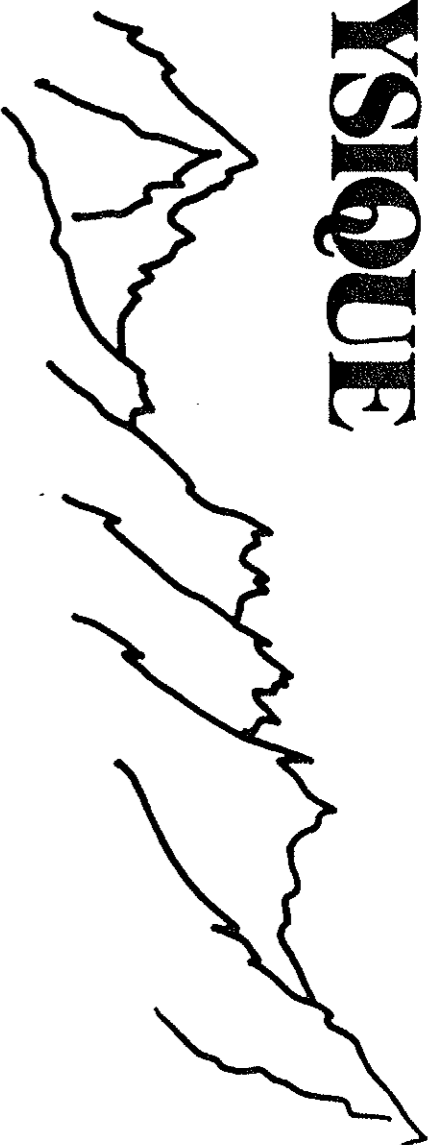
*Two sessions will be held in 1994, one on "Fields Theory and statistical mechanics of extended objects", the other on "Mesoscopic Systems".*



# CENTRE DE PHYSIQUE DES HOUCHEES

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Nato Advanced Research Workshop

## SCIENCE WITH ASTRONOMICAL NEAR-IR INFRARED SKY SURVEYS

20-24 September 1993

The advent of near-infrared array detectors allows revolutionary opportunities for surveying large regions of the infrared sky. A European project at ESO (DENIS) and an American one (2MASS) will provide within a few years near-infrared surveys of the sky with a sensitivity improved by a factor of  $10^4$  over what is currently available. Together with the opening of the far-infrared window by space missions, these data should produce fundamental progress in many fields of astronomy.

In order to maximize scientific output from these operations, the different groups engaged in the European consortium are organizing this workshop to bring together specialists from the wide range of fields expected to benefit from the new work. A large participation of the American colleagues engaged in the 2MASS project is expected. The workshop aims at a broad discussion of the scientific results expected in the various fields and at discussions regarding the best strategy for the scientific exploitation of the survey results. The main topics discussed will include :

- Local populations of low luminosity stars
- Galactic structure
- Magellanic Clouds
- Structure of the local Universe
- Population and evolution of evolved stars
- Young stars and molecular clouds
- Stellar populations of galaxies

Specialized sessions will be devoted to instrumentation and survey strategy and to reduction, analysis, archiving and distribution of the data.

The scientific level of the workshop will be particularly appropriate for advanced graduate students and postdocs, as well as to those currently involved in the field.

### Scientific Committee

- I. Appenzeller (Heidelberg), C. Beichman (Pasadena), M. Davis (Berkeley), T. de Jong (Groningen), G. Gilmore (Cambridge), H. Habing (Leiden), M. Jura (UCLA), J. Lequeux (Meudon), J. L. Puget (Orsay)
- I. Appenzeller, C. Beichman, A. Blanchard, C. Cesarsky, T. Chester, T. de Jong, N. Epchtein, M. Feast, J. Frogel, H. Habing, H. Jahnreiss, M. Jura, S. Kleinmann, P. Persi, J.L. Puget, A. Robin, S. White, P.R. Wood.

### Speakers to include

### Organisers

W. B. Burton (Leiden), N. Epchtein (Meudon), A. Omont (IAP Paris), P. Persi (Frascati)

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Participants will be requested to pay a fee of 2.000 FF which includes board, lodging at the Center during the workshop and the proceedings. Attendance is limited to 55 participants. This session is supported by CNRS/SDU, CNES, and Université Joseph Fourier/Grenoble.

To apply send a brief C.V. before **July 10**, 1993 to : Mrs. Josette SCHMITT, IAP, 98 Bis Bd Arago, 75014 PARIS (France) fax : (33) 1 43 29 86 73, e-mail : [Schmitt@iap.fr](mailto:Schmitt@iap.fr) or 17649::Schmitt



# TERRE PROFONDE

ECOLE DES HOUCHES - 27 SEPTEMBRE AU 2 OCTOBRE 1993

Malgré une décennie de progrès spectaculaires, le manteau profond de la terre et son noyau, à tout jamais inaccessibles, restent aux frontières des géosciences. Le programme Dynamique et Bilans de la Terre de l'Institut National des Sciences de l'Univers a décidé d'encourager la communauté scientifique à coordonner ses efforts pour mieux comprendre la structure, l'évolution et la dynamique des parties les plus profondes de notre planète.

L'Ecole des Houches consacrée à la Terre Profonde en est la première étape. Elle se donne pour but de faire le point des connaissances et d'encourager, à travers la discussion, la formulation des problèmes qu'il nous faut désormais résoudre.

Des exposés revêtant la forme de cours occuperont les matinées. Les après-midi seront consacrées à des discussions et illustrées par quelques brèves présentations.

## FORMATION ET COMPOSITION DU NOYAU

### La formation du noyau

C.J. Allègre (IUF, Paris 7)

### La composition du noyau

J.P. Poirier (IPG, Paris 7)

## DYNAMIQUE DU NOYAU

### La convection dans le noyau liquide

P. Cardin (ENS Paris)

### Les contraintes sismologiques et la stratification du noyau

B. Valette (ORSTOM/IPGP)

## LA DYNAMO TERRESTRE

### Modèles de dynamo

D. Jault (IPG Paris)

### Systématique des inversions

C. Laj (CFR, Gif)

## DISCONTINUITÉS ET COUCHES LIMITES

### Transitions de phase et couches limites

P. Gillet (ENS Lyon)

### Structure de la couche D"

H.C. Nataf (ENS Paris)

### La zone de transition

P. Machetel (OMP, Toulouse)

## HÉTÉROGÉNÉITÉS ET INSTABILITÉS DU MANTEAU PROFOND

### Echelles d'hétérogénéités dans le manteau profond

F. Albarède (ENS Lyon)

### Mise en évidence et origine des panaches

C. Jaupart (IUF, IPG Paris)

Le public attendu va des chercheurs confirmés aux étudiants en cours de thèse dans de nombreux domaines des géosciences quantitatives.

L'un des buts de l'Ecole est aussi de permettre aux spécialistes des sciences de la Terre d'interagir avec des spécialistes de chimie, de physique, de mathématiques appliquées.

Le village des Houches se trouve dans la vallée de Chamonix, dans les Alpes. Fondée en 1951, l'Ecole est située dans un groupe de chalets de montagne entouré de prés et de bois à 1000m d'altitude.

Le comité scientifique de l'Ecole est composé de : V. Courtillot, P. Gillet, F. Guyot, J. Hinderer, G. Manhès, H.C. Nataf, G. Poupinet et A. Souriau.

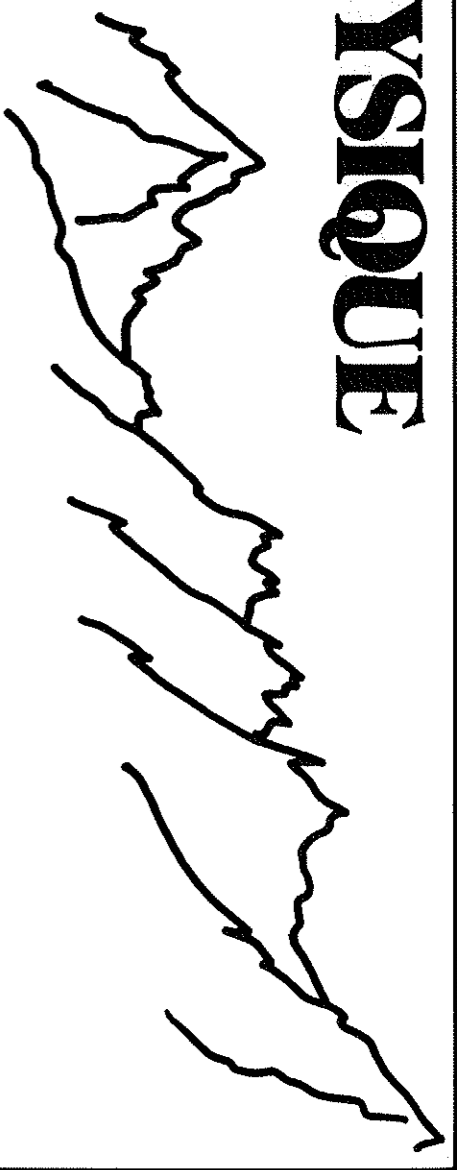
**INSCRIPTIONS:** à renvoyer impérativement avant le 1er Juillet 1993 à Sylvie Larousse, Laboratoire de Paléomagnétisme et Géodynamique, IPG Paris  
4, Place Jussieu - Tour 14-24, 1er étage 75252 PARIS CEDEX 05 Tel. : 44 27 39 08 - Fax : 44 27 33 73 email : larousse@ipgp.jussieu.fr



# CENTRE DE PHYSIQUE DES HOUCHES

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## THE GAMMA-RAY SKY WITH COMPTON GRO AND SIGMA January 25 - February 4, 1994

NATO Advanced Study Institute

In April 1991, NASA launched the COMPTON Gamma Ray Observatory (GRO) satellite which covers six decades of energy from 15 keV to 30 GeV with a suite of four instruments (BATSE, COMPTEL, EGRET and OSSE). Since December 1989, the french gamma-ray telescope SIGMA - onboard the soviet GRANAT satellite - is currently imaging the sky.

Four years after the GRANAT launch, and nearly three years after the COMPTON GRO one, time will be ripe to put together physicists concerned with high energy phenomena and their application in astrophysical contexts. It is of utmost importance that the SIGMA and GRO School is organized in order for experimentalists and theoreticians - both astrophysicists and particle physicists - to meet with the aim of reviewing achievement problems and prospects in the field. This session is also intended for young scientists who are working on related topics. The ultimate aim of the School is to contribute to answer some fundamental questions such as:

*What are gamma-ray bursts ? Are active galaxies powered by black holes ? Is there a truly cosmological gamma ray background ? What is happening at the Center of the Galaxy ? What is the nature of galactic dark matter ?*

### Scientific Direction

M. SIGNORE (ENS, Paris), P. SALATI (LAPP, Annecy), G. VEDRENNE (CESR, Toulouse).

### International Scientific Committee

C. FICHTEL (NASA, Greenbelt), G. FISHMAN (NASA, Huntsville), J. KURFESS (NRL, Washington),  
R. RAMATY (NASA, Greenbelt), P. SALATI (LAPP, Annecy), V. SCHÖNFELDER (MPI, München),  
M. SIGNORE (ENS, Paris), G. VEDRENNE (CESR, Toulouse).

### List of Speakers

J.L. ATTEIA (Toulouse), G. BIGNAMI (Milano), P. CHARDONNET (Annecy), B. CORDIER (Saclay),  
T. COURVOISIER (Genève), C. DERMER (Washington), R. DIEHL (Garching), A. FABIAN (Cambridge, UK),  
G. FISHMAN (Huntsville), G. FONTAINE (Palaiseau), N. GEHRELS (Greenbelt), R. HARTMAN (Greenbelt),  
D. HARTMANN (Clemson), W. HERMSEN (Leiden), G. KANBACH (Garching), J. KURFESS (Washington),  
J.P. LASOTA (Meudon), M. LEVENTHAL (College Park), P. MICHELSON (Stanford),  
L. OZERNOY (Greenbelt), V. PACIESAS (Huntsville), J. PAUL (Saclay), T. PRINCE (Pasadena),  
R. RAMATY (Greenbelt), J.P. ROQUES (Toulouse), J. SILK (Berkeley), A. STRONG (Garching),  
V. TRIMBLE (College Park), D. VAUTHERIN (Orsay), T. WEEKES (Amado).

The fee of 4400 FF includes board and lodging at the Center, and the proceedings.

Applications, including a brief C.V. and recent publications, should be sent before November 15, 1993 to:  
M. SIGNORE - École Normale Supérieure - 24, rue Lhomond - 75231 PARIS Cedex 05 - France - Fax: 33 (1) 44.32.39.92

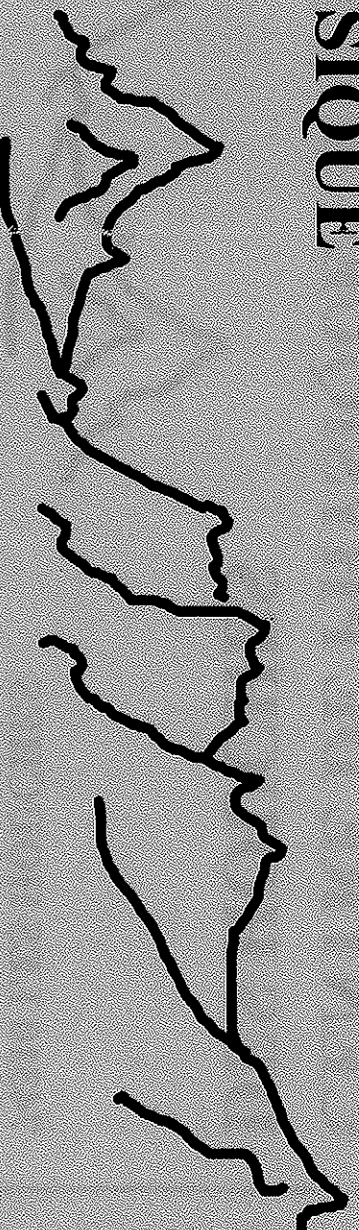
This session is a NATO Advanced Study Institute.

*The Physics School in Les Houches is affiliated to University Joseph Fourier and National Polytechnical Institute in Grenoble. It is subsidised by CNRS, the Ministry of Superior Education and Research and the Atomic Energy Commission.*



# CENTRE DE PHYSIQUE DES HOUCHEs

74310 LES HOUCHEs  
France



## LUMINESCENCE OF POROUS SILICON AND SILICON NANOSTRUCTURES 8 to 12 February 1994

The discovery of bright visible light emission from porous silicon has opened the door to various nanometer sized silicon structures where the confinement of carriers gives rise to interesting physical properties. Indeed the high efficiency of the light emission in the visible range is the most prominent feature; however their structures display similar properties with other highly divided materials (even non semiconductors); and then justify a multidisciplinary approach. This along with potential applications has attracted a large number of researchers followed by students to be trained. Until now international conferences have provided the exchange of information but have remained highly specialised so it is time to give thought to the organisation of topical and advanced lectures where the multidisciplinary and the didactic approach will be paramount. L'école des Houches is ideally devoted to that purpose.

### Scientific committee

G. Bomchil (Grenoble), L. Brus (Murray Hill), L.T. Canham (Malvern), J. Derrien (Marseille), P. Fauchet (Rochester), F. Gaspard (Grenoble), F. Koch (München), N. Koshida (Tokyo), W. Lang (München), R. Romestain (Grenoble), R. Tsu (Charlotte N.C.), J.C. Vial (Grenoble), M. Voos (Paris) and C. Weisbuch (Paris).

Organizing committee : J.C. Vial \*\* and J. Derrien \*\*

### Invited speakers included

A. Naudon (Poitiers); P. Fauchet (Rochester); B. Champagnon (Lyon); F.A. d'Avitaya and I. Berbezier (Marseille); C. Delerue (Lille); R. Tsu (Charlotte N.C.); J. Von Bardeleben, C. Ortega, R. Ferreira, J.-N. Chazalviel and P. Lavallard (Paris); A. Biesy, F. Gaspard, R. Herino, R. Romestain and J. C. Vial (Grenoble); G. Bomchil and A. Halimaoui (Meylan); A.G. Cullis, P. Calcott and L.T. Canham (Malvern); L. Brus (Murray Hill); F. Koch and W. Lang (München); H. Munder (Julich); N. Koshida (Tokyo).

The fees \*\* of 2000 FF include board and lodging at the centre. Attendance is limited to 60 participants.

Applications, including a brief C.V., should be sent (Please use Fax or Email if possible), before November 15, 1993, to : Dr. J.C. Vial Laboratoire de Spectrométrie Physique-Université J. Fourier de Grenoble B.P. 87 38402 St. Martin d'Hères cedex FRANCE.

Tel (33) 76 63 58 66 Fax (33) 76 51 45 44 Email JCIVAL@GRENET.FR

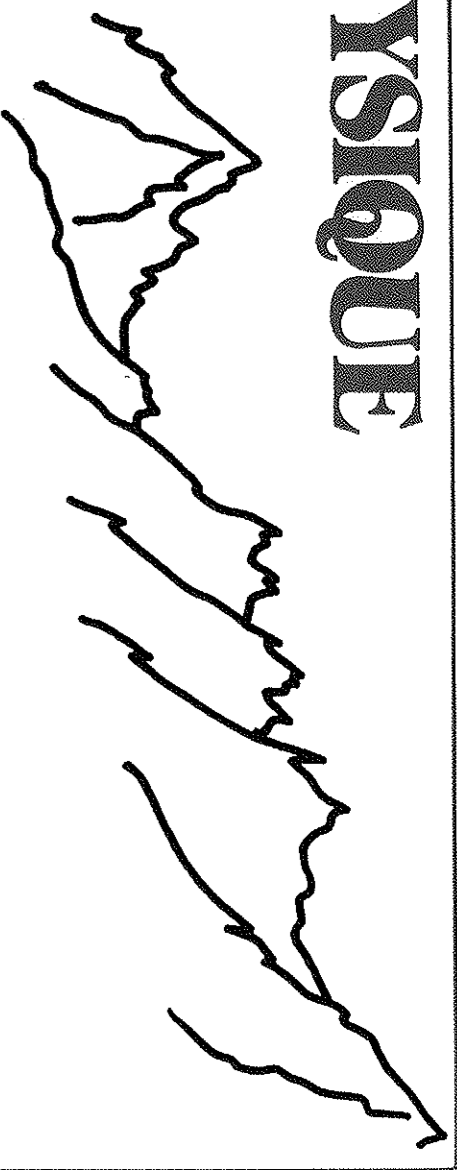
\*The Centre de Physique des Houches belongs to the University J. Fourier of Grenoble, it is co-financed by the CNRS, the ministère de l'enseignement supérieur and the CEA. This particular school is also sponsored by the DRET and the CNET.

\*\*Coordinators of the Groupement de Recherche du CNRS #1091

\*\*\* Members of the CNRS will pay half price.



# CENTRE DE PHYSIQUE DES HOUCHEES



Workshop

74310 LES HOUCHEES

France

## INTERPLAY OF GENETIC AND PHYSICAL PROCESSES IN THE DEVELOPMENT OF BIOLOGICAL FORM

**21-26 February 1994**

A fundamental question in developmental biology is the formation of spatial order. What determines the morphology of the developing organism? According to one extreme view, favored by most biologists, forms and pattern are the result of a program encoded in the DNA. Another extreme view, favored mainly by mathematicians and physicists, holds that the determining factors of morphogenesis are the intrinsic self-organizing properties of tissues, in analogy with other viscoelastic materials. The basic theme of the workshop is the growing recognition that neither of these views gives an adequate description of developmental processes. Chemists and physicists will be brought together with cellular and developmental biologists to discuss the relative importance of genetic and physical processes in development and their possible interactions. Specific topics included in the program are: cellular adhesion, interfacial phenomena at tissue boundaries, percolation and intra- and extracellular network formation, reaction diffusion and hydrodynamic processes.

### Organizers

**D. BEYSENS** (CE, Saclay), **M.-A. FÉLIX** (Inst. J. Monod, Paris), **G. FORGACS** (Clarkson Univ., Potsdam),  
**F. GALL** (Biologie Marine, Paris).

### Advisory Committee

**Y. COUDER** (ENS, Paris), **P.-G. de GENNES** (Collège de France, Paris), **E. KARSENTI** (EMBL, Heidelberg),  
**D. McCLAY** (Duke Univ. Durham), **S. NEWMAN** (New-York Med. Coll., Valhalla),  
**N. RIVIER** (Imperial Coll. London), **E. SACKMANN** (Techn. Univ., München).

### Among the Contributors

**A. ADOUTTE**, **M. AKAM**, **L. BELOUSSEV**, **F. BROCHARD**, **Y. COUDER**, **M. DEMBO**, **S. DOUADY**,  
**W. FRANKE**, **S. FRASER**, **F. GALL**, **B. GEIGER**, **A. GOLDBETER**, **R. HYNES**, **D. KAISER**, **E. KARSENTI**,  
**R. LIPOWSKI**, **H. MEINHARDT**, **D. McCLAY**, **I. MOLNAR**, **R. MOSSERI**, **S. NEWMAN**,  
**C. NÜSSEIN-VOLHARD**, **G. OSTER**, **P. PELCÉ**, **A. PROCHANTZ**, **N. RIVIER**, **E. SACKMANN**,  
**Y. SCHIFFMAN**, **V. SMALL**, **A. WINFREE**, **L. WOLPERT**.

Les Houches is a resort village in the Chamoniix valley of the French Alps. Established 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at 1000 m. elevation. It is ideally located for mountaineering, skiing or touring as well as for intellectual work.

Participants will be requested to pay a fee of 2100 FF which includes boards, lodging at the Center during the workshop, and the proceedings. Attendance is limited to 60 participants.

To apply send a brief C.V. and description of research interest to:

Mme F. DYKSTRA,

Atelier Interplay Genetics-Physics, I.P.N.

F-91406 ORSAY Cedex (France)

Fax: (33) 1 69.41.64.70 - e:Mail: DYKSTRA@IPNCLS.IN2P3.FR

For information on the other meetings to be held in the Centre contact the Directrice du Centre, M. LEDUC, Centre de Physique des Houches, F-74310 LES HOUCHEES (FRANCE).

The School is affiliated with Université Joseph Fourier. This Session is granted by la Formation Continue du CNRS.

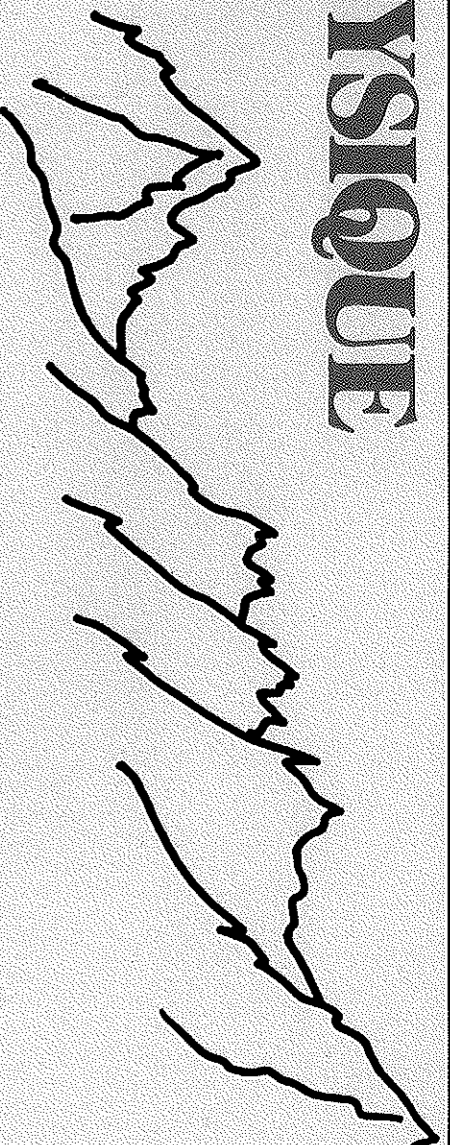


# CENTRE DE PHYSIQUE DES HOUCHEs

école de physique théorique

74310 LES HOUCHEs

France



## MOLECULAR ASPECTS OF CONFINED LIQUIDS 27th FEBRUARY - 5th MARCH 1994

The static and dynamic properties of the first molecular layers of liquids on solid surfaces are the phenomena controlling adhesion, wetting and lubrication.

During these last years, significant experimental and theoretical advances have been realized in the study of interfaces at the Angstrom scale. The aim of this meeting is to compare the main results obtained on flow of confined liquids, rheology of complex fluids at the interfaces, adhesion and interfacial friction.

### The organizing committee

placed under the patronage of the Professor P.G. de GENNES is the following:

J.M. GEORGES, Lyon (F), P. BOTOHREL, Talence (F), G. HADZIIOANNOU, Groningen (NL),  
J.P. HANSEN, Lyon (F), J. ISRAELACHVILI, Santa Barbara (USA), J.F. JOANNY, Strasbourg (F).

### Few guests

J.L. BARRAT (ENS, Lyon), F. BROCHARD (Collège de France, Paris),  
B. GAUTHIER-MANUEL (LES, Besançon), G. HADZIIOANNOU (Groningen Univ.),  
J. HARRISON (Navy Research, Washington), J. ISRAELACHVILI (UCSB, Santa Barbara),  
J.F. JOANNY (ICS, Strasbourg), J. KLEIN (Weizmann Inst., Rehovot),  
L. LÉGER (Collège de France, Paris), J.L. LOUBET (ECL, Lyon), U. LANDMAN (Georgia Tech, Atlanta),  
O. MARTI (University of Konstanz), D. MAZUYER (ECL, Lyon), J.P. MONTFORT (LPMI, Pau),  
P. LUCKHAM (Imperial Coll., Londres), J.P. RABE (Max Planck Institut, Mainz),  
Ph. RICHETTI (CRPP, Bordeaux), M. ROBBINS (John Hopkins University, Baltimore),  
A. SCHLJPER (Shell Research, Thornton).

Les Houches is a resort village in the Chamonix valley of the french Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at 1000 m elevation. It is ideally located for mountaineering, skiing or touring as well as for intellectual pursuits.

The fee of 2800 FF includes board and lodging at the Center during the workshop.

Applications, including a brief C.V., should be sent to: Pr J.M. GEORGES,  
École Centrale de Lyon, 36 Av. Guy de Collongue, BP 163 - 69131 ÉCULLY CEDEX, FRANCE  
Fax: (33) 78.43.33.83 - e.mail: loubet@cc.ec-lyon.fr

This workshop is granted by the Départements des Sciences Physiques et Mathématiques, Sciences Chimiques and Sciences pour l'ingénieur of the CNRS, Ultimatech, Elf, Rhône Poulenc, Saint-Gobain and the Institut Français du Pétrole.

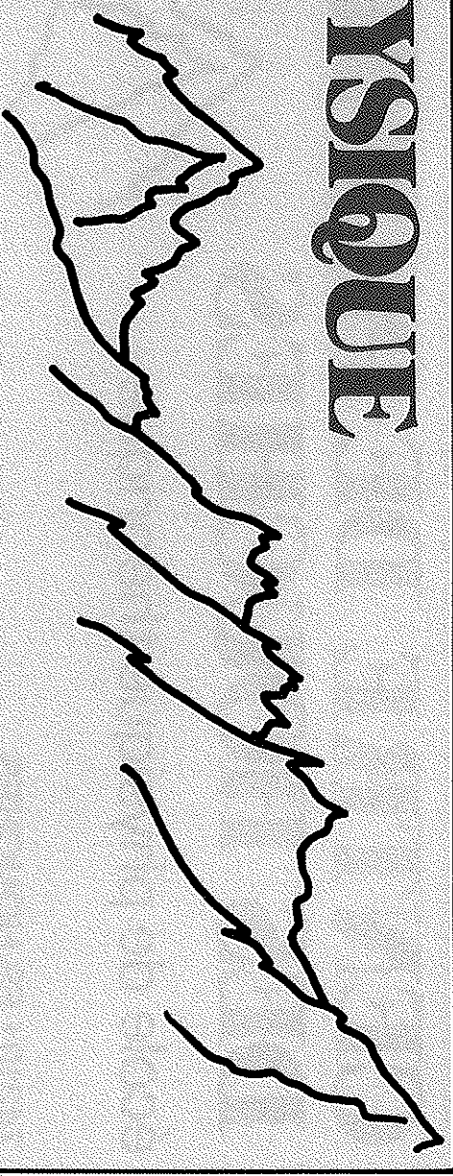
For information on the other meetings to be held in the Centre de Physique, please contact the Director,  
Michèle LEDUC, Centre de Physique - 74310 LES HOUCHEs - Fax: (33) 50.55.53.25.

The Physics School in Les Houches is affiliated to University Joseph Fourier and National Polytechnical Institute in Grenoble. It is subsidised by the Ministry of superior Education and Research, C.N.R.S. and the Atomic Energy Commission.



# CENTRE DE PHYSIQUE DES HOUCHEs

école de physique théorique



74310 LES HOUCHEs

France

## BEYOND QUASICRYSTALS

Hidden Order in Solids

March 7-18 1994

### Organizers

Françoise AXEL (Orsay), Denis GRATIAS (Vitry).

### Scientific Committee

Françoise AXEL (Orsay), Denis GRATIAS (Vitry), André KATZ (Palaiseau), Peter KRAMER (Tübingen),  
Michel MENDES FRANCE (Bordeaux).

The goal of this Winter School is to bring together elements of three scientific communities, mathematicians, theoretical and condensed matter physicists to study deterministic quasiperiodic and non quasiperiodic disorder, its relevance to the description of order in solids and its relationships with random disorder.

The discovery of quasicrystals in 1984 brought the concrete demonstration of the fact that solids could exhibit a novel **non periodic** type of long range order.

After an intense research by crystallographers, metallurgists and physicists devoted to the characterization of order propagation in quasicrystals, it now becomes necessary to enlarge the field of investigations to more general kinds of deterministic disorder.

The two questions which emerge now,

— which types of long range order are relevant in nature ?

— what are the experiments which could possibly reveal non trivial order ?

require experimental and theoretical physicists together with mathematicians to define some common main guide lines for future research.

Therefore the School is, on the one hand an opportunity to open to experimentalists the wide domain of the sophisticated tools elaborated in mathematics and theoretical physics on deterministically and randomly disordered systems, on the other hand experimentalists will also explain to theorists and mathematicians the powers and limits of their techniques to study long range order in solids. It certainly is also a critical issue to be able to understand - and also invent - materials as yet unknown which could have useful applications.

## Topics of the courses

Deterministically and randomly disordered systems

- Quasicrystals: Quasicrystallography, symmetries, tilings, matching rules, defects, self-diffusion.
- Finite automata, automatic and substitutional sequences: pseudo-random character, complexity, opacity, trace mappings, Fourier transforms, dynamical systems, conditional entropy, quasi-stochastic dynamics; walks, random and automatic.
- Schrödinger-type operators, Ising models and 3D multilayer systems with deterministic disorder.
- Diffraction aspects of order in solids, multifractal analysis.

## Invited speakers

J.P. ALLOUCHE (Marseille), F. AXEL (Orsay), V. BERTHE (Marseille), M. DEKKING (Delft), D. GRATIAS (Vitry),  
A. JANNER (Nijmegen), T. JANSSEN (Nijmegen), P. KALUGIN (Moscow), A. KATZ (Palaiseau), P. KRAMER (Tübingen),  
H. KUNZ (Lausanne), P. LARDET (Marseille), Y. MEYER (Paris), M. MENDES FRANCE (Bordeaux), J. PEYRIÈRE (Orsay),  
K. PLOOG (Berlin), M. QUEFFELC (Lille), N. RIVIER (London), L. ROBERTSON (Oak Ridge), W. STEURER (Zürich),  
A. SUTO (Lausanne), Z.Y. WEN (Wuhan, China).

The number of participants is limited to 60. The fee is 5200 FF per participant which includes food and lodging at the Centre during the School and the volume of proceedings.

Applications including a brief C.V. should be sent before January 25, 1994 to Madame Françoise KAKOU (Secretary of the Winter School Beyond Quasicrystals) - Laboratoire de Physiques des Solides - Bâtiment 510 - Université Paris-Sud, 91405 Orsay France (Fax 33-1 69.41 60.86).

This School is supported by the Commission of the European Communities (General Directorate XII), the Direction des Etudes, Recherches et Techniques of the French Ministry of Defense and by the Formation Permanente of the C.N.R.S.

*The "Centre de Physique des Houches", is located in a group of mountain chalets near Chamomix in a magnificent site facing the Mont-Blanc range. It is an ideal site for mountaineering as well as for intellectual work. It is affiliated to the Université Joseph Fourier and the INP (Grenoble). It is subsidized by the Ministry of Superior Education and Research, C.N.R.S. and CEA.*



# CERTIFICAT INTERNATIONAL D'ASTRONOMIE ET D'ASTROPHYSIQUE

Université de Lausanne

Université de Lyon 1 (Claude Bernard)

Ecole Normale Supérieure de Lyon

Université de Genève

Université de Grenoble 1 (Joseph Fourier)

Dans le cadre de la convention transfrontalière signée par les quatre universités sus mentionnées et I'ENS de Lyon, un cycle de cours communs d'astrophysique est organisé chaque année rassemblant les étudiants des régions Rhône-Alpes française et suisse. Ce cycle d'enseignement constitue la dernière partie de la formation dispensée dans le cadre du Certificat International d'Astronomie et d'Astrophysique, qui comporte environ 250 heures d'enseignements théoriques et une formation appliquée sous forme d'ateliers pratiques et de stages.

## Cycle de cours communs

Lieu et date : **Ecole des Houches du 13 au 20 Mai 1994**

### Programme :

\* Cours de **Thierry LANZ** (Institut d'Astronomie de Lausanne)

Thème : Atmosphères stellaires - Transfert radiatif hors ETL. Durée : 10 heures

\* Cours de **Michel MAYOR** (Observatoire de Genève)

Thème : Spectroscopie par la technique de corrélation (vitesses radiales, vitesse de rotation, métallicité et champ magnétique). Durée : 10 heures

Cours de **François SIBILLE** (Observatoire de Lyon)

Thème : Astronomie infrarouge (instruments, méthodes, investigations scientifiques, projet ISO).

Durée : 10 heures

Les étudiants qui se sont inscrits au Certificat International d'Astronomie et d'Astrophysique dans l'une des universités sus-mentionnées seront accueillis gratuitement à cette école.

Ce cycle d'enseignement est également ouvert aux étudiants engagés dans une thèse d'astronomie et d'astrophysique, moyennant une participation financière de 1.000 FF. Il sera demandé aux participants de faire un bref exposé (environ 15mn) de leur activité de recherche.

Les inscriptions devront être adressées avant le 30 Avril au Professeur Guy Pelletier, Laboratoire d'Astrophysique de l'Observatoire de Grenoble, Domaine Universitaire, BP 53, 38041 Grenoble Cédex 9, France.

Professeurs responsables du programme, de l'organisation et de la délivrance du diplôme du certificat.

B. Hauck, Université de Lausanne

G. Patrel, Université de Lyon 1

MC. Artu, Ecole Normale Supérieure de Lyon

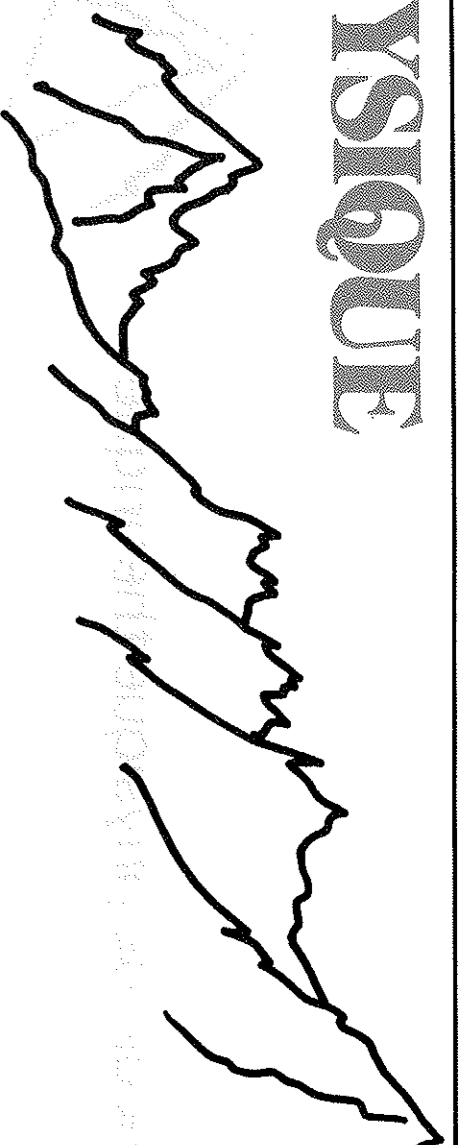
L. Martinet, Université de Genève

G. Pelletier, Université de Grenoble 1



# CENTRE DE PHYSIQUE DES HOUCHEES

école de physique théorique



74310 LES HOUCHEES  
France

UE Euroconference programme "Applied Nonlinear Dynamics" and CNRS  
Workshop

## NONLINEAR EXCITATIONS IN BIOMOLECULES

Centre de Physique des Houches (France)

May 30 - June 4, 1994

In the last few years, many attempts have been made to use ideas coming from nonlinear physics (solitons, nonlinear energy localization for instance) to model some biological processes like energy transport in proteins, DNA conformational changes and thermal denaturation, etc. Nonlinear excitations, which are exceptionally stable, immune to perturbations and build-up spontaneously in many systems, appear as interesting candidates to explain some of these molecular processes. However, although they are promising, current physical models need further developments and experimental testing before they can be used to solve actual problems encountered in biology. This cannot be achieved without a close cooperation between theoretical and experimental physicists and biologists.

The aim of the workshop is to bring together **physicists and biologists** to identify the problems in which nonlinear physics could contribute to biology in a relevant manner. Therefore, in addition to the presentation of recent research results, the conference will be organized around long lectures in each field, in order to introduce the important notions and stimulate discussions.

Invited lecturers include A.R. BISHOP (Los Alamos), H. FRAUENFELDER (Urbana-Champaign and Los Alamos), A. GARCIA (Los Alamos), J. KRUMHANSL (Cornell and University of Massachusetts), R. LAVERY (Paris), W. MENTELE (Freiburg), C. REISS (Paris), A.C. SCOTT (Tucson and Lyngby).

### Scientific committee

- M. PEYRARD (ENS Lyon), M. BARTHES (University of Montpellier), G. CARERI (University of Rome),  
P. CHRISTIANSEN (Technical University of Denmark Lyngby),  
J. KRUMHANSL (Cornell and University of Massachusetts), C. REISS (Institut Jacques Monod, Paris),  
A.C. SCOTT (University of Tucson and Technical University of Denmark),  
G. TSIRONIS (Research Center and University of Crete).

### Information for participants

Les Houches is a resort village in the Chamoni valley of the french Alps. Established in 1951, the school is located in a group of mountain chalets surrounded by meadows and woods at 1000 m elevation. It is ideally located for mountaineering or touring as well as intellectual pursuits. In an effort to favor concentrated discussions and lively interactions, the number of participants will be limited to approximately 40 and we hope to have a good balance between physicists and biologists.

The fee of 3400 FF will cover registration and full board lodging during the school.

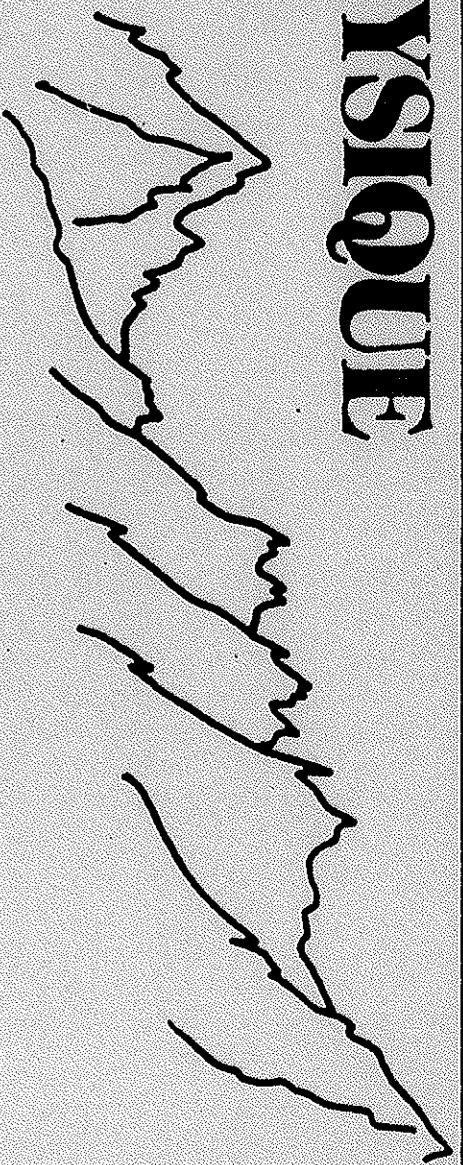
Grants to contribute to registration, travel and subsistence expenses of selected young researchers of the European Union through the Euroconference programme will be available. The deadline for receiving the final application for support is February 15, 1994. Interested researchers are urged to enquire as soon as possible for the application forms.

If you wish to receive further notices regarding this conference please contact M. PEYRARD, Conference Biomolecules, Laboratoire de Physique, École Normale Supérieure de Lyon, 46, allée d'Italie, 69364 Lyon Cedex 07, France, (Fax: +33 72.72.80.80), preferably by e-mail at the address [bioconf@physique.ens-lyon.fr](mailto:bioconf@physique.ens-lyon.fr).

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# CENTRE DE PHYSIQUE DES HOUCHEES



Workshop  
74310 LES HOUCHEES  
France

## POLARIZED BEAMS AND TARGETS : SENSITIVE TOOLS FOR THE STUDY OF SOLIDS, NUCLEI AND PARTICLES

JUNE 7 - 10, 1994

The workshop is organized by the European "Human Capital and Mobility" Network on "Development of High Intensity Beams of Polarized Atoms and Electrons". The goal of the network is to develop tools for a new generation of experiments on the structure of solids, nuclei and nucleons by scattering spin-polarized beams from spin-polarized targets.

There are two principal objectives :

- \* to produce an intense, low-emittance beam of polarized electrons with a time structure extending into the GHz range.
- \* to generate intense beams of polarized hydrogen, deuterium and 3-He atoms and also store or compress ensembles of these polarized atoms.

These objectives both rely on the principle of optical pumping with polarized laser light and transfer of angular momentum to the electron or nuclear spins. High-power lasers are employed to generate intense beams of electrons from a 4-He plasma or a solid state surface, having the ultrafast time structure for injection into an accelerator. Similarly, lasers serve to optically pump large quantities of 3-He gas or, via spin-exchange, hydrogen or deuterium gas, which may be used to supply internal targets in a high-energy storage ring or, after compression, serve as spin-filter for thermal neutron beams.

The workshop is organized in order to emphasize the cross-disciplinary aspect of the network, in which laser physics, atomic physics, solid-state physics and accelerator technology are involved. It will offer a unique introduction especially for the young researchers to the different, but interconnected network projects.

### ORGANIZERS

MICHELE LEDUC (LABORATOIRE KASTLER BROSSEL, ENS, PARIS)  
ERNARD STEFFENS (MPI, HEIDELBERG)

### SCIENTIFIC COMMITTEE

C. de WITT HUBERT and C.W. de JAGER (NIKHEF, Amsterdam), E. OTTEN and E. REICHERT (Mainz), E. STEFFENS (MPI, Heidelberg), M. LEDUC (ENS, Paris), C. PAPANICOLAS (Athens).

### INVITED SPEAKERS

Following the order of the program :  
E. Otten (Mainz), F. Mezel (HMI, Berlin), F. Tasset (ILL, Grenoble), T. Chupp (Michigan), R. Milner (MIT), N. Ramsey (Harvard), G. Lampel (Ecole Polytechnique), F. Meier (ETH, Zürich), D. Schultz (SLAC), K. Rith (Erlangen), D. Kleppner (MIT), T. Walker (Madison), C. Jones (Ann Arbor), J.V.D. Brand (Madison), Yu Shatunov (Novosibirsk), M. Swartz (SLAC), K. Walters (Rice), A. Siskrinsky (Novosibirsk), C. Prescott (SLAC).

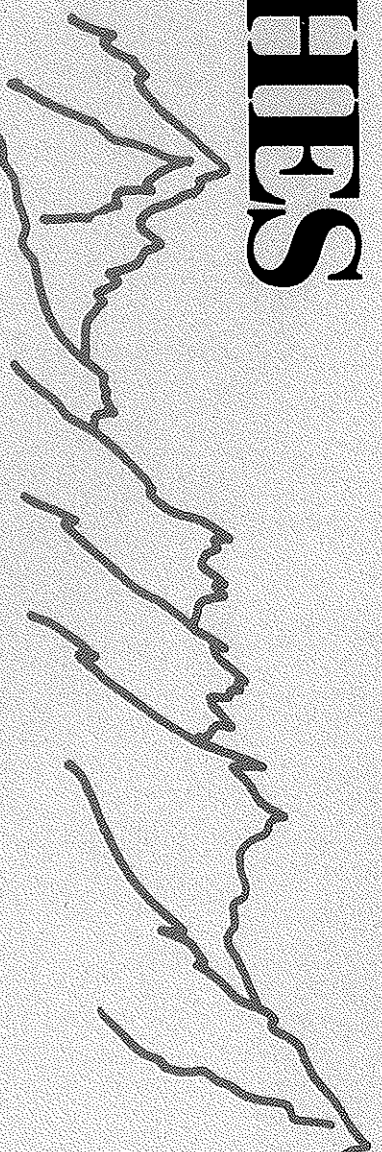
### INFORMATION FOR PARTICIPANTS

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The Physics School in Les Houches is affiliated to the University Joseph Fourier and National Polytechnical Institute in Grenoble. It is subsidized by the Ministry of Superior Education and Research, C.M.R.S., and the Atomic Energy Commission. This workshop is supported by the DRET.



# LES HOUCHES



**SESSION LXI**  
**NATO ADVANCED STUDY INSTITUTE**  
**June 28 - July 29 1994**

école d'été de physique théorique

## **MESOSCOPIC QUANTUM PHYSICS**

### **PHYSIQUE QUANTIQUE MESOSCOPIQUE**

SCIENTIFIC DIRECTION: **E. AKKERMANS** (Technion, Israël)  
**G. MONTAMBAUX** (Orsay, France)  
**J.L. PICHARD** (Saclay, France)

Quantum Interferences in Disordered and Chaotic Systems: **B. ALTSHULER**, M.I.T., USA  
Adiabatic Transport: **J. AVRON**, Technion, Israël  
Quantum Interferences and Superconductivity: **C. BEENAKKER**, Leiden, The Netherlands  
Experiments on Disordered Metals: **H. BOUCHIAT**, Orsay, France  
Single Charge Effects: **M. DEVORET**, Saclay, France  
Anderson Insulators: **Y. IMRY**, Weizmann, Israël  
Quantum Hall Effects: **A. MACDONALD**, Bloomington, USA  
Classical Waves Localization: **G. MARET**, Strasbourg, France  
Theory of Random Matrices: **P. MELLO**, U.N.A.M., Mexico  
Fermi and Non-Fermi Liquids: **H. SCHULZ**, Orsay, France  
Semiclassical Quantization: **U. SMILANSKY**, Weizmann, Israël  
Ballistic Transport and Quantum Chaos in Nanostructures: **A.D. STONE**, Yale, USA

Colloquium lectures will be given among others by: **J. BELLISSARD** (Toulouse), **A. BENOIT** (Grenoble), **C. BERGER** (Grenoble), **O. BOHIGAS** (Orsay), **Y. FYODOROV** (Weizmann), **C. GLATTLI** (Saclay), **J. KEATING** (Manchester), **B. KRAMER** (Hamburg), **L. LEVY** (Grenoble), **D. MAILLY** (Bagnex), **S. OUVRY** (Orsay), **M. SANQUER** (Saclay), **M. WILKINSON** (Edimburg).

This session is devoted to a rapidly evolving field of condensed matter physics, dealing essentially with electronic quantum coherence in microstructures. Due to the progress of nanotechnologies, a wealth of new experimental and fundamental questions have emerged, implying the use of new theoretical methods and concepts. Mesoscopics are defined as systems where quantum coherent effects are fully preserved for a macroscopic number of electrons. Their size is intermediate between usual macroscopic systems and those described by atomic physics. This subject has gathered a broad community of physicists from various origins (solid state physics, nuclear physics, field theory, physics of chaos...). The aim of this school is to provide pedagogical lectures on the different fields involved in the problematic of mesoscopic quantum physics and to emphasize the interrelations between them. It is mainly intended for young scientists but also for more experienced physicists interested in getting a broader view of the subject. Seminars by participants will be organized around the latest developments.

*Les Houches is a resort village in the Chamornix valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at an altitude of 1000 m. It is above the village, facing the Mont-Blanc range. It is ideal for mountaineering, hiking or touring as well as for more intellectual work. Accommodation and meals are provided within the School for both participants and lecturers. A financial contribution of FF 4 600 is requested from each participant. Some possibilities for grants exist. Participants who intend to rent lodging should directly inquire at: Office du Tourisme, 74310 Les Houches (tel. 50 55 50 62). The School is affiliated to University Joseph Fourier and National Polytechnical Institute in Grenoble. It is subsidised by the Ministry of Superior Education and Research, CNRS and the Atomic Energy Commission. This session is a **NATO Advanced Study Institute**.*

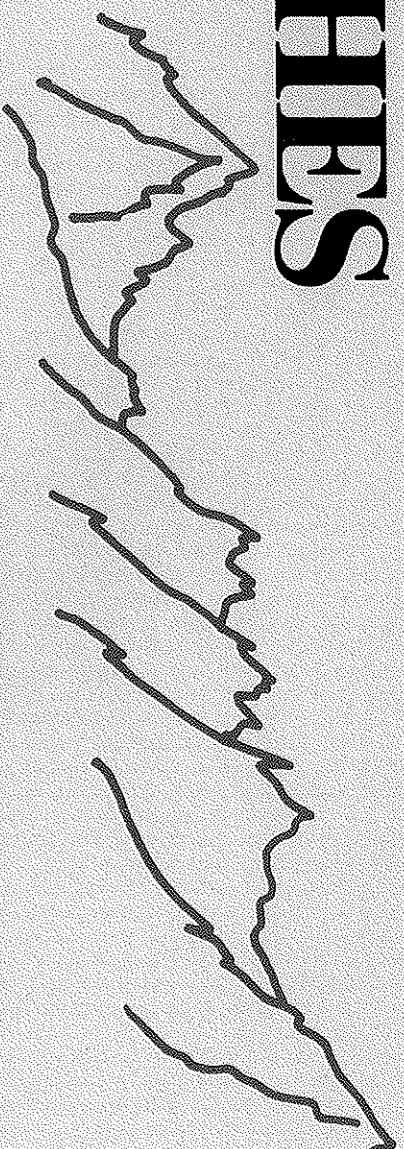
Admission forms and additional information are available from:  
ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE - 74310 LES HOUCHES, FRANCE  
Telephone: (33) 50 54 40 69 / Fax: (33) 50 55 53 25

Complete files (admission forms and recommendation letters) must have reached this address before march 1 1994.

*The second 1994 session will be entitled "Fluctuating Geometries in Statistical Mechanics and Field Theory".  
Two sessions will be held in 1995, one on "Quantum Fluctuations", the other on "Quantum Symmetries".*



# LES HOUCHEs



**SESSION LXII**  
**NATO ADVANCED STUDY INSTITUTE**  
**August 2 - September 9 1994**

école d'été de physique théorique

## **FLUCTUATING GEOMETRIES IN STATISTICAL MECHANICS AND FIELD THEORY**

### **GEOMÉTRIES FLUCTUANTES EN MÉCANIQUE STATISTIQUE ET EN THÉORIE DES CHAMPS**

SCIENTIFIC DIRECTION: **F. DAVID** (Saclay, France)  
**P. GINSPARG** (Los Alamos, USA)

Fluctuations in Membranes: **L. PELITI**, Napoli, Italy  
Path Integrals in Random Media: **M. KARDAR**, MIT, USA  
Defects in Membranes and Directed Polymers: **D. NELSON**, Harvard, USA  
Quantum Theory of Many Body Systems: **J. FRÖHLICH**, ETH, Switzerland  
Phase Transitions in the Early Universe: **N. TUROK**, Princeton, USA  
Random Surfaces and Quantum Gravity: **J. AMBJØRN**, NBI, Denmark  
Conformal Field Theory and String Theories: **G. MOORE**, Yale, USA  
String Theory and Space Time: **J. POLCHINSKI**, Santa Barbara, USA

Short courses are scheduled on: **Foams** by **D. MUKAMEL** (Weizmann, Israël), **Vortices in Turbulence** by **I. PROCACCIA** (Weizmann, Israël), **Black Holes** by **A. STROMINGER** (Santa Barbara, USA). Colloquium lectures on latest developments and seminars by participants will also be organized.

Many theoretical methods currently employed in statistical mechanics and in quantum field theory have a common underpinning in ideas of universality, phase transitions, and the renormalization group. In recent years there has been important progress in the study of the interplay between the geometry, the dynamics and the fluctuations of extended objects, with applications to quantum gravity, string theories and cosmology as well as statistical mechanics of interfaces, defects and physical membranes. The school aims to provide a common background and language to a mixed audience of young researchers from cosmology and high energy physics and from statistical mechanics and condensed matter physics, and to provide an introduction to active branches of theoretical physics in which these concepts currently play an important role.

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Admission forms and additional information are available from:

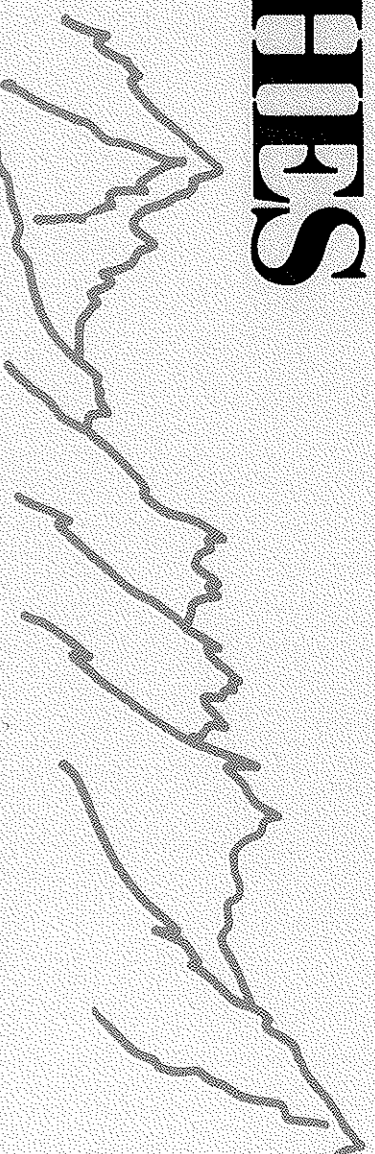
ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE - 74310 LES HOUCHEs, FRANCE  
Telephone: (33) 50 54 40 69 / Fax: (33) 50 55 53 25

Complete files (admission forms and recommendation letters) must have reached this address before **march 1 1994**.

*The second 1994 session will be entitled "Mesoscopic Physics".  
Two sessions will be held in 1995, one on "Quantum Fluctuations", the other on "Quantum Symmetries".*



# LES HOUCHES



SESSION VII  
11 septembre – 23 septembre 1994

école pré-doctorale de physique

## FÉDÉRATION FRANÇAISE DES MAGISTÈRES DE PHYSIQUE

### PHYSIQUE DES PARTICULES : PHÉNOMÉNOLOGIE ET EXPÉRIENCE

**MODÈLE STANDARD : F. BOUDJEMA** (LAPP, Annecy)

**SITUATION EXPÉRIMENTALE ACTUELLE EN PHYSIQUE DES PARTICULES :**

**M. DAVIER** (LAL, Orsay)

**PHYSIQUE DES NEUTRINOS : J. BOUCHEZ** (DAPNIA, Saclay)

**EXTENSION SUPERSYMÉTRIQUE MINIMALE DU MODÈLE STANDARD :**

**P. BINÉTRUY** (LPTHE, Orsay)

**EXPÉRIENCES À VENIR : D. TREILLE** (CERN, Genève)

**INTRODUCTION À LA PHYSIQUE DES ACCELERATEURS : O. NAPOLY** (DAPNIA, Saclay)

**DÉTECTEURS : DÉVELOPPEMENTS RÉCENTS : D. FOURNIER** (LAL, Orsay)

L'objectif pédagogique général de cette session est d'offrir une vue d'ensemble de la situation phénoménologique et expérimentale de la Physique des Particules et de ses développements futurs ainsi qu'une vue détaillée du modèle standard et de son extension supersymétrique. Les cours des Ecoles pré-doctorales sont approfondis mais de caractère suffisamment général. Ils sont destinés principalement aux jeunes chercheurs venant de terminer un DEA ou un Magistère, à ceux qui sont en cours de Thèse et, plus généralement, aux jeunes chercheurs étrangers dans une situation d'études analogue. Ils doivent permettre de compléter la formation des participants à la fois dans leur domaine de recherche et dans d'autres disciplines à un niveau plus accessible et moins spécialisé que celui des autres Ecoles. Un effort pédagogique y est effectué tant pour les cours eux-mêmes que par les échanges entre étudiants et enseignants et par les interactions entre étudiants. En dehors des cours et séminaires effectués par les enseignants, chacun des participants fera un court exposé sur son sujet de recherche ou de stage (DEA, Magistère).

### Candidatures et financement

Cette École est ouverte aux étudiants de toute nationalité. Les candidats doivent envoyer un dossier qui sera examiné par un Comité de Sélection. Ce dossier doit comprendre un curriculum vitæ détaillé, une lettre de recommandation et éventuellement une demande de bourse.

Le Comité de Sélection attribuera des bourses couvrant totalité ou partie des frais d'inscription et de séjour lesquels s'établissent à 2 500 FF.

Le dossier d'inscription doit parvenir :

**avant le 10 Juin 1994**

à D. DÉCAMP

Laboratoire d'Annecy de Physique des Particules, BP 110, 74941 Annecy-le-Vieux Cedex  
Tél. 50.09.16.74 - Fax 50.27.94.95 - email : decamp@cernvm.cern.ch ou @frcpn11.in2p3.fr

### Comité d'organisation

**D. DÉCAMP** (LAPP, Univ. de Savoie) et **F. LE DIBERDER** (LAL, Univ. PARIS XI), Directeurs Scientifiques  
**J.C. LE GUILLLOU** (UFG, ENSLAPP, Univ. de Savoie) - **R. MAYNARD** (EN, Univ. de Grenoble I)

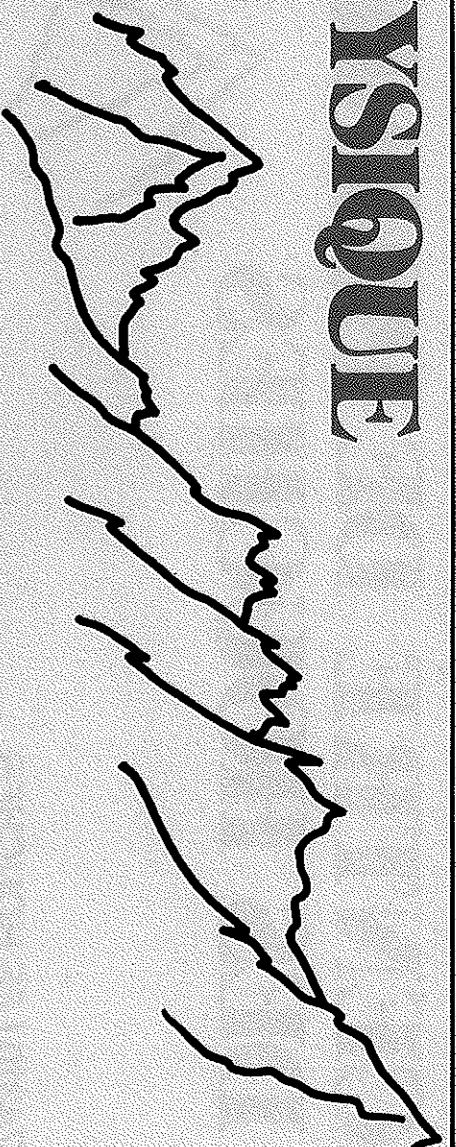
L'École pré-doctorale des Houches est organisée par la Fédération Française des Magistères de Physique qui regroupe les Magistères de l'Université Joseph-Fourier (Grenoble I), de Paris-Sud (Orsay), de l'Université Paris 7, de l'Université Claude-Bernard et de l'ENS de Lyon, de l'Université de Rennes, le Magistère Interuniversitaire de Physique (Paris 6, 7, 11 et 13 et ENS) et le Magistère "Matériaux" (Strasbourg I et Mulhouse).

*Les Houches est un village de la vallée de Chamoni, dans les Alpes françaises. L'École a lieu dans un groupe de chalets montagnards entourés de prairies et de bois. Il est situé à une altitude de 1000 m. L'hébergement et les repas sont assurés pour tous les participants. Les étudiants bénéficieront en permanence de salles de réunion et d'une bibliothèque.*

*L'École de Physique des Houches est affiliée à l'Université Joseph Fourier et à l'Institut National Polytechnique de Grenoble. Elle est subventionnée par le Ministère de l'Enseignement Supérieur et de la Recherche, le CNRS et le Commissariat à l'Énergie Atomique.*



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES  
France

## SPACE-FILLING PROBLEMS 9 - 19 January 1995

Space-filling geometrical structures are encountered in a multitude of physical situations, from microscopic to macroscopic scales. The purpose of this workshop is to bring physicists and mathematicians together to clarify our comprehension of these structures. The principal themes that will be represented include geometric frustration in condensed matter (liquid crystals, amphiphilic systems, amorphous structures); tilings and quasicrystal models; packings; random cellular structures (froths, magnetic bubbles, breath figures, biological tissues...); random sequential addition and deposition models; phyllotaxis. An important place will be given to methods of mathematics and theoretical physics for investigating space-filling structures (probability theory,  $n$ -dimensional geometry, minimal surfaces, curved spaces, graph theory, statistical mechanics).

### Organizers

C. GODRÉCHE (Saclay), J. M. LUCK (Saclay), R. MOSSERI (Paris), J. F. SADOC (Orsay),  
M. SENECHAL (Northampton), G. TARJUS (Paris), P. VIOT (Paris)

### Among invited lecturers

M. de BOISSIEU (Grenoble), J. CHARVOLIN (Grenoble), R. CONNELLY (Cornell), E. DOMANY (Rehovot)  
S. DOUADY (Paris), E. DUBOIS-VIOLETTE (Orsay), M. DUNEAU (Palaiseau), V. ELSER (Tübingen)  
J.W. EVANS (Ames), H. FLYVBJERG (Copenhagen), K. H. GROCHENIG (Connecticut), R. JULLIEN (Montpellier)  
J. LAGARIAS (Murray Hill), G. LE CAER (Nancy), LE TU QUOC THANG (Buffalo), G. PORTE (Montpellier)  
H. REISS (Leiden), N. RIVIER (Strasbourg), C. SIRE (Toulouse), J. SOCOLAR (Duke), J. STAVANS (Rehovot)  
S. TORQUATO (Princeton), M. WIDOM (Pittsburgh)

### Information for participants

The fee of 4 200 FF includes board and lodging at the Centre. Attendance is limited to 60 participants. Applications, including a brief CV, should be sent before November 20, 1994 to: Claude Godrèche, SPEC/Orme des Merisiers, Centre d'Études de Saclay, 91191 Gif-sur-Yvette Cedex, France. Fax: (33) 1 69.08.87.86. godreche@amoco.saclay cea.fr.

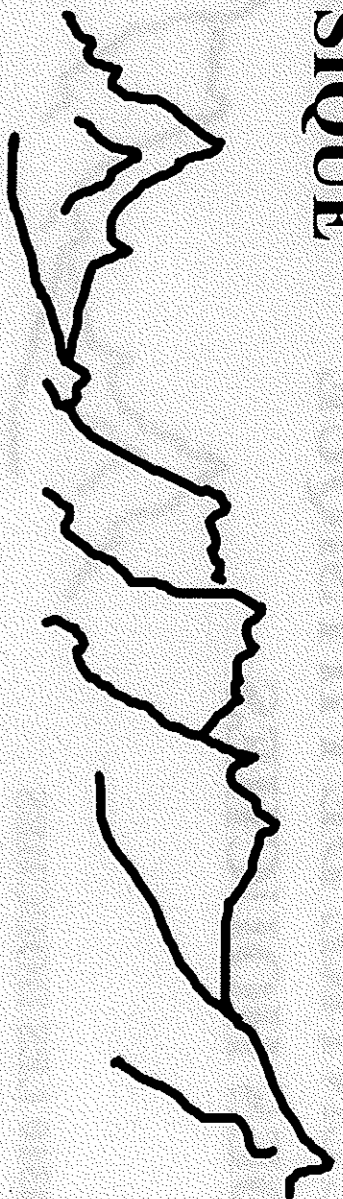
*The Physics School in Les Houches is affiliated to University Joseph Fourier and National Polytechnical Institute in Grenoble. It is subsidized by the Ministry of Superior Education and Research, CNRS and Atomic Energy Commission.*

*Centre de Physique des Houches, Côte des Chavants, 74310 Les Houches. Director: Michèle Leduc - Tel.: (33) 50.54.40.69 - Fax: (33) 50.55.53.25.*



# CENTRE DE PHYSIQUE DES HOUCHES

74310 LES HOUCHES  
France



## FRONTIERS IN LOW TEMPERATURE PLASMA DIAGNOSTICS 23 to 27 January 1995

Low temperature plasmas are of increasing importance in numerous applications. Diagnostics are essential, both for basic research into these plasmas and for control of industrial plasma processes. Significant progress has been made in the last ten years with the development of many new sophisticated laser spectroscopy techniques allowing in-situ, non-intrusive characterisation of the plasma volume and of the surfaces in contact with it. At the same time, considerable improvements have been made in established techniques such as Langmuir probes, mass spectrometry and plasma emission spectroscopy. A multidisciplinary approach is essential for the development and applications of these techniques. The meeting will thus be limited in size to allow close interaction between scientists and to place the emphasis on understanding. The Ecole de Physique des Houches is ideally suited for this purpose.

### Scientific committee

H.J. Döbele (Essen); W. Graham (Belfast); G. Hancock (Oxford);  
G. Kroesen (Eindhoven); J. Perrin (Palaiseau); N. Sadeghi (Grenoble)

Organizing committee: J. Derouard, J.P. Booth, N. Sadeghi

### Invited speakers include:

E. Aydill (Santa Barbara); N. Braithwaite (Milton Keynes); C. Hollenstein (Lausanne);  
J. Lawler (Madison); T. Makabe (Yokohama); K. Muraoka (Kyushu);  
M. Péalat (Palaiseau); P. Werle (Garmisch-Partenkirchen)

### Call for contributions

Besides the review talks presented by the invited speakers, the meeting will consist of 1: a limited number (18) of in depth (30') oral contributions, which will either present new and promising diagnostic techniques or summarise work which has significant impact on the characterisation of low temperature plasmas; 2: round table and 3: poster sessions. Ample time will be reserved for extended discussion and free periods will allow informal contact between the participants. People are invited to send a title and a short (max 10 lines) abstract of their proposed contribution to J. Derouard (see below). Contributions from related fields (combustion, environment...) are encouraged.

Attendance will be limited to 62 participants. Participants will be selected by the scientific committee on the basis of their proposed contribution and/or a short CV. 15 places will be reserved for young scientists (less than about 30 years old). Abstracts and applications should be sent before October 1st 1994 to J. Derouard, Laboratoire de Spectrométrie Physique, Université J. Fourier-Grenoble 1, B.P. 87 38402 St. Martin d'Hères cedex FRANCE. Tel (33) 76 51 47 43; Fax (33) 76 51 45 44; Email DEROUARD@GRENET.FR  
The fees of 2500 FF (1000 FF for young scientists) include registration, board and lodging at the Centre des Houches.

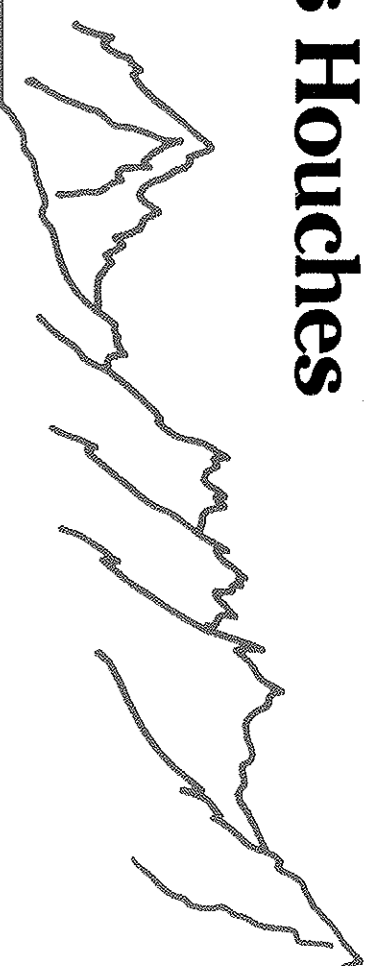
\*The Centre de Physique des Houches belongs to the University J. Fourier of Grenoble, it is co-financed by the CNRS, the Ministère de l'Enseignement Supérieur et de la Recherche and the CEA. This particular school is also sponsored by DRET, Jobin-Yvon, Hiden-SAI, PSI and Spectra Physics.



# Centre de Physique des Houches

école de physique théorique

74310 Les Houches, France



## Decadal Climate Variability: Dynamics and Predictability

NATO Advanced Study Institute

13-24 February 1995

Decadal climate variability has become an area of considerable interest as observational evidence of its ubiquitous occurrence is accumulating. Recent model studies have identified various processes involving the thermohaline circulation of the ocean and ocean atmosphere interactions. With such a complex system, understanding the many pathways and interactions requires not only numerical models, but also skill in interpreting both model results and model data comparisons, for present and past climate conditions. Extended coverage will be given to the core topics: Physics of long-term climate oscillations, Predictability of climate fluctuations, Interpretation of climate data sets, Interpretation of and deductions from palaeo data. In addition, a number of related research topics will be presented.

The purpose of the ASI is to bring young scientists interested in climate problems up to date on the causes of climate variability on time-scales up to a few decades, including techniques needed to model that variability and an overview of the advanced statistical methods needed to interpret it. It is expected that most participants will have a background in physics, atmospheric or oceanic sciences or a related discipline at a graduate student or post-doctoral level, but participants with a geochemical or geological background are also encouraged to apply.

### Organising Committee

D. ANDERSON (*University of Oxford*),  
C. Le PROVOST (*University of Grenoble*),  
P. RHINES (*University of Washington*),  
J. WILLEBRAND (*University of Kiel*)

### Invited Lecturers

L. BENGTSSON, J.-C. DUPLÉSSY, M. GHIL,  
A. GORDON, M. LATIF, J. MAROTZKE,  
T. PALMER, P. RHINES, E. SARACHIK,  
T. STOCKER, M. WALLACE.

The cost of board and lodging is 4,800 FF for the full period, but some financial support may be available. Applicants should indicate if any assistance is needed. Applications, including a CV and a letter of recommendation, should be sent to:

Sarah Harrington, NATO-ASI, Dept. of Atmospheric Physics,  
Clarendon Laboratory, Parks Rd., Oxford, OX1 3PU  
*by 31 October 1994.*

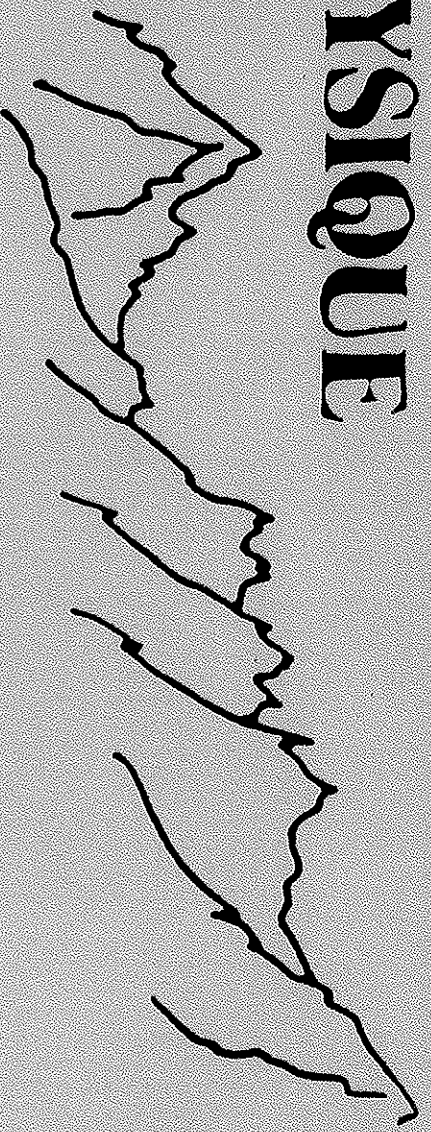
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### THIS ASI IS CO-SPONSORED BY THE EUROPEAN UNION

For information on other meetings to be held in the Centre de Physique, contact:  
the Director, M. Leduc, Centre de Physique, 74310 Les Houches. Fax (33) 50555325.



# CENTRE DE PHYSIQUE DES HOUCHEs



74310 LES HOUCHEs  
France

## HYDRODYNAMIQUE ET MAGNETOHYDRODYNAMIQUE en ASTROPHYSIQUE

du 28 Février au 7 Mars 1995

Université de Lausanne  
Université de Lyon 1 (Claude Bernard)  
Ecole Normale Supérieure de Lyon

Université de Genève  
Université de Grenoble 1 (Joseph Fourier)

Dans le cadre de la convention transfrontalière signée par les quatre universités sus mentionnées et l'ENS de Lyon, un cycle de cours communs d'astrophysique est organisé chaque année rassemblant les étudiants des régions Rhône-Alpes française et suisse. Cette session d'enseignement prédoctoral en langue française s'adresse aux étudiants inscrits au **Certificat International d'Astronomie et d'Astrophysique**. Elle est également ouverte aux étudiants préparant une thèse de doctorat.

### Programme :

\* Cours de **Willy BENZ** (Université d'Arizona, Tucson)  
Thème : Techniques numériques en hydrodynamique. Introduction aux techniques numériques hydrodynamiques appliquée au cadre astrophysique. Principes de base de la discrétisation. Concepts de convergence et de stabilité. Différents schémas pour résoudre les équations hydrodynamiques 1D, 2D et 3D. Durée : 10 heures

\* Cours de **Jean-Paul ZAHN** (Observatoire de Meudon)  
Thème : Quelques applications de la dynamique des fluides à l'astrophysique. Bref rappel des notions de base : instabilités linéaires et d'amplitude finie, turbulence, transport turbulent. Application à la convection stellaire, au mélange induit par rotation dans les étoiles, aux disques d'accrétion. Durée : 10 heures

\* Cours de **Guy PELLETIER** (Observatoire de Grenoble)  
Thème : Introduction à la MagnétoHydroDynamique. Validation de la MHD en astrophysique. Principaux Phénomènes. Quelques structures MHD. Rôle du champ magnétique dans les jets et les disques d'accrétion. Durée : 10 heures

Les étudiants qui se sont inscrits au Certificat International d'Astronomie et d'Astrophysique dans l'une des universités sus-mentionnées seront accueillis gratuitement à cette école. Une participation de 1.000 FF, couvrant les frais d'inscription et d'hébergement est demandée aux autres étudiants qui pourront s'en acquitter au moyen d'un bon de commande émanant de leur laboratoire.

Les inscriptions devront être adressées avant le 10 Février au Professeur Guy Pelletier, Laboratoire d'Astrophysique de l'Observatoire de Grenoble, Domaine Universitaire, BP 53, 38041 Grenoble Cédex 9, France.

Professeurs responsables du programme, de l'organisation et de la délivrance du diplôme du certificat.

MC. Artru,	Ecole Normale Supérieure de Lyon	G. Paturel,	Université de Lyon 1
B. Hauck,	Université de Lausanne	L. Martinet,	Université de Genève
G. Pelletier,	Université de Grenoble 1		

Professeur responsable des écoles prédoctorales des Houches : JC. Le Guillou

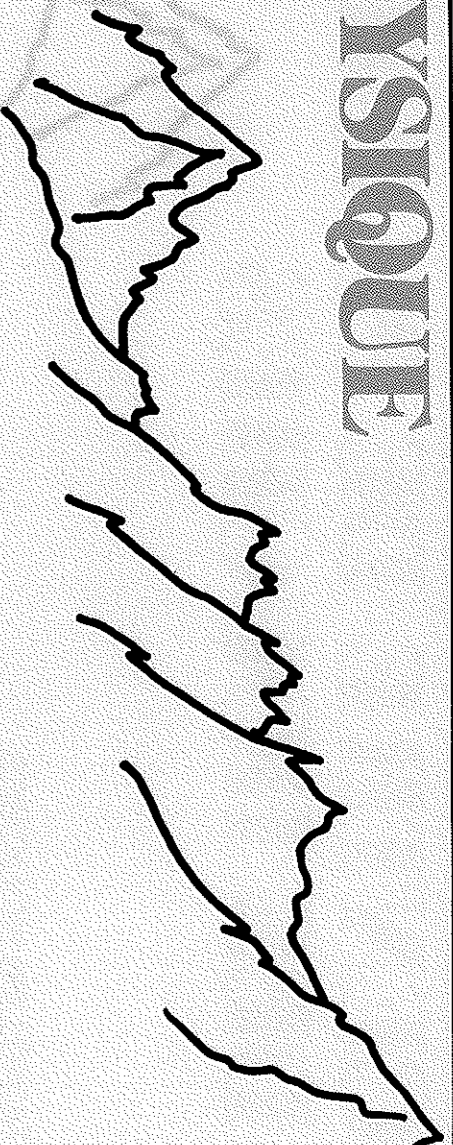
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Centre de Physique des Houches, Côte des Chavants, 74310 Les Houches. Directeur : Michèle Leduc

Tél : (33) 50 54 40 69 Fax : (33) 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCCHES



74310 LES HOUCCHES  
France

## INTENSE ION BEAM AND TARGET PHYSICS FOR PARTICLE DRIVEN ICF

A European "HCM-High Energy Density"

Advanced Research Workshop

Co-sponsored by CNRS (Paris), DRET (Paris) and ONR (London)

March 13th - 17th, 1995

After consultation with several colleagues actively involved in the challenging fields of Target Physics as well as Faisceauology of Intense Ion Beams for achieving Particle Driven Thermonuclear Fusion, *it appears highly timely*, to gather for a week or so, senior scientists with young and bright practitioners, in a nice resort, to present and discuss topics of current interest.

The format of this envisioned winter school would essentially consist of a series of tutorial lectures (45 mn) interspersed with invited topical lectures (30 mn) presented in a pedagogical style in order to foster a swift acquaintance of the audience with the central hot topics in these fields.

Actually, it is recognized by many of us that a novel momentum has to be imparted to particle driven ICF, especially in Europe, where a detailed and coordinated exploration of the so-called indirect drive approach to Heavy Ion Fusion is planned for the next coming two years period.

Such a study, in the spirit of the previous and successful HIBALL project dedicated to direct drive, should help in filling former gaps dismissed at the time as unimportant.

Such items would include handling and diagnostics of intense ion beams in the reactor chamber, in the vicinity of the thermonuclear target.

With the disclosure of the indirect drive approach, such issues gain a central significance. They are for instance, directly connected to the two-sided illumination scenario recently advocated through numerical simulations and partial declassification of atomic physics data.

A more realistic perception of the accelerator constraints in order to implode a low gain target is therefore at hand. It also appears of great interest to discuss in a critical fashion the most recent target physics results arising from sophisticated simulations or from light ion beam irradiated targets.

### Partial List of Invited Speakers

- S. ATZENI (GENEA, Frascati), M. BASKO (ITEP, Moscow), M. DESCROISSETTE (CEN, Limeil),  
C. DEUTSCH (LPGP, Orsay), A. FALTENS (LNL, Livermore), A. FRIEDMAN (LNL, Livermore),  
D. GARDES (IPN, Orsay), I. HOFMANN (GSI, Darmstadt), J. JACOBY (GSI Darmstadt),  
J. LINDL (LLNL, Livermore), J.Y. MARUHN (Goethe U, Frankfurt), J. MARTINEZ-VAL (DENIM, Madrid),  
T.A. MEHLHORN (SNL, Albuquerque), Y. MEYER-TER-VEHN (MPQ, Munich), M. MURAKAMI (ILE, Osaka),  
B. SHARKOV (ITEP, Moscow), M. TABAK (LLNL, Livermore), N.A. TAHIR (GSI, Darmstadt),  
U. VON MÖLLENDORF (KFK, Karlsruhe), Z. ZINAMON (Weizmann, Rehovot).

### Scientific Director

C. DEUTSCH, Physique des Gaz et Plasmas, Bât. 212, Université Paris XI - 91405 ORSAY (France)  
Tél.: (33-1) 69.41.76.05 - Fax: (33-1) 69.41.78.44 - e-mail: Deut@PSISUN.U-PSUD.FR, to whom applications should be sent.

### Scientific Committee

R.O. BANGERTER (LBL, Berkeley), R. BOCK (GSI, Darmstadt), W.B. HERRMANNSELDT (SLAC, Stanford),  
D.G. KOSHKAREV (ITEP, Moscow), C. RUBBIA (CERN, Geneva), G. VELARDE (DENIM, Madrid).

Participants will be requested to pay a 2 500 FF fee covering board and lodging.

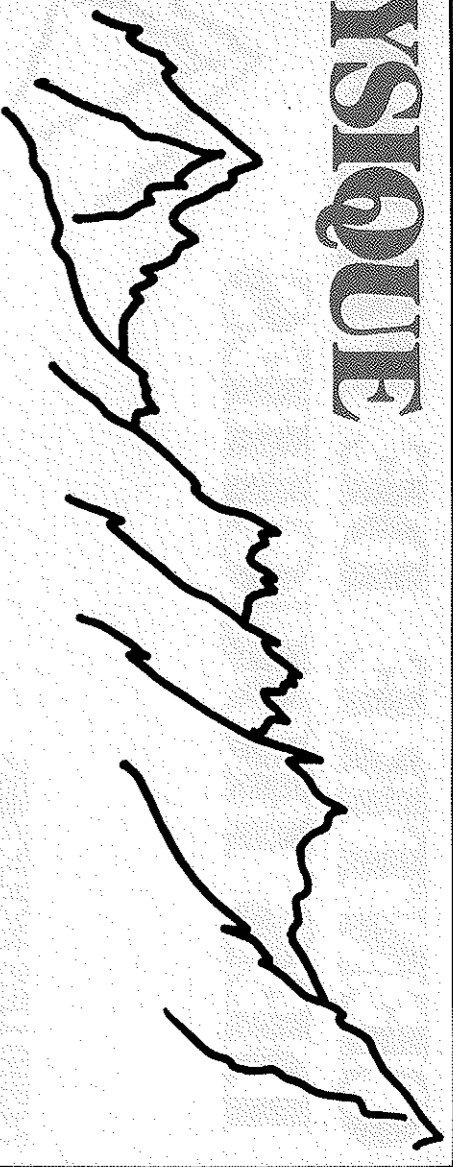
Specific travel and tuition grants may also be attributed upon request.

The Physics School in Les Houches is affiliated to University Joseph Fourier and National Polytechnical Institute in Grenoble. It is subsidized by the Ministry of Superior Education and Research, CNRS and Atomic Energy Commission.

Centre de Physique des Houches, Côte des Chavants, 74310 Les Houches. Director: Michèle Leduc - Tel.: (33) 50.54.40.69 - Fax: (33) 50.55.53.25.



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES  
France

## WAVES AND HETEROGENEOUS MEDIA 21 - 31 March 1995

Wave propagation in heterogeneous media is a very general topic which concerns many areas of fundamental and applied research. The exchanges between mathematicians, opticians, acousticians, geophysicists and medical scientists are however too infrequent.

These various communities have traditionally worked in an independent fashion, through specific and topical workshops. In contrast, we want to bring together scientists, engineers and applied mathematicians in a meeting devoted to an interdisciplinary program. We intend to set up the meeting in a genuinely tutorial way by organising a pedagogical progression of the lectures and we will encourage general presentations of each topic for non-specialists.

The study of wave interaction with heterogeneous structures requires the use of fundamental concepts such as multiple scattering, radiative transport, weak and strong localization, time reversal invariance, speckle correlations and near field propagation, ... These concepts are particularly useful in a large number of applications including non-destructive characterization of heterogeneous materials, medical diagnosis, seismic detection, meteorological prediction, etc.

The aim of this meeting is to exchange views, foster interactions, share expertise and methodologies so as to promote cross fertilisation and develop a wider perspective among the different disciplines.

The workshop is sponsored to a large extent by the french C.N.R.S., the GDR POAN, the DRET.

### Organising Committee

Mathias FINK (Paris), Georg MARET (Strasbourg), Roger MAYNARD (Grenoble).

### Scientific Committee

Walter ARNOLD (Saarbrucken), Ad LAGENDIJK (Amsterdam), Georges PAPANICOLAOU (Stanford).

### Partial List of Invited Speakers

M. CAMPILLO (Grenoble), U. FISCHER (Munster), S. FAUVE (Lyon), Ph. FLAMANT (Paris), J.P. FOUQUE (Paris),  
A. GENACK (New-York), V.E. KRAVSTOV (Stuttgart), K. MAYER (Kassel), A. MIGUS (Paris),  
M. PATTERSON (Hamilton), D. PEPPER (Los-Angeles), H. VAN DE HULST (Leiden).

### Information for participants

Applications should be sent to Mathias Fink ESPCI - 10 rue Vauquelin - 75005 Paris - Tel. (33-1) 45.87.01.88 -  
Fax (33-1) 40.79.44.25, before January 15, 1995.

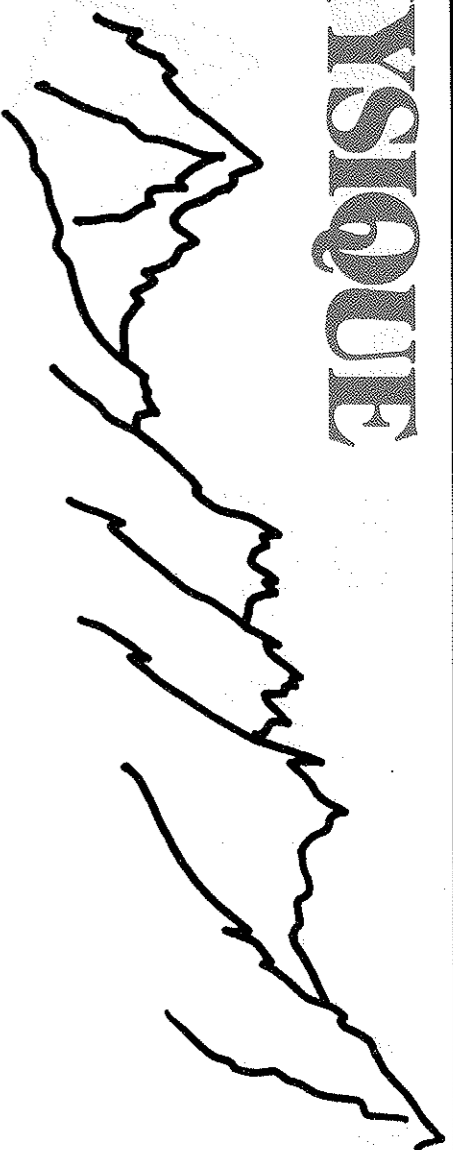
The fee of 4 500 FF includes board, lodging at the center during the workshop.

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*Centre de Physique des Houches, Côte des Chavants, 74310 Les Houches. Director: Michèle Leduc - Tel.: (33) 50.54.40.69 - Fax: (33) 50.55.53.25.*



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES  
France

## QUANTUM MECHANICAL SIMULATION METHODS FOR STUDYING BIOLOGICAL SYSTEMS 2 - 7 May 1995

An important area of current theoretical research is the examination of the structure and the function of biological macromolecules such as proteins and nucleic acids. Because of their complexity, numerical simulation methods are important tools in their study. For many phenomena, such as the investigation of the equilibrium structures of a biological polymer, simulations based upon classical mechanics are sufficiently accurate. However, in other cases, such as the simulation of electron transfer or of enzymatic reactions, it is necessary to use quantum mechanical methods. The aim of the workshop is to assess the state-of-the-art in the field and to highlight areas for future research by bringing together researchers who develop quantum mechanical simulation methods and apply them to biological systems.

### Topics

*Ab-Initio* Molecular Dynamics, Quantum Dynamical Simulations  
Quantum Mechanical Calculations, Density Matrix Methods  
Electron and Proton Transfer Reactions

### Invited speakers

H.J.C. BERENDSEN (Gröningen), P.L. DUTTON (Pennsylvania), R.A. FRIESNER (Columbia),  
J.T. HYNES (Boulder), B. LESYNG (Warszawa), J.N. ONUCHIC (UCSD),  
M. PARRINELLO (Stuttgart), A. ST AMANT (Ontario), K. SCHULTEN (Urbana-Champaign)  
A. WARSHHEL (UCLA), M.C. ZERNER (Gainesville).

### Organizing committee

D.J. BICOUT (IBS, Grenoble), M.J. FIELD (IBS, Grenoble),  
B. HONIG (Columbia, New York), A. SZABO (NIH, Bethesda).

### Information for participants

Les Houches is a resort village in the Chamoronix valley of the French Alps. Established in 1951, the school is situated in a mountain village surrounded by meadows and woods at an elevation of 1000 m. It is ideally located for mountaineering, skiing or touring as well as for intellectual pursuits.

The fee of 3 000 FF includes board, lodging at the center during the workshop, and a copy of the proceedings. Attendance is limited to 60 participants. A limited number of grants to help with the registration and subsistence expenses of selected young researchers will be available.

Applications, including a brief C.V. and recent publications, should be sent before February 15, 1995 to: Mme Monique Marchand, Institut de Biologie Structurale Jean-Pierre Ebel, 41, avenue des Martyrs, F - 38027 Grenoble Cedex 1 - France, Fax: (33) 76.88.54.94, email: monique@ibs.fr.

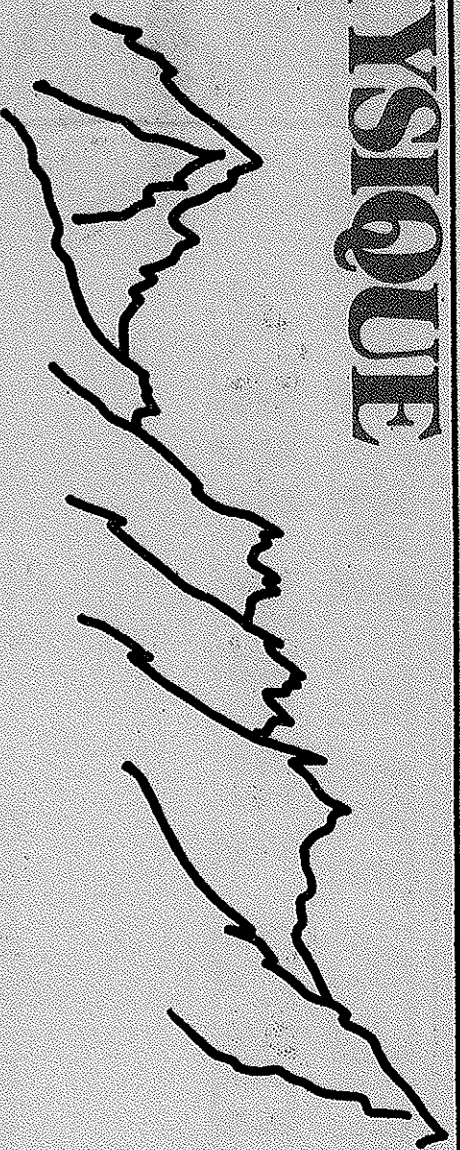
For information on other meetings to be held in the Centre de Physique, please contact the Director, Mme Leduc, Centre de Physique des Houches, F - 74310 Les Houches - France.

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# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES  
France

NATO ADVANCED STUDY INSTITUTE

## QUANTUM OPTICS OF CONFINED SYSTEMS

May 23 - June 2, 1995

Supported by European Commission - DG XII, CNRS, Université Paris-Nord  
and sponsored by the E.P.S. Quantum Electronics and Optics Division

In the last few years, recent advances have been performed in the field of resonant quantum optics in confined space from the point of view of both atomic physics and solid state physics. In atomic physics, cavity quantum electrodynamics (QED), in which the behavior of atomic systems in electromagnetic (e.m.) microcavities is monitored, has undergone a very fast surge : spontaneous emission enhancement or inhibition, cavity Lamb shift, vacuum Rabi splitting, long range atom-surface interactions, etc.. On the other hand, solid state physics has seen the emergence of novel research fields connected with the fast technological developments in micro- and nano-optoelectronics : semiconductor and metallic multiquantum wells, micro-cristallites, electron confinement, excitonic resonances, etc....

This should lead to new developments in the generation and use of peculiar e.m. fields (non-classical photon statistics, squeezed states, microlaser without threshold, optical logics...). Although studied by different communities, these various new quantum phenomena are specifically related with electronic or optical confinement on a sub-wavelength size, as shown notably by the emergence of photonic bandgap materials. Emphasis will be given to basic courses accessible to a broad audience, bringing together atomic physicists, solid state physicists and optics specialists. High-level research results will also be presented in more specialized seminars.

**Invited lecturers notably include :** R. CHANG (Yale), C. DELALANDE (ENS Paris), J.W. HAUS (Rensselaer Polytechnic Institute), A. QUATTROPANI (Lausanne), J.M. RAIMOND (ENS Paris) J. RARITY (Malvern), Y.Z. WANG (Shanghai), A. WEIS (Garching), Y. YAMAMOTO (Stanford University).

### Scientific committee

**M. DUCLOY** (Université Paris-Nord), **T.W. HÄNSCH** (Max Planck Institut and Munich University), **S. HAROCHE** (ENS Paris), **V. LETOKHOV** (Institute of Spectroscopy, Moscow and Université Paris-Nord), **Y.Z. WANG** (Institute of Fine Mechanics and Optics, Shanghai), **C. WEISBUCH** (DRET, Paris), **Y. YAMAMOTO** (Stanford).

### Information for participants

Les Houches is a resort village in the Chamoni valley of the french Alps. Established in 1951, the school is located in a group of mountain chalets surrounded by meadows and woods at 1000 m elevation. It is ideally located for mountaineering or touring as well as intellectual pursuits. In an effort to favor concentrated discussions and lively interactions, the number of participants will be limited to approximately 60 and we hope to have a good balance between atomic physicists and solid state physicists.

The fee of 4000 FF will cover registration and full board lodging during the school. Grants to contribute to registration, travel and subsistence expenses will be available. The deadline for receiving the final application for participation is February 15, 1995. Interested researchers are urged to enquire as soon as possible for the application forms.

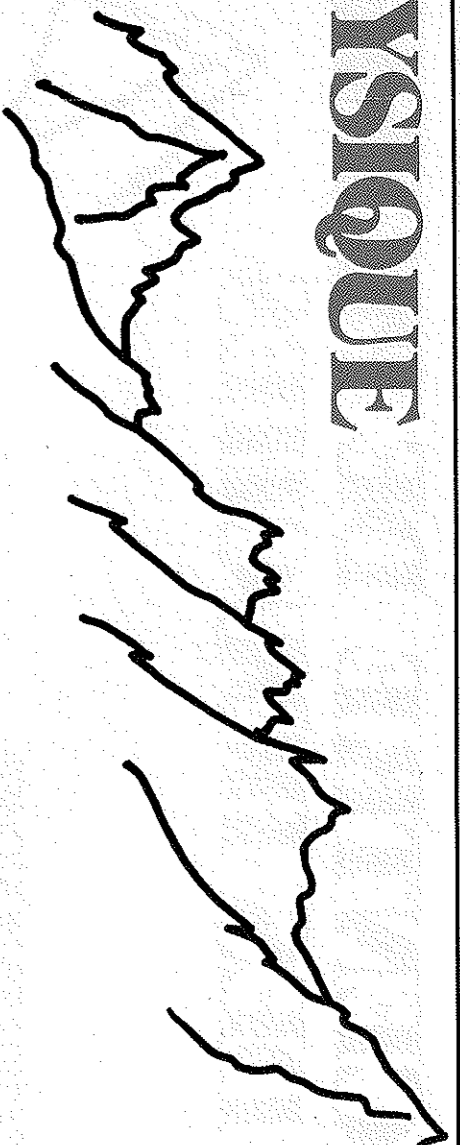
### Organizers

If you wish to receive further notice regarding this meeting, please contact the organizers **M. DUCLOY** and **D. BLOCH**, Laboratoire de Physique des Lasers, Université Paris-Nord, Institut Galilée, Avenue J.B. Clément, 93430 Villetaneuse, France, Fax 33 1 49 40 32 00.

*The Physics School in Les Houches is affiliated to the University Joseph Fourier and National Polytechnical Institute in Grenoble. It is subsidized by the Ministry of Superior Education and Research, C.N.R.S., and the Atomic Energy Commission. Centre de Physique des Houches, Côte des Chavants, 74310 Les Houches. Fax : (33) 50 55 53 25. Director : Michèle Leduc.*



# CENTRE DE PHYSIQUE DES HOUCCHES



74310 LES HOUCCHES  
France

## NEW TOOLS FOR NEUTRON INSTRUMENTATION 6 - 9 June 1995

### Program

The neutron is a powerful probe, but an expensive one to produce. It is therefore important to develop neutron instrumentation, both to maximize the usefulness of today's sources and to prepare for tomorrow's. This workshop is organized by the European Network for Neutron Instrumentation - ENNI\* - a network of 14 members from 6 countries. ENNI's role is to stimulate the development of new technologies for neutron instrumentation, and this workshop will explore these topics through invited and contributed presentations. These papers will include the progress of the current members of the network in the areas of detectors, polarization and data visualization.

### Invited Speakers (those confirmed on 24/1/95):

**Detection:** D.P. Hutchinson, M. Lehmann, C. Pettilio, C. Rausch, N. Rhodes, G. Zanella  
**Data analysis:** P.J. Brown, W.M. Johnson, G. Kearley, M. Könnecke, C. Moreton-Smith, R. Papoular, E. Ressouche, D.S. Sivia  
**Optics:** B. Alefeld, I. Anderson, P. Böni, C. Lartigue, A. Magerl, U. Schmidt  
**Polarization:** T. Chupp, C. Fermon, R. Gähler, W. Hell, Y. Masuda, O. Schärpf, E. Stuhman, R. Surkau, F. Tasset, A.K. Thompson, C. Zeyen  
**UCN, Interferometry, Diffraction, Fundamental:** T.J. Bowles, T. Ebisawa, A. Hewat, H. Rauch

### Information for participants

Les Houches is a resort village in the Chamornix valley of the French Alps. Established in 1951, the school is located in a group of mountain chalets surrounded by meadows and woods at 1 000 m elevation. It is ideally located for mountaineering or touring as well as intellectual pursuits. The number of participants being limited to approximately 60, most of them will be members of the network and invited speakers. Only a very limited number of additional participants will be possible.

### Organizers

Francis TASSET and Herma BÜTTNER, ILL, Grenoble  
(e-mail: [buttner@ill.fr](mailto:buttner@ill.fr) or Fax: +33 76 48 39 06)

### Scientific Committee

**UK:** A. Taylor, J. Finney, M. Johnson; **France:** M. Leduc, J. Schweizer; **Italy:** F.P. Ricci;  
**Germany:** E. Otten, D. Richter, T. Springer; **USA:** T. Chupp, G. Greene; **Japan:** Y. Endoh, Y. Masuda;  
**ILL:** R. Scherm, A. Heidermann

\*ENNI - an EC HCM funded program, co-ordinated by Dr. M.W. Johnson, RAL UK, and with members from the ILL, HMI, Delft, Risø and the University of Rome.

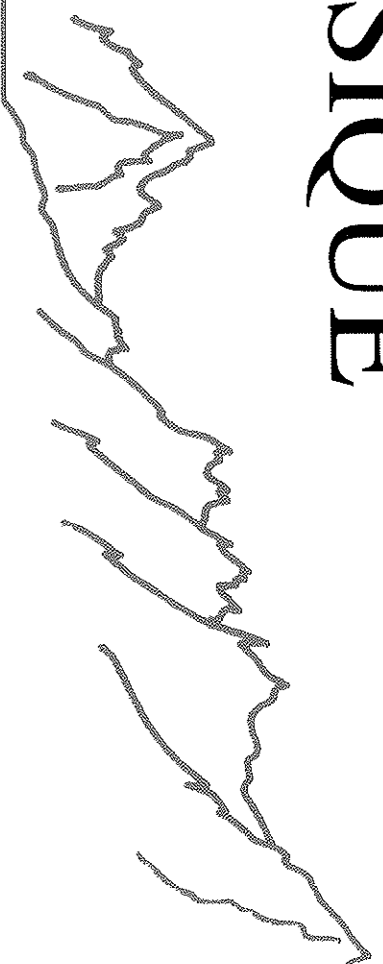
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Centre de Physique des Houches, Côte des Chavants, 74310 Les Houches. Director: Michèle Leduc - Tel.: (33) 50.54.40.69 - Fax: (33) 50.55.53.25.



# CENTRE DE PHYSIQUE DES HOUCCHES

NATO ADVANCED STUDY INSTITUTE  
LES HOUCCHES, FRANCE



## PHYSICS AND CHEMISTRY OF LOW DIMENSIONAL INORGANIC CONDUCTORS

**13 - 23 June 1995**

This Institute is devoted to the field of low-dimensional inorganic conductors showing electronic instabilities. Various aspects of materials science including chemistry, synthesis and characterization as well as physical properties, experiment and theory, will be covered.

### TOPICS

**Transition metal oxides, new chalcogenides and bronzes, cluster compounds, misfit layer compounds - Structural instabilities - Charge and spin density waves, statics and dynamics, excitations - Electronic structures, theory and experiment - Wigner crystals.**

### LECTURES

R.V. Coleman (Virginia, USA), A. Cox (Oxford, UK), J.C. Gill (Bristol, UK), M. Greenblatt (Rutgers, USA), G.Grüner (UCLA, USA), D. Jérôme (Orsay, F), R. McCarley (Ames, USA), P. Monceau (Grenoble, F), J.P. Pouget (Orsay, F), J. Rouxel (Nantes, F), C. Schlenker (Grenoble, F), W. Wonneberger (Ulm, Germany).

### SEMINARS

K. Biljakovic (Zagreb, Croatia), S. Brazovskii (Landau Inst., Russia), J. Brill (Kentucky, USA), E. Canadell (Orsay, F and Barcelona, Spain), L. Degiorgi (ETH Zurich, Switzerland), J. Dumas (Grenoble, F), M. Hervieu (Caen, F), M. Kanatzidis (Michigan, USA), P. Littlewood (AT&T Bell Labs., USA), D. Malterre (Neuchâtel, Switzerland and Nancy, F), G. Mihaly (Budapest, Hungary), S. van Smaalen (Groningen, NL, and Kiel, Germany), K. Smith (Boston, USA), R. Thorne (Cornell, USA), M. Whangbo (North Carolina, USA).

### ORGANIZING COMMITTEE

**J. Dumas (Grenoble, F), M. Greenblatt (Rutgers, USA),  
C. Schlenker (Grenoble, F), S. van Smaalen (Groningen, NL and Kiel, Germany)**

The number of participants is limited to 65. Fellowships will be available for living expenses. Application form, curriculum vitae, list of publications, a letter of motivation and a letter of recommendation should arrive

**before FEBRUARY 15, 1995** to :

Claire Schlenker / Jean Dumas , NATO-ASI  
LEPES - CNRS, B.P. 166  
38042 GRENOBLE CEDEX 9, FRANCE  
Fax : (33) 76 88 79 88  
e-mail : dumas@lepes.polycnrs-gre.fr

*Les Housses is a resort village in the Chamonix Valley of the French Alps. Established in 1951, the School takes place in mountain chalets surrounded by meadows and woods at an altitude of 1000m. It is ideally located for mountaineering, hiking and touring, as well as for intellectual challenge.*

*The School is affiliated to Université Joseph Fourier and Institut National Polytechnique de Grenoble.*

*It is subsidized by the French Ministry of Higher Education and Research, CNRS and CEA. This Institute is supported by NATO and by CNRS-Formation Permanente.*

Centre de Physique des Housses, Côte des Chavands, F-74310 Les Housses.

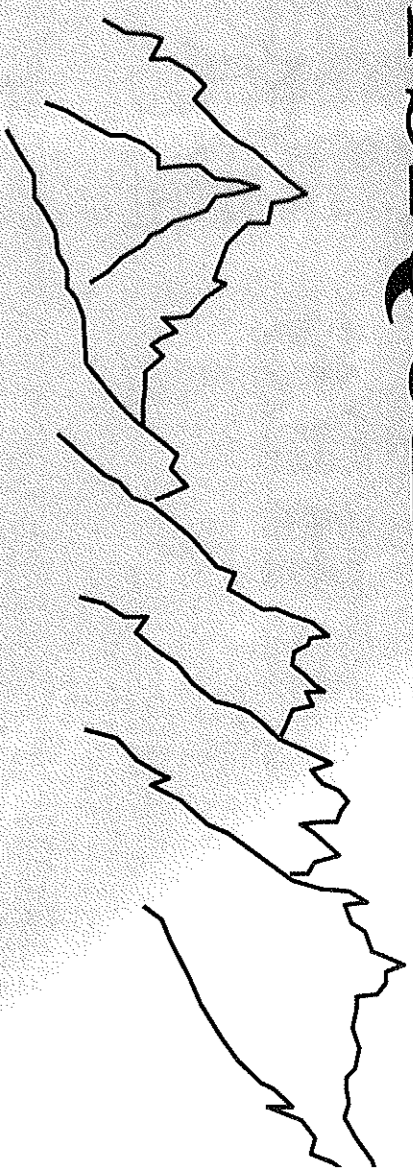
Director : Michèle Leduc

Tel. : (33) 50 54 40 69

Fax : (33) 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHEES



14310 LES HOUCHEES  
France

## ASTROPHYSICAL SOURCES OF GRAVITATIONAL RADIATION

26 SEPTEMBER – 6 OCTOBER 1995

### Organizers

Jean-Alain Marck (France) – Jean-Pierre Lasota (France)

### Scientific Committee

J. Bicák (Czech Republic), A. Brillet (France), T. Damour (France), A. Giazotto (Italy), P. Haensel (Poland),  
W. Hillebrandt (Germany), K. Kokkotas (Greece), T. Piran (Israel), B. Schutz (U.K.), E. Seidel (U.S.A.), K.S. Thorne

Gravitational wave astronomy will soon become an observational science. The three interferometric detectors under construction in Europe and the United States are likely to detect the first signals around the year 2000. In addition to the VIRGO detector in France, the LIGO detectors in the states of Washington and Louisiana, other projects, such as the Anglo-German GEO, are in progress. Since gravitational radiation can only be emitted through the acceleration of large masses, all the sources observable by LIGO will necessarily be astrophysical ones. In particular one expects to observe rapidly rotating neutron stars, supernovae, coalescence of binary neutron stars. Moreover, it may be possible to detect the merging of a neutron star with a black hole collisions between black holes. Thus, a new window on the universe is opening. The scientific community of physicists and astronomers therefore needs to be prepared to work with the new type of data that is expected in the very near future. The aim of this school is to assemble specialists from various areas of physics and astrophysics involving gravitational radiation to discuss their research students and post-docs.

### Topics of the Courses

- Generation of gravitational radiation; coalescing binaries, supernovae, pulsars, black hole collisions, active galactic nuclei, cosmological sources.
- Numerical methods and simulations.
- Relation between gravitational radiation and gamma ray bursts.
- Detection of gravitational waves; bar detectors and terrestrial and space interferometric detectors.

### Invited Speakers

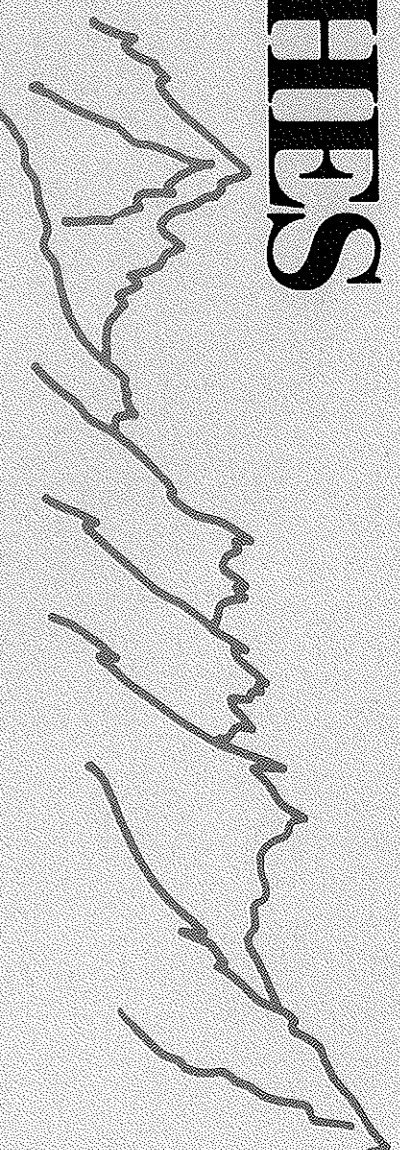
A. Abrahams (U.S.A.), B. Allen (U.S.A.), A. Alpar (Turkey), J. Bicák (Czech Republic), L. Blanchet (France),  
C. Boisson (France), S. Bonazzola (France), A. Brillet (France), T. Damour (France), K. Danzmann (German),  
R. D'Inverno (U.K.), A. Giazotto (Italy), E. Gourgoulhon (France), L. Grishchuk (Russia), P. Haensel (Poland),  
A. R. King (U.K.), K. Kokkotas (Greece), J.M. Martí (Spain), E. Müller (Germany), T. Nakamura (Japan),  
K. O'hara (Japan), T. Piran (Israel), B.S. Sathyaprakash (India), B. Schutz (U.K.), E. Seidel (U.S.A.),  
S. Teukolsky (U.S.A.), R. Wagoner (U.S.A.), A. Wolszczan (U.S.A.)

The number of participants is limited to 60. The fee is 4650 FF per participant which includes food and lodging at the Centre de Physique des Houches. The School and the volume proceedings. Application including a brief C.V. should be sent before 25 July 1995 to *Madeleine Rosolen, D.A.R.C., Observatoire de Paris – section de Meudon, 92190 Meudon, France (fax: 33-1 45 07 79 14310 houches@iris.obspm.fr).*

This School is supported by the Commission of the European Communities, the Direction des Etudes, Recherches et Techniques of the French Ministry of Defense, by the Formation Permanente of the C.N.R.S., the I.N.S.U., and the



# LES HOUCHEs



SESSION LXIII  
NATO ADVANCED STUDY INSTITUTE  
June 27 - July 28 1995

école d'été de physique théorique

## QUANTUM FLUCTUATIONS FLUCTUATIONS QUANTIQUES

Scientific Direction: **E. GIACOBINO** (Paris, France),  
**S. REYNAUD** (Paris, France).

Sensitivity in Quantum Measurements: **V.B. BRAGINSKY** (Moscow, Russia)  
Quantum Measurement and Quantum Stochastic Methods: **C.W. GARDINER** (Hamilton, New Zealand) and  
**P. ZOLLER** (Boulder, USA)  
Quantum Fluctuations in Optical Systems: **P. KNIGHT** (London, UK)  
Quantum Fluctuations in Electrical Networks: **M. DEVORET** (Saclay, France)  
Sub-Poisson Photon Statistics: **L. DAVIDOVICH** (Rio de Janeiro, Brazil)  
Cavity QED and Tests of Quantum Measurement Theory: **S. HAROCHE** and **J.-M. RAIMOND** (Paris, France)  
Propagation of Quantum Fields in Dielectrics: **S.M. BARNETT** (Glasgow, UK)  
Quantum Fluctuations and Non Linear Optical Patterns: **L. LUGIATO** (Milano, Italy)  
Atom Optics: **J. MLYNEK** (Konstanz, Germany)  
Quantum Fluctuations and Inertia: **M.T. JAEKEL** (Paris, France)  
Vacuum Fluctuations and Cosmology: **L.P. GRISHCHUK** (Saint Louis, USA)  
Quantum Chaos: **F. HAAKE** (Essen, Germany)  
Spectral Fluctuations in Disordered and Strongly Correlated Metals: **G. MONTAMBAUX** (Orsay, France)

*Colloquium lectures on latest developments and seminars by participants will also be organized.*

Quantum fluctuations have become a field of great current interest in physics. It is now possible to analyze and modify their effects. New techniques are continuing to be developed to "squeeze" these fluctuations, to measure quantum observables without perturbing their evolution, to manipulate atoms, and to reduce or enhance atomic coupling with radiation fields. Applications have been proposed which may improve the quantum-noise-limited sensitivity of physical measurements. The school aims to gather young physicists working in various fields of quantum optics, quantum electronics, atomic physics, metrology, relativity and cosmology and to provide them with a common background covering theoretical models, experimental methods, and potential applications.

*Les Houches is a resort village in the Chamornix valley of the french Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at an altitude of 1 000 m. It is above the village, facing the Mont-Blanc range. It is ideal for mountaineering, hiking or touring as well as for more intellectual work. Accommodation and meals are provided within the School for both participants and lecturers. A financial contribution of FF 4 750 is requested from each participant. Some possibilities for grants exist. Participants who intend to rent lodging should directly inquire at : Office du Tourisme, 74310 Les Houches (tel. (33) 50.55.50.62). The School is affiliated to University Joseph Fourier and National Polytechnical Institute in Grenoble. It is subsidised by the Ministry of Superior Education and research, CNRS and the Atomic Energy Commission. This session is a NATO Advanced Study Institute.*

Admissions forms and additional information are available from:

**ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE - F - 74310 LES HOUCHEs**  
**FAX: 33/50.55.53.25**

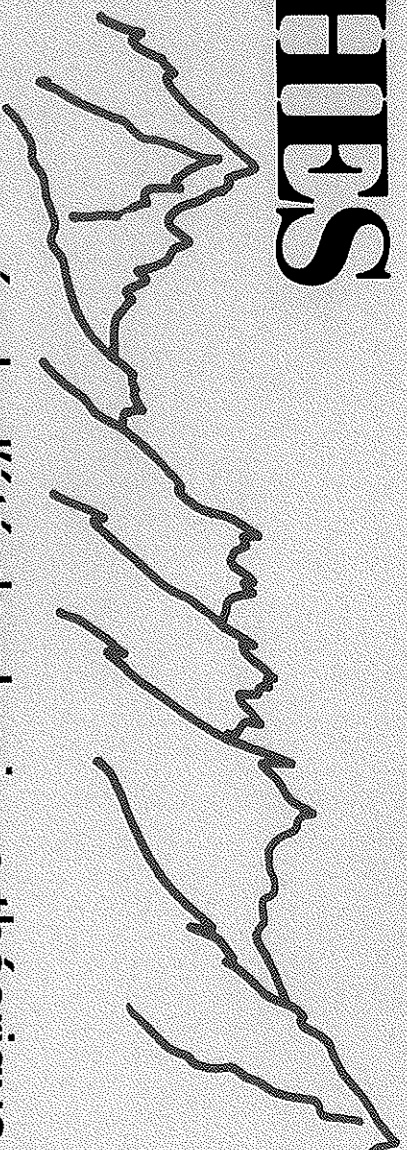
Complete files (admission forms and recommendatory letters) must have reached this address before **March 1, 1995**.

The second 1995 session will be entitled "Quantum Symmetries".  
Two sessions will be held in 1996, one on "Biology for physicists", the other on "Trends in Nuclear Physics".



# LES HOUCHEs

SESSION LXIV  
NATO ADVANCED STUDY INSTITUTE  
August 1 - September 8 1995



école d'été de physique théorique

## QUANTUM SYMMETRIES SYMÉTRIES QUANTIQUES

Scientific Direction: **A. CONNES** (Collège de France),  
**K. GAWEDZKI** (IHES, Bures-sur-Yvette).

Non-commutative geometry: **A. CONNES** (Paris, France)  
Topological field theory and strings: **R. DIJKGRAAF** (Amsterdam, The Netherlands)  
Hidden symmetries of integrable models: **L. FADDEEV** (St Petersburg, Russia)  
Conformal field theory and integrable systems: **G. FELDER** (Chapel Hill, USA)  
Gravity in non-commutative geometry: **J. FRÖHLICH** (Zürich, Switzerland)  
Supersymmetric analysis: **A. JAFFE** (Harvard, USA)  
Topology of diffeomorphism groups: **J. JONES** (Warwick, England)  
Algebraic topology for physicists: **J.L. LODAY** (Strasbourg, France)  
Infinite-dimensional quantum symmetries: **T. MIWA** (Kyoto, Japan)  
Strings and gravity: **A. POLYAKOV** (Princeton, USA)  
Quantum groups and braid groups: **M. ROSSO** (Strasbourg, France)  
Compact and non-compact quantum groups: **S. WORONOWICZ** (Warsaw, Poland)

Recent developments in theoretical physics and in mathematics have led to the discovery of new symmetry principles and of new geometry ultimately related to them. These discoveries have stemmed from the study of quantum integrable systems of statistical mechanics, field theory and string theory and from the mathematical development of non-commutative geometry and quantum group theory. The aim of the school is to provide the basic knowledge about these subjects to a mixed audience of young theoretical physicists and young mathematicians interested in quantum symmetries and quantum geometry. The program will concentrate on the current research topics most ripe for cross-fertilization between physics and mathematics.

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Admissions forms and additional information are available from:

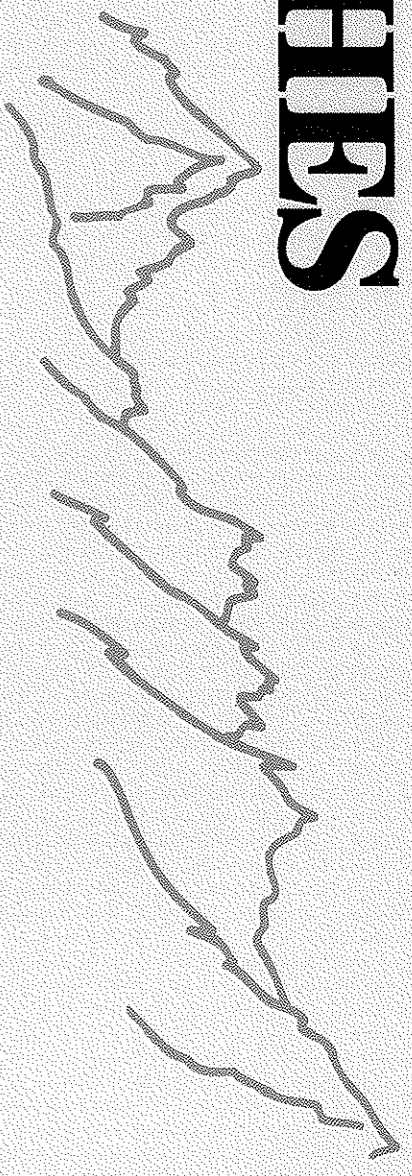
**ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE - F - 74310 LES HOUCHEs**  
**FAX: 33/50.55.53.25**

Complete files (admission forms and recommendatory letters) must have reached this address before **March 1, 1995**.

The second 1995 session will be entitled "Quantum Fluctuations".  
Two sessions will be held in 1996, one on "Biology for physicists", the other on "Trends in Nuclear Physics".



# LES HOUCHES



SESSION VIII

10-22 septembre 1995

école pré-doctorale de physique

ÉCOLE DOCTORALE SCIENCES DE LA TERRE  
FÉDÉRATION FRANÇAISE DES MAGISTÈRES DE PHYSIQUE

## PHYSIQUE DE LA TERRE: RÉGIME THERMIQUE ET DYNAMIQUE DU MANTEAU

Thermodynamique du manteau terrestre: **F. GUYOT** (Paris 7)  
Tomographie sismique et modèles élastiques: **H.C. NATAF** (ENS Paris) et **J.P. MONTAGNER** (IPGP)  
Aspects thermiques de la dynamique du manteau: **C. JAUPART** (IPGP/IUF)  
Dynamique du manteau et rotation de la terre: **Y. RICARD** (ENS Lyon)  
Modèles numériques de convection et régimes convectifs comparés des planètes telluriques: **C. SOTIN** (Nantes)

L'objectif pédagogique général de cette session est d'offrir un panorama synthétique sur les résultats récents concernant la convection dans le manteau de la Terre, les différentes approches numériques et expérimentales et les observations récentes effectuées sur ce sujet. Les cours des Écoles pré-doctorales sont approfondis mais de caractère suffisamment général. Ils sont destinés principalement aux jeunes chercheurs venant de terminer un DEA ou un Magistère, à ceux qui sont en cours de Thèse et, plus généralement, aux jeunes chercheurs étrangers dans une situation d'études analogue. Ils doivent permettre de compléter la formation des participants à la fois dans leur domaine de recherche et dans d'autres disciplines à un niveau plus accessible et moins spécialisé que celui des autres Écoles. Un effort pédagogique y est effectué tant pour les cours eux-mêmes que par les échanges entre étudiants et enseignants et par les interactions entre étudiants. En dehors des cours et séminaires effectués par les enseignants, chacun des participants fera un court exposé sur son sujet de recherche ou de stage.

## Candidatures et financement

Cette École est ouverte aux étudiants de toute nationalité. Les candidats doivent envoyer un dossier qui sera examiné par un Comité de Sélection. Ce dossier doit comprendre un curriculum vitae détaillé, une lettre de recommandation et éventuellement une demande de bourse.

Le Comité de Sélection attribuera des bourses couvrant totalité ou partie des frais d'inscription et de séjour lesquels s'établissent à 2 500 FF.

Le dossier d'inscription doit parvenir:

**avant le 16 juin 1995**

à **J. ACHACHE**

Institut de Physique du Globe de Paris (IPGP), 4, place Jussieu - 75252 Paris Cedex 05  
Tél.: (1) 44 27 24 48 - Fax: (1) 44 27 33 73 - Email: [achache@ipgp.jussieu.fr](mailto:achache@ipgp.jussieu.fr)

## Comité d'organisation

**J. ACHACHE** (IPGP), **J.P. POIRIER** (IPGP) et **Y. RICARD** (ENS Lyon), Directeurs Scientifiques  
**J.C. LE GUILLOU** (IUF, ENSLAPP, Univ. de Savoie) - **R. MAYNARD** (EN, Univ. Grenoble I)

Les Écoles pré-doctorales des Houches sont organisées par la Fédération Française des Magistères de Physique qui regroupe les Magistères de l'Université Joseph Fourier (Grenoble I), de Paris-Sud (Orsay), de l'Université Paris 7, de l'Université Claude Bernard et de l'ENS de Lyon, de l'Université de Rennes, le Magistère Interuniversitaire de Physique (Paris, 6, 7, 11 et 13 et ENS) et le Magistère "Matériaux" (Strasbourg I et Mulhouse). La session 1995 est organisée avec l'École Doctorale Sciences de la Terre de l'Institut de Physique du Globe de Paris et de l'Université Paris 7.

*Les Houches est un village de la vallée de ChamoniX, dans les Alpes françaises. L'École a lieu dans un groupe de chalets montagnards entourés de prairies et de bois. Il est situé à une altitude de 1000 m. L'hébergement et les repas sont assurés pour tous les participants. Les étudiants bénéficieront en permanence de salles de réunion et d'une bibliothèque.*

L'École de Physique des Houches est affiliée à l'Université Joseph Fourier et à l'Institut National Polytechnique de Grenoble. Elle est subventionnée par le Ministère de l'Enseignement Supérieur et de la Recherche, le CNRS et le Commissariat à l'Énergie Atomique.

École de Physique des Houches, Côte des Chavants, 74310 Les Houches  
Tél.: (33) 50 54 40 69 - Fax: (33) 50 55 53 25

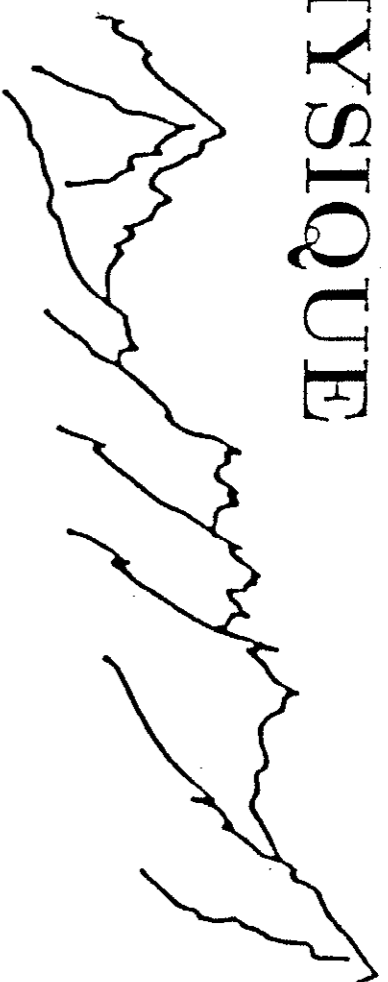






# CENTRE DE PHYSIQUE DES HOUCHEES

74310 LES HOUCHEES  
France



## ION SURFACE INTERACTION

March 12 - 16 1996

Organiser : P. Roncin ( France )

Scientific Committee

V. Kempter ( Germany ) and N. Stolterfoht ( Germany )

This workshop aims to focus on the understanding of basic mechanisms of the interaction of slow ions with surfaces (metal, semi-conductor and insulator). It will gather participants of two communities : specialists of atomic collisions will meet with solid states and surface physicists. The workshop will include the study of both secondary electronic and ionic emission. The role of electron exchange close to the surface will be emphasised as well as primary mechanisms responsible for kinetic and potential emission of electrons. A special attention will be paid to the interaction of multiply charged ions with surfaces and to the formation of "Hollow Atoms".

**Participants** : This workshop is constructed around a common meeting of two HCM European networks :

- "Interaction of slow, highly charged ions with surfaces"  
- " Charge Transfer at Surfaces "

P. Echenique	San Sebastian	Spain	Papageorgeopoulos	Ioannina	Greece
F. Flores	Madrid	Spain	P. Roncin	Orsay	France
V. Esaulov	Orsay	France	R. Schuch	Stockholm	Sueden
J.P. Gauyaacq	Orsay	France	N. Stolterfoht	Berlin	Germany
W. Heiland	Osnabruck	Germany	P. Varga	Vienna	Austria
V. Kempter	Clausthal	Germany.	H.P. Winter	Vienna	Austria
R. Morgenstern	Groningen	The Netherland	D.P. Woodruff	Coventry	UK
A. Niehaus	Utrecht	The Netherland	T. Zouros	Heraklion	Greece

The number of participants is limited to 65. Applications should be sent to :

Philippe Roncin, LCAM,bat. 351, Université Paris Sud, F 91405 Orsay Cedex

Fax (33) 1 69 41 76 71, e-mail roncin@lcam.u-psud.fr

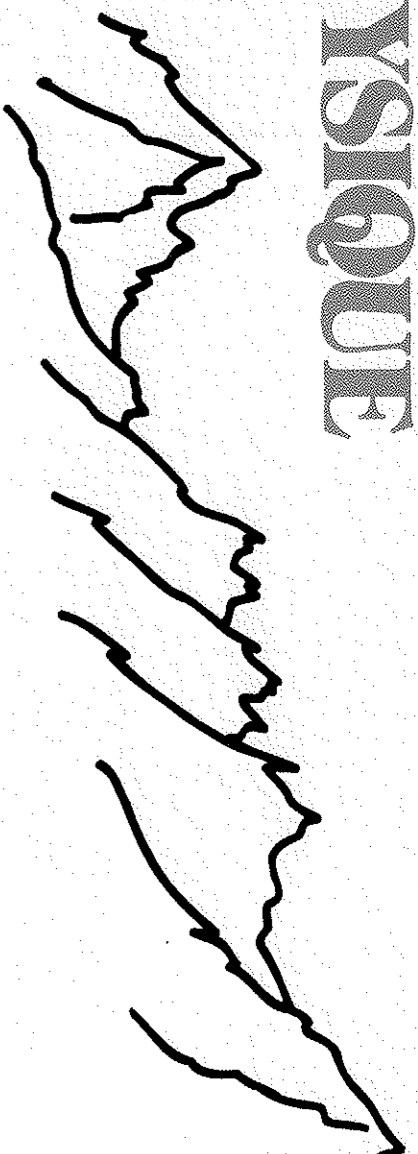
Complete forms must have been reached at this address before **February 15, 1996**. They will then be submitted to the Scientific Committee.

*The "Centre de Physique des Houches" is located in a group of mountain chalets near Chamonix. It is affiliated to the "Université Joseph Fourier" and to the "Institut Polytechnique National" in Grenoble. It is subsidized by the "Ministère de l'Education Nationale, de l'Enseignement Supérieur et de la Recherche" the CNRS and the CEA.*

*Centre de Physique des Houches, Côte des Chavants, 74310 Les Houches. Director : Michèle Leduc. Tel.: (33) 50 54 40 69, Fax : (33) 50 55 53 25.*



# CENTRE DE PHYSIQUE DES HOUCHEES



74310 LES HOUCHEES

France

**FORMATION PERMANENTE DU CNRS**

**ÉCOLE THÉMATIQUE**

**CATALYSE PAR LES MÉTAUX**

**ASPECTS FONDAMENTAUX ET INDUSTRIELS**

**19-29 mars 1996**

**Objectif de l'école**

L'objectif de l'École est de faire le point sur les progrès accomplis au cours des dix dernières années dans les laboratoires et dans l'industrie:

- au plan fondamental, en présentant les nouvelles méthodes de caractérisation et en décrivant, au plan théorique et expérimental, la détermination de structures électroniques, la chimisorption et la réactivité,
- les catalyseurs réels seront également traités en insistant sur les aspects préparation et désactivation,
- les nouveaux domaines d'application: dépollution, combustion et transformation des ressources agro-alimentaires seront exposés ainsi que les nouveautés dans les applications plus classiques tels que le raffinage ou l'élaboration des grands intermédiaires.

**Profil du public visé**

L'École est principalement destinée à former les entrants au CNRS ou à l'Université ainsi que les jeunes ingénieurs, aux différents aspects de la catalyse par les métaux. Des chercheurs confirmés désirant mettre à jour leurs connaissances seront également intéressés par cette formation.

**Organisateurs**

**A. RENOUPREZ, H. JOBIC, J. BARBIER et J.L. PORTEFAIX**

**Thèmes abordés**

Caractérisation: G. BERGERET, F. MAUGÉ, H. JOBIC  
Structure électronique: G. TRÉGLIA, D. SIMON, G. TOURILLON  
Réactivité et Chimisorption: M. FORISSIER, J.C. BERTOLINI  
Complexes de métaux de transition: A. MORTREUX  
Préparation des catalyseurs industriels: C. TRAVERS  
Dépollution et combustion: J. BARBIER  
Raffinage: P. COURTY  
Intermédiaires de la chimie organique: G. CORDIER  
Transformation des ressources agro-alimentaires: P. GALLEZOT  
Frais d'inscription: • CNRS: couverts par la formation permanente  
• Universitaires: 4 500 F  
• Industriels: 10 000 F

Renseignements: M.L. GARET, Institut de Recherches sur la Catalyse - 2, avenue A. Einstein - 69626 Villeurbanne Cedex - Tél. (16) 72.44.53.06 - Fax. (16) 72.44.53.99

La station du village des Houches (altitude 1150 m) se trouve au centre des Alpes, dans la vallée de ChamoniX. Fondée en 1951 l'École est située dans un groupe de chalets de montagne entouré de prairies et de bois. C'est un lieu idéal pour le travail intellectuel et les sports de montage.

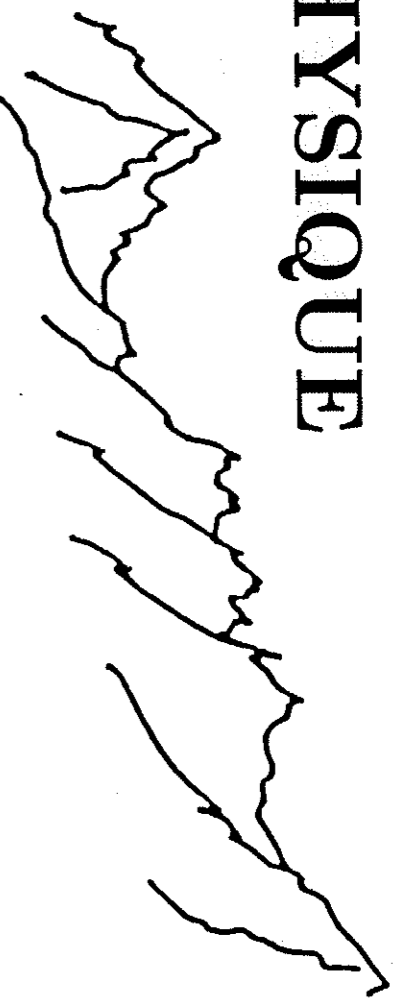
L'École de Physique des Houches est affiliée à l'Université Joseph Fourier et à l'Institut National Polytechnique de Grenoble. Elle est subventionnée par le Ministère de l'Enseignement Supérieur et de la Recherche, le CNRS et le commissariat d'Énergie Atomique.

Centre de Physique des Houches, Côte de Chavants, F-74310 Les Houches. Directeur Michèle LEDUC  
Tél. (33-16) 44.32.20.23 ou (33-16) 50.54.40.69 - Fax : (33-16) 50.55.53.25



# CENTRE DE PHYSIQUE DES HOUCHES

74310 LES HOUCHES  
France



## Effets Collectifs dans les Gaz Atomiques Ultra-froids

1<sup>er</sup> avril - 5 avril 1996

### Organisateurs

Christophe Salomon (France) - Yvan Castin (France)

### Comité Scientifique

F. Lalœ (France) - A. Mysyrowicz (France) - W. Phillips (USA) - J. Walraven (Pays-Bas)

Le progrès des méthodes de refroidissement et de piégeage a conduit récemment à l'observation de la condensation de Bose-Einstein dans des gaz dilués d'alcalins. Cette percée ouvre des perspectives nouvelles pour l'étude des effets de statistique quantique dans les gaz atomiques ultra-froids. Cet atelier de travail d'une semaine a pour objectif de réfléchir aux expériences cruciales et aux applications possibles de ce domaine de recherche. Les sujets abordés comprendront les expériences sur la condensation de Bose-Einstein, la théorie des gaz quantiques dilués, le laser à atomes, les cavités et les pièges pour atomes, le refroidissement laser.

### Conférenciers Invités:

G. Baym (Urbana)	C. Bordé (Paris)	K. Burnett (Oxford)
C. Cohen-Tannoudji (Paris)	S. Chu (Stanford)	E. Cornell (Boulder)
J. Dalibard (Paris)	R. Dum (Paris)	W. Ertmer (Hannover)
D. Heinzen (Austin)	R. Hulet (Houston)	J. Javanainen (Storrs)
M. Kagan (Moscow)	M. Kasevich (Stanford)	W. Ketterle (Cambridge)
D. Klepner (Cambridge)	F. Lalœ (Paris)	A. Leggett (Urbana)
M. Lewenstein (Saclay)	P. Meystre (Tucson)	A. Mysyrowicz (Palaiseau)
W. Phillips (Gaithersburg)	F. Shimizu (Tokyo)	G. Shlyapnikov (Moscow)
R. Spreuw (Amsterdam)	J. Walraven (Amsterdam)	Y. Yamamoto (Stanford)
P. Zoller (Innsbruck)		

Deux présentations de posters seront organisées. Le nombre de participants est limité à 65. Des formulaires de candidature sont disponibles auprès de : Michèle Sanchez, Atelier des Houches, Laboratoire Kastler Brossel, ENS, 24 rue Lhomond, 75231 PARIS Cedex 5, FRANCE. Fax +33 1 45 35 00 76, adresse électronique [sanchez@physique.ens.fr](mailto:sanchez@physique.ens.fr).

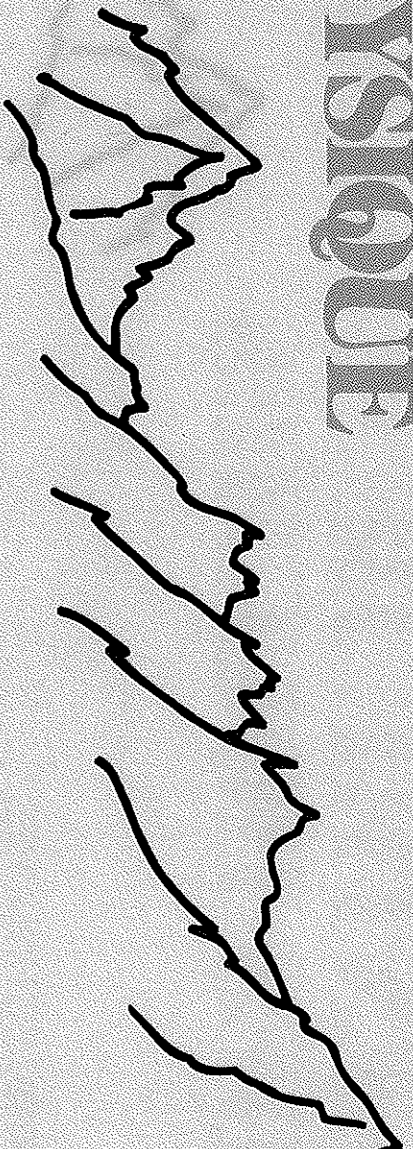
Les demandes de candidature remplies devront parvenir à cette adresse avant le **31 janvier 1996**.

*Le Centre de Physique des Houches est situé dans un groupe de chalets de montagne près de Chamonix, dans un site magnifique au pied de la chaîne du Mont-Blanc. C'est un lieu idéal pour conjuguer travail et activités de montagne. Il est affilié à l'Université Joseph Fourier et à l'INP de Grenoble et subventionné par le Ministère de l'Enseignement Supérieur et de la Recherche, le C.N.R.S. et le C.E.A.*

Centre de Physique des Houches, Côte des Chavants, 74310 Les Houches. Directeur: Michèle Leduc. Tél.: (33) 50 54 40 69, Fax: (33) 50 55 53 25.



# CENTRE DE PHYSIQUE DES HOUCCHES



74310 LES HOUCCHES  
France

## HIGH ANGULAR RESOLUTION IN ASTROPHYSICS

april 9-19, 1996

### A NATO Advanced Study Institute

During the past ten years, many efforts have been made to develop High Angular Resolution techniques in Astrophysics. Combined with imaging facilities, they quite rapidly proved their efficiency and already led to major astrophysical results. In such a context or rapidly evolving techniques and of growing needs for higher angular resolution to test theories or discover new objects, we propose to review both instrumental and scientific aspects. The main questions to be addressed will be : what kind of science can take benefit from High Angular Resolution techniques ?; how to use them in the best way ? The school will be opened to post-doctoral students, students about to defend their PHD, and researchers, in a limited number.

#### Scientific committee

**S. BECKWITH (D), J. DAVIS (AU), R. FOY (F), A.M. LAGRANGE (F),  
D. MOURARD (F), F. PARESCÉ (D), S. RIDGWAY (US).**

#### Invited lecturers

**R. ANGEL (USA), S. BECKWITH (D), P. BELY (USA), B. COTTON (USA), J. DAVIS (Aust), T. ENCRENAZ (F),  
R. FOY (F), R. GENZEL (D), S. GUILLOTEAU (F), A. LANNES (F), A. LEGER (F), M. MAYOR (CH),  
F. PARESCÉ (D), S. RIDGWAY (USA), F. RIGAUT (USA), D. ROUAN (F), M. SHAO (USA), O. VAN DER LÜHE (D).**

#### Contact addresses

**Anne-Marie LAGRANGE**, *Laboratoire d'Astrophysique, Université J. Fourier, BP 53, F-38041 Grenoble Cedex*  
Tél.: (33) 76 51 42 03 - Fax: (33) 76 44 88 21 e-mail: lagrange@gag.observ-gr.fr.

**Denis MOURARD**, *Observatoire du Calern, 2130 route de l'Observatoire, Caussols, F-06460 Saint Vallier de Thiey*  
Tél.: (33) 93 40 54 92 - Fax: (33) 93 40 44 31 e-mail: mourard@obs-nice.fr.

The Physics School in Les Houches is affiliated to University Joseph Fourier and National Polytechnical Institute in Grenoble. It is subsidized by the Ministry of Superior Education and Research, CNRS and Atomic Energy Commission.

*Les Houches is a resort village in the Chamonix Valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at 1150 m elevation. It is ideally located for mountaineering, skiing and touring as well as for intellectual pursuits. This Winter School will also be supported by NATO, CNRS, CNES and the PNHRA.*

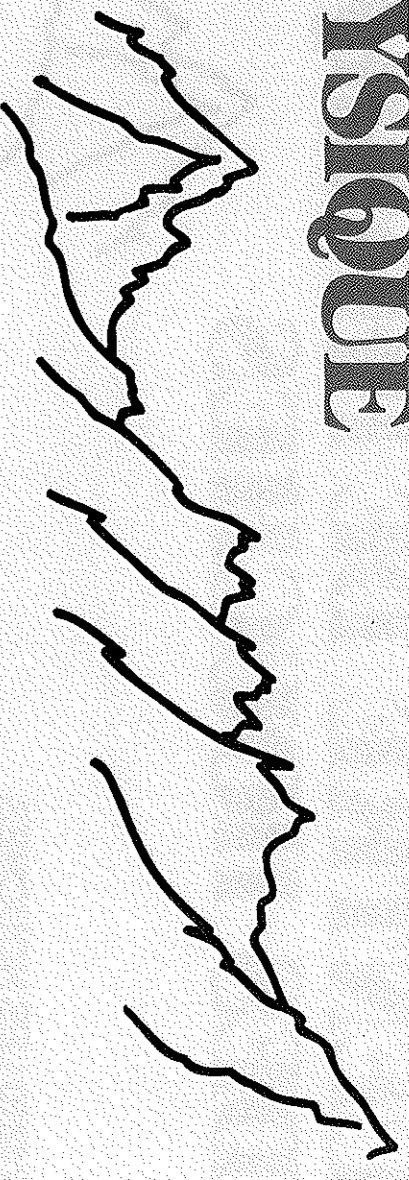
Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches

Director: Michèle Leduc

Tél.: (33) 50 54 40 69 or (33-1) 44 32 20 23 - Fax: (33) 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES  
France

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## SECOND ORDER NONLINEAR OPTICS: FROM FUNDAMENTALS TO APPLICATIONS

**22-26 April 1996**

The recent development of new laser sources, such as the diode-pumped solid state lasers, and the availability of new highly nonlinear materials (crystals, artificial materials based on the quasi-phase-matched techniques) has induced a renewal of the domain of second order nonlinear optics (including parametric and frequency mixing effects). These researches cover a broad spectrum, ranging from *fundamentals* (generation of nonclassical states of light, amplification without added noise, frequency division chain...) to *applications* (spectroscopy, teledetection, metrology, communications...), through the *development of new light sources* (coherent and tunable, pulsed or c.w.), and of new optronic devices. The purpose of this workshop is to *gather researchers from different cultures and horizons* (fundamental and applied research, industry), and to be a place of training and exchange giving to the participants the opportunity of learning the present and future of this field of research and starting fruitful collaborations.

### Organizers

C. FABRE (ENS Paris), J.P. POCHOLLE (THOMSON-CSF LCR Orsay)

### Scientific committee

M.H. DUNN (St Andrews, UK), M. FEJER (Stanford, USA), C. FROELICH (IRCOM Limoges, France),  
D.C. HANNA (Southampton, UK), E. MOTTAY (BML, France), A. PISKARKAS (Vilnius, Lithuania),  
S. SCHILLER (Konstanz, Germany)

### Tentative list of speakers

P. BOURDON (ETCA), T. DEBUSSCHERT (THOMSON-CSF), M. DUNN (St Andrews), C. FABRE (ENS),  
M. FEJER (Stanford), D. HANNA (Southampton), A. LAUBEREAU (München), A. LEVENSON (CNET),  
L.A. LOMPPE (CEA), A. PISKARKAS (Vilnius), E. POLZIK (Aarhus), E. ROSENCHER (THOMSON-CSF)  
S. SCHILLER (Constance), G. STEGEMAN (Orlando), R. WALLENSTEIN (Kaiserslautern),  
N.C. WONG (MIT), J. ZYSS (CNET)

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The registration fee is 2 400 FF.

The Physics School in Les Houches is affiliated to University Joseph Fourier and National Polytechnical Institute in Grenoble. It is subsidized by the Ministry of Education and Research, CNRS, Atomic Energy Commission and by some private industrial companies.

Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches.

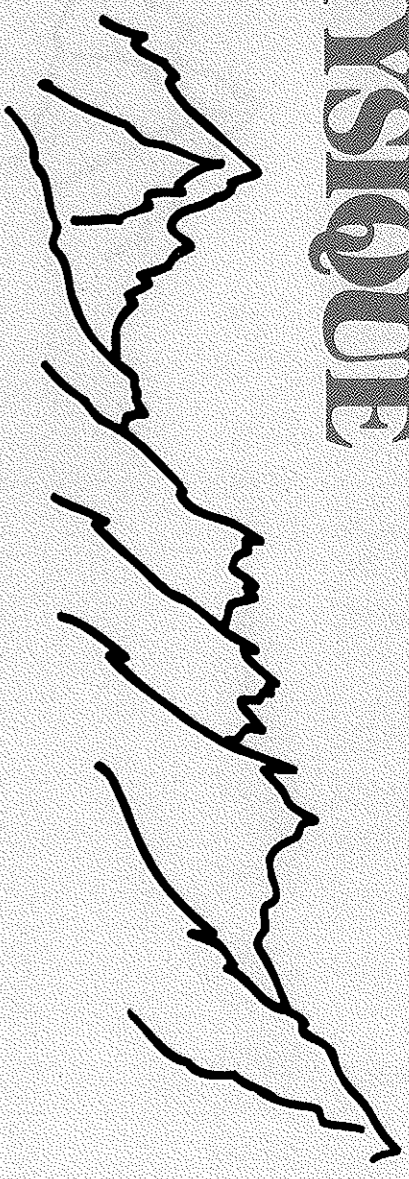
Director: Michèle LEDUC    Tél.: (33) 1-44 32 20 23 or (33) 50 54 40 69

Fax : (33) 50 55 53 25

For informations and applications, contact C. FABRE, E-mail : fabre@spectro.jussieu.fr, Fax (33) 1-44 27 38 45.



# CENTRE DE PHYSIQUE DES HOUCCHES



74310 LES HOUCCHES  
France

# 1/f

## LONG-RANGE DEPENDENT PROCESSES, FROM MODELS TO APPLICATIONS

April 29 - May 3, 1996

Stochastic processes with long-range dependencies are naturally observed in areas such as physics, hydrology, geophysics or finance, as well as in road traffic, telecommunication networks or biology. Those processes, which evidence a  $1/f$  spectral behavior over wide ranges of frequencies and self-similarity properties, give rise to challenging problems from the point of view of both analysis and modeling. The aim of this Spring School is to address such issues from the many perspectives offered by recent developments in statistics, signal theory, wavelets and fractal analysis.

### Session Directors

P. FLANDRIN (ENS Lyon), J. LÉVY-VÉHEL (INRIA Rocquencourt)

### Organizing Committee

P. ABRY (ENS Lyon), P.-O. AMBLARD (CEPHAG-ENSIEG Grenoble), E. MOULINES (Télécom Paris)

### Invited speakers

A. ARNÉODO (Bordeaux), A. BENVENISTE (Rennes), J. BERAN (Konstanz), B. CASTAING (Grenoble)  
Y. MEYER (Paris), G. OPPENHEIM (Paris), M. SHLESINGER (Arlington), M. TAOQU (Boston), M. TEICH (New York).

The number of participants is limited to 50. The fee is 2 110 FF per participant which includes food and lodging at the Center during the School. Application, including a brief C.V. and eventually a motivated request for financial support, must be sent before **December 1st, 1995** to P. FLANDRIN (*lrd96*), *Laboratoire de Physique, ENS Lyon, 46 allée d'Italie, 69364 Lyon Cedex 07 France, or to lrd96@physique.ens-lyon.fr.*

The Physics School in Les Houches is affiliated to University Joseph Fourier and National Polytechnic Institute in Grenoble. It is subsidized by the Ministry of Superior Education and Research, CNRS and Atomic Energy Commission.

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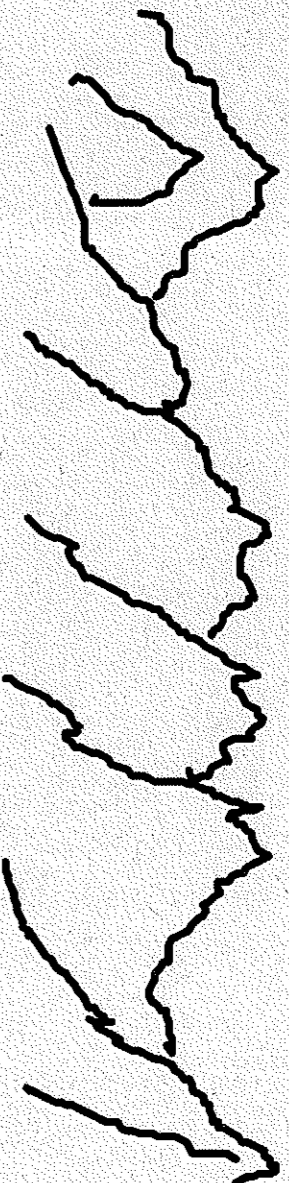
Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches

Director: Michèle Leduc

Tél.: (33) 50 54 40 69 or (33-1) 44 32 20 23 - Fax: (33) 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES

France

## NATO ADVANCES RESEARCH WORKSHOP ATOMIC AND MOLECULAR WIRES

6-10 May, 1996

Sponsored by the CNRS and the Max-Planck-Institut

There is a growing interest in the wiring of a single molecule or an atomic line. There are several ways of making an atomic line, such as the self assembling of metal atoms on surface, the deposition from (or the sliding with) a STM tip apex or the local surface modification by STM voltage pulse. The synthesis of molecular wires is now targeted towards conjugated low gap rigid oligomers. Therefore, a new class of materials, at the nanoscale, will be soon under investigation: atomic lines made of metal atoms, lines of atomic defects and conjugated oligomers. Their fabrication, their structural (stability) and electronic properties will be exposed and discussed in this workshop together with recent advances in techniques leading to their electrical characterization: mechanical, STM and nanolithography-made nanojunctions.

### SCIENTIFIC COMMITTEE

**C. JOACHIM** (CEMES, Toulouse), **K. MÜLLEN** (Max-Planck-Institut, Mainz),  
**M.A. RATNER** (Northwestern University, Evanston), **S. ROTH** (Max-Planck-Institut, Stuttgart)

### INVITED LECTURERS

Notably include:

**M. AONO** (Saitama), **J.L. BREDAS** (Mons), **R. CAR** (Geneva), **N. GARCIA** (Madrid), **J. GIMZEWSKI** (Rüschlikon),  
**N.D. LANG** (Yorktown Heights), **J. NOGAMI** (Wisconsin), **M. REED** (Yale), **K.H. RIEDER** (Berlin),  
**J.M. TOUR** (South Carolina), **Y. WADA** (Saitama)

The number of participants is limited to 50. The fee is 2.110 FF per participant which includes food and lodging at the Center, during the School. Application, including a brief C.V. and eventually a motivated request for financial support, must be sent before **January 15th, 1996** to **C. JOACHIM**, CEMES/CNRS, B.P. 4347, F-31055 Toulouse Cedex, France or to [joachim@cemes.fr](mailto:joachim@cemes.fr).

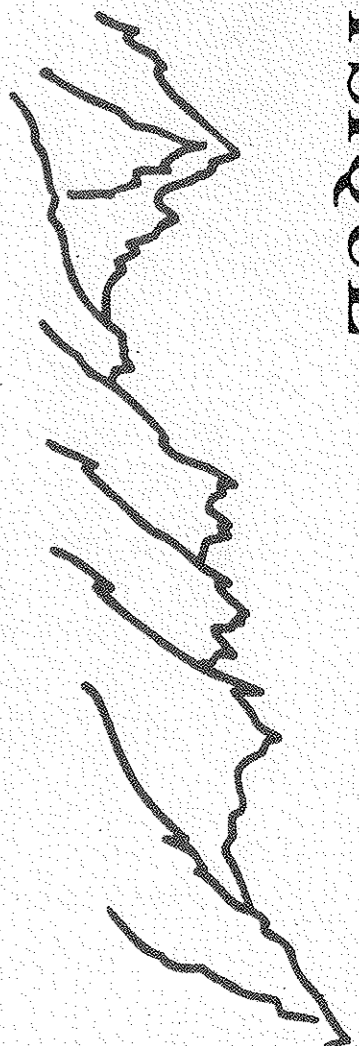
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Director: Michèle Leduc  
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# CENTRE DE PHYSIQUE DES HOUCCHES



74310 LES HOUCCHES  
France

## NEW TOOLS IN TURBULENCE MODELLING

21 - 31 May 1996

Large-Eddy Simulations (LES) in turbulence are undergoing a considerable development, based both on new subgrid modelling methods, and on the tremendous progress of scientific computing. These are now applied to more and more complex flow geometries. LES are able to provide both deterministic (in terms of coherent-vortex dynamics for instance) and statistical predictions. This is very important for assessing and possibly improving statistical models of turbulence, such as one-point closure models, in particular in the presence of external forces. In the coming years, LES will undoubtedly have a decisive impact on industrial modelling and control. The applications of LES are numerous, e.g. external aerodynamics from incompressible flows (thermo-hydraulics; turbo-machinery) to hypersonic flows, internal aerodynamics (combustion; propulsion), meteorology, oceanography, internal geophysics and astrophysics. The objective of the session is to review and investigate the present and potential use of LES techniques for industrial and environmental applications. Topics such as the contribution of these methods to the improvement of other turbulence modelling techniques, the complementarity between experimental and numerical approaches of turbulence will be widely discussed. A particular effort will be made to encourage contacts between researchers and industrialists. The session is intended for selected graduate students, scientists and engineers. General lectures as well as more specialized seminars will be given by leading experts of different domains of turbulence modelling.

*Scientific Direction:* J. FERZIGER (Stanford, USA); O. MÉTAIS (LEGI, Grenoble, France)

*Scientific Committee:* M. LESIEUR (Grenoble, France); P. MASON (Bracknell, U.K.); P. MOIN (Stanford, USA); P. PERRIER (Paris, France); W. RODI (Karlsruhe, Germany).

**New trends in Large-Eddy Simulations of Turbulence:** Part One; M. LESIEUR, Grenoble, France

**New trends in Large-Eddy Simulations of Turbulence:** Part Two; J. FERZIGER, Stanford, USA

**Statistical models and Large-Eddy Simulation:** complementary approaches; W. RODI, Karlsruhe, Germany

**Compressibility effects on turbulence;** T. GATSKI, Hampton, USA

**Turbulence modelling in atmospheric flows:** the Planetary Boundary Layer; P. MASON, Bracknell, U.K.

**Simulation and modeling of turbulent combustion;** T. POINSOT/D. VEYNANTE, France

**Active control of turbulence;** P. MOIN, Stanford, USA

*Additional lecturers:* D. BESNARD, J.P. BONNET, P. COMTE, G. COMTE-BELLOT, J. COUSTEIX, D. GOSMAN, D. GRAND, H. HA MINH, D. LAHALLE, D. LAURENCE, O. MÉTAIS, F. NIEUWSTADT, P. PERRIER, A. POUQUET, P. SAGAUT

The number of participants is limited to 50. The fee per participant is 6 500 FF, for Academic and 8 000 FF, for Industrial including meals and lodging at the Center during the School. Some possibilities for grants exist. Application, including a brief C.V. and eventually a motivated request for financial support must be sent before **15 March, 1996** to *Olivier MÉTAIS-LEGI/IMG, BP 53, 38041 Grenoble Ceder 9, FRANCE, or to Olivier.Metais@img.fr.*

The Physics School in Les Houches is affiliated to the University Joseph Fourier and the National Polytechnic Institute in Grenoble. It is subsidized by the Ministry of Superior Education and Research, CNRS and Atomic Energy Commission. This session is granted by: the DRET, "1a formation permanente du CNRS", the programme TIM (CEA/CNRS), and "le Ministère des Affaires Étrangères".

*Les Houches is a resort village in the Chamoniix valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at an altitude of 1150 m. It is above the village, facing the Mont-Blanc range. The situation is ideal for mountaineering, hiking or touring as well as for intellectual pursuits.*

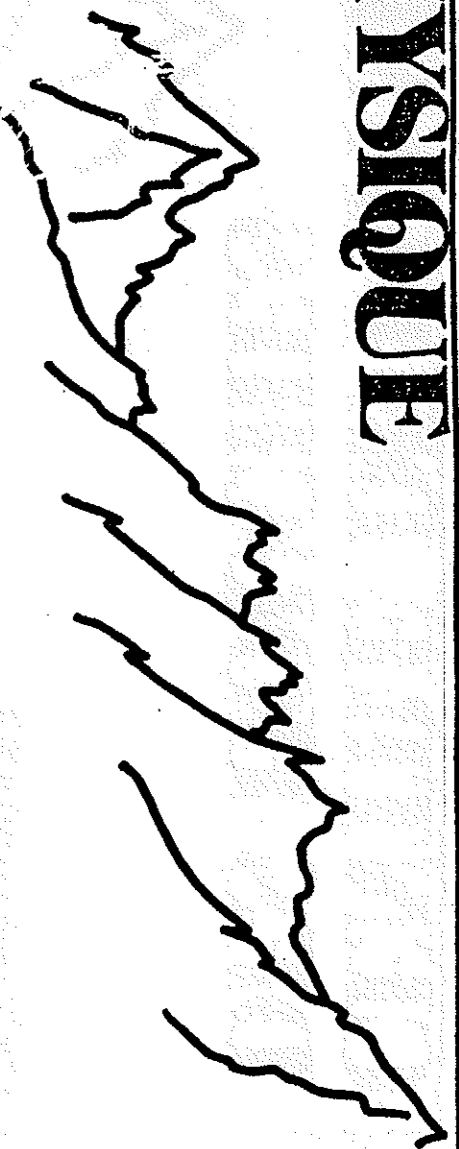
Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches

Director: Michèle Leduc

Tel: (33) 50 54 40 69 or (33-1) 44 32 20 23 - Fax (33) 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES  
France

## WORKSHOP

### METROLOGY AND FUNDAMENTAL PHYSICAL CONSTANTS

June 3<sup>rd</sup> - June 7<sup>th</sup>, 1996

*Supported by BNM-Bureau National de Métrologie (France),*

*European Commission (+), Ministry of Research (France),*

*CNRS (France), Conservatoire national des arts et métiers (Paris).*

The observation of new physical effects and the experimental determination of fundamental physical constants play an increasing role to set up the definitions of the units and to achieve the most accurate materialisation of the references. For example new atomic clocks using cooled and trapped atoms have been recently developed ; the construction of Josephson arrays, of quantum Hall devices, the single electron macroscopic effects introduced tremendous improvements for electricity references and could change the future metrological landscape ; the determination of Avogadro constant, of  $h/m$ , are elements towards another definition of the unit of mass...

Although studied by different communities, these experiments require the same metrological approach and strong interactions between physicists and metrologists have to be encouraged. That is one of the purpose of the workshop, where experimentalists from various fields (atomic physics, theoretical physics, astronomy, signal processing, electricity, etc.). Emphasis will be given to basic lectures (in english or french) accessible to a broad audience (typically PhD), together with more specialized talks or specific workshops. The program deals with the international system of units, the uncertainty determinations, the measurement of the fundamental physical constants (Rydberg, Fine-Structure, Avogadro constant,..), the testing of fundamental theories, the time-clocks and the wavelength references, the quantum effects involved in electrical metrology...

### INVITED LECTURERS (preliminary list)

BNM (France, G.Genevès, P.Juncar, A.Marschal, C.Morillon), IMGC (Italy), NPL (United Kingdom, B.Petley, J.Gallop, B.Kibble), PTB (Germany, W.Wögel, M.Gläser), CNRC (Canada, J.Vanier), ENS (Paris, M.Leduc, C.Salomon, S.Reynaud, F.Biraben), CEA (Saclay, M.Dévoret), CNRS (Orsay, P.Cérez, Ch.Westbrook), U.Standford (M.Kasevich), CERGA (Grasse, J.Kovalevsky, C.Veillet), Russia (V.Letokhov)

### INFORMATION FOR PARTICIPANTS

Les Houches is a resort village in the Chamornix valley of the french Alps. Established 1951, the school is located in a group of mountain chalets surrounded by meadows and woods (1150 m in elevation). It is ideally situated for mountaineering or touring as well as for intellectual pursuits. In an effort to favor concentrated discussions and lively interactions, the number of participants will be approximately limited to 60 and we hope to have a good balance between physicists and metrologists.

The fee of 800 FF will cover registration and full board lodging during the workshop. Grants to contribute to the registration and to subsistence expenses will be available. The deadline for return of the final application is May 7<sup>th</sup>, 1996. Interested PhD students, postdocs, researchers and engineers are urged to enquire as soon as possible for the application forms.

### Organizers

L.ÉRARD (BNM-LCIE), S.GUELLATI & M.HIMBERT (BNM-INM)

If you wish to receive further notice regarding this meeting and an application form (to be completed before May 7<sup>th</sup>), please contact :

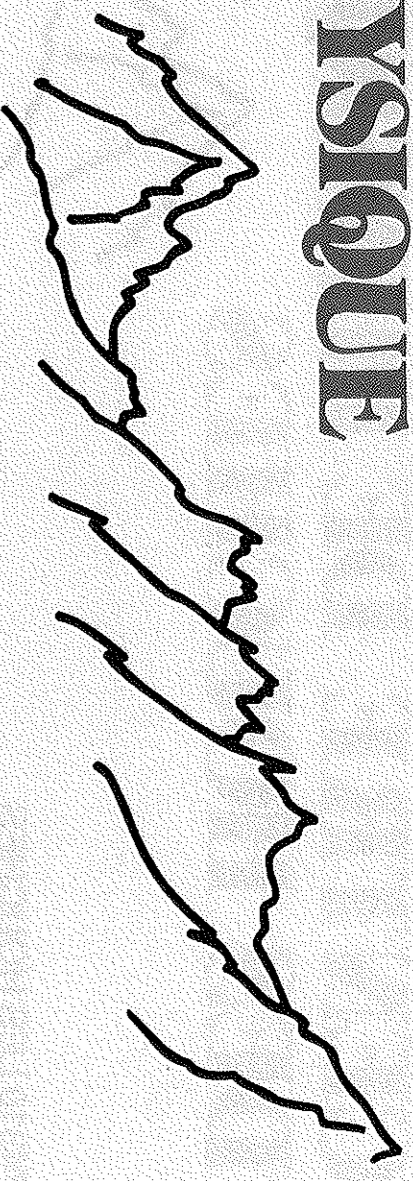
**M.HIMBERT**, BNM-INM, Conservatoire national des arts et métiers, 292 rue Saint-Martin, 75003 Paris, France, fax : +33 1 42713736 or +33 1 49403200, mail : himbert@cnam.fr cc guellati@cnam.fr

*The Physics School in Les Houches is affiliated to the University Joseph Fourier and to National Polytechnical Institute in Grenoble. It is subsidized by the Ministry of Superior Education and Research, C.N.R.S, and the Atomic Energy Commission. Centre de Physique des Houches, Côte de Chavants, F-74310 Les Houches Tél: (33) 50 54 40 69 Fax : (33) 50 55 53 25. Director : Michèle Leduc.*

(+)to be confirmed



# CENTRE DE PHYSIQUE DES HOUCHEES



74310 LES HOUCHEES  
France

## NONLINEAR WAVES: APPLICATION TO OPTICS AND OTHER FIELDS

18 - 28 Juin 1996

**A School supported by CNRS, Formation Permanente and  
GDR "Propagation des Ondes en milieux Aléatoires et/ou Non-linéaires"  
(also supported by CEA and DRET)**

The classical concepts of nonlinear sciences have found wide applications in optics since quite a long time, including technological devices such as frequency multipliers, parametric amplifiers and oscillators. More recently, spectacular developments, like the cascade of period doubling, have been observed as well in optics. All this concerns the systems with a few degrees of freedom, although the most advanced research is now concerned with problems posed by extended systems, as for instance the cross-section of a laser beam at high Fresnel number or a convection pattern in a fluid with many wavelengths. The summer school aims at gathering physicists and applied mathematicians working in fluid mechanics, condensed matter and optics with a common interest for these nonlinear phenomena. Tutorial lectures will be given about various aspects of patterns dynamics as the applications of the corresponding ideas to specific problems in nonlinear optics and elsewhere.

### Organising committee

Andrée TALLET, Yves POMEAU, Pierre GLORIEUX

### Tentative list of lecturers

T. BOHR (NBI, Copenhagen), P. COULLET (INLN, Sofia Antipolis), S. FAUVE (ENS, Lyon)  
P. GLORIEUX (LSH, Lille), G. GRYNBERG (LKB, ENS, Paris) V. HAKIM (Phys. Stat. ENS, Paris),  
L. KRAMER (Phys. Dep., Bayreuth), M. Le BERRE (PPM, Orsay), L. LUGIATO (Milan Univ. ),  
P. MANDEL (ULB, Brussels), A. NEWELL (Applied Math. Dep. Tucson),  
L. PISMEN (TECHNION, Haifa), Y. POMEAU (Phys. Stat. ENS, Paris),  
J.C. SAUT (Applied Math. ,Orsay), J. TREDICCE (INLN, Sophia Antipolis)

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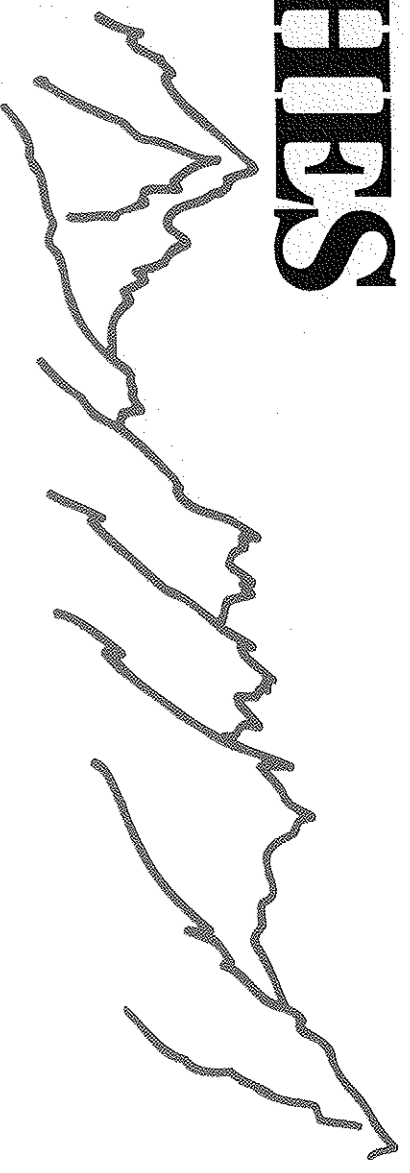
Participants will be requested to pay a 5 000 FF fee covering board and lodging. Specific travel and tuition grants may also be attributed upon request.

**Registration: André Tallet, Photophysique Moléculaire, Bât. 213, Université Paris-XI, 91405 Orsay, France.  
Tel.: (33) 1 69 41 73 92 - Fax: (33) 1 69 41 67 77 - email: tal@psisun.u-psud.fr.**

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Director: Michèle LEDUC Tel.: (33) 1-44 32 20 23 ou (33) 50 54 40 69 - Fax : (33) 50 55 53 25



# LES HOUCHES



SESSION LXV  
NATO ADVANCED STUDY INSTITUTE  
July 8 - July 26 1996

école d'été de physique théorique

## FROM CELL TO BRAIN: THE CYTOSKELETON - INTRA AND INTER-CELLULAR COMMUNICATION - THE CENTRAL NERVOUS SYSTEM DE LA CELLULE AU CERVEAU: LE CYTOSQUELETTE - COMMUNICATIONS INTRA ET INTER-CELLULAIRES - LE SYSTÈME NERVEUX CENTRAL

Scientific Direction:  
**J. ZACCAI** (Grenoble, France),  
**J. MASSOULIÉ** (Paris, France).

The cytoskeleton in morphogenesis; microtubule structure and dynamics *in vitro* and *in vivo*; molecular motors, actin-myosin, kinesin, dynein; genetic approaches to cytoskeleton organisation in yeast, *C. elegans*, transgenic animals; cell cycle and cytoskeleton, trigger and feed-back control mechanisms: **D. JOB** (Grenoble, France); **R. MARGOLIS** (Grenoble, France); **R.R. MCINTOSH** (Boulder, Colorado, USA); **R. WADE** (Grenoble, France).

Functional organisation and internal architecture of a eukaryotic cell; constitutive and regulated mechanisms in secretory and uptake pathways; protein folding and chaperones; concepts of signal recognition; dynamics and identity of subcellular components: **B. GOUD** (Paris, France); **J. MASSOULIÉ** (Paris, France); **D. SABATINI** (New-York, NY, USA).

Ontogeny and phylogeny of representation: evolution of the tetrapod limb; from limb to brain; morphological plasticity in the adult nervous system; quasi redundancy of membrane receptors; from external signal to transcription; time, space and memory: **D. DUBOULE** (Geneva, Switzerland); **A. PROCHIANTZ** (Paris, France); **J.D. VINCENT** (Gif-sur-Yvette, France).

Invited seminars on latest developments: **G. EDELMAN** (San Diego, California, USA); **D. ENGELMAN** (New Haven, Connecticut, USA); **D. GLOVER** (Edinburgh, UK); **U.B. KAUP** (Jülich, Germany); **R. KELLY** (San Diego, California, USA).

The objective of the Session is to provide a review, from an introductory level to latest developments, of the cytoskeleton, intra and inter-cellular traffic and the central nervous system. These topics in Cell Biology have been chosen because they all involve exciting recent progress as well as a potential for new interdisciplinary approaches at the boundary between Physics, Chemistry and Biology (long range dynamic ordering, molecular motors and chaperones, selective membrane transport and two dimensional interactions at membrane surfaces, cell-cell communication in complex ramifications, the development and plasticity of nervous systems...). The topics will be presented with some overlap as a logical progression going from the cell and its internal complexity to highly integrated systems.

*Les Houches is a resort village in the Chamonix valley of the French Alps. Established in 1951, the School is located in a group of chalets surrounded by meadows and woods, at an altitude of 1 150 m facing the Mont-Blanc range - a very favourable environment of intellectual activity in ideal surroundings for hiking, mountaineering and sight-seeing. A financial contribution of 3 000 FF is required per participant for accommodation and meals provided within the School, with the possibility of applying for grants to cover all or part of this sum. Participants who prefer to rent lodging should enquire directly to: Office du Tourisme, F-74310 Les Houches, France (Tel. (33) 50.55.50.62). The School is affiliated to the Université Joseph Fourier, Grenoble and the Institut National Polytechnique, Grenoble and is supported by the Ministère de l'Éducation Supérieure et de la Recherche, the Centre National de la Recherche Scientifique (Institut National de Physique Nucléaire et Corpusculaire) and the Commissariat à l'Énergie Atomique (Direction des Sciences de la Matière).*

Admission forms and additional information are available from:

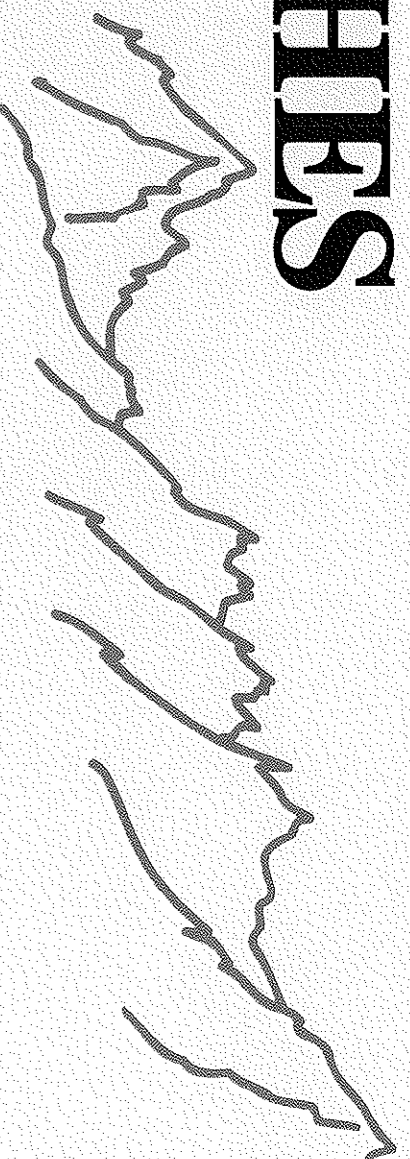
ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE - F - 74310 LES HOUCHES  
PHONE: 33/50.54.40.69 - FAX: 33/50.55.53.25

Complete applications (admission forms and letters of recommendation) must have reached this address before March 1, 1996.

Two sessions are Foreseen in 1997: "Climate Modeling and Variability", "Modèle standard en physique des particules".



# LES HOUCHEs



SESSION LXVI  
July 30 - August 30 1996

école d'été de physique théorique

## TRENDS IN NUCLEAR PHYSICS, 100 YEARS LATER OÙ EN ÉST LA PHYSIQUE NUCLÉAIRE APRÈS 100 ANS D'EXISTENCE ?

Scientific Direction:

**H. NIFENECKER** (ISN Grenoble France),  
**J.P. BLAZOT** (CE Saclay France),  
**G. BERTSCH** (Un. of Washington USA),  
**W. WEISE** (T.U. München Germany).

Introduction to QCD: **A. Mueller** (Columbia Un., N.Y. USA)  
Nuclear Structure: **B. MOTTELSON** (N.B.I. Copenhagen, DK)  
The physics of the Quark-Gluon Plasma: **J.P. BLAZOT** (CE Saclay, FR)  
Collective excitations: **G. BERTSCH** (Un. Washington, USA)  
Hadrons and Nuclei: **W. WEISE** (T.U. München, D)  
Electromagnetic and weak interactions in nuclei: **B. DESPLANQUES** (ISN Grenoble, FR)  
Excited nuclear matter: **U. MOSEL** (Un. GIESSEN, D)  
Phase transition phenomena: **X. CAMPI** (IPN Orsay, FR)  
Multifragmentation: **B. TAMAIN** (Un. Caen, FR)  
Energy production with accelerators: **C. RUBBIA** (CERN Geneva, CH)  
Synthesis of very heavy nuclei: **P. ARMBRUSTER** (GSI Darmstadt, D)  
Nuclear astrophysics: **C. PETHICK** (NORDITA Copenhagen, DK)  
In addition to the general courses, a number of more specific lectures or seminars will be given, either by invited speakers or by school-attendants.

In 1996 Nuclear Physics will be 100 years old. This centenarian is still a most active and lively discipline with many recent developments and new challenges. Radioactive beams and advanced detectors give new impetus to nuclear structures studies. New electron facilities explore the deep interior of hadrons as well as the role of subnuclear degrees of freedom in nuclei. Heavy ion collisions, from moderate to the highest achievable energies, allow the investigation of the densest forms of matter and the transition to the quark-gluon plasma. A profound unity, beyond the specialisation of the various subfields, can be found in Nuclear Physics today. It is a field of research which exhibits essentially all manifestations of strongly interacting, finite fermionic systems. The aim of the School is to provide a unified presentation of both the main experimental developments and the new theoretical tools in the field. The School will be open to advanced graduate students as well as to more senior physicists.

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Admissions forms and additional information are available from:

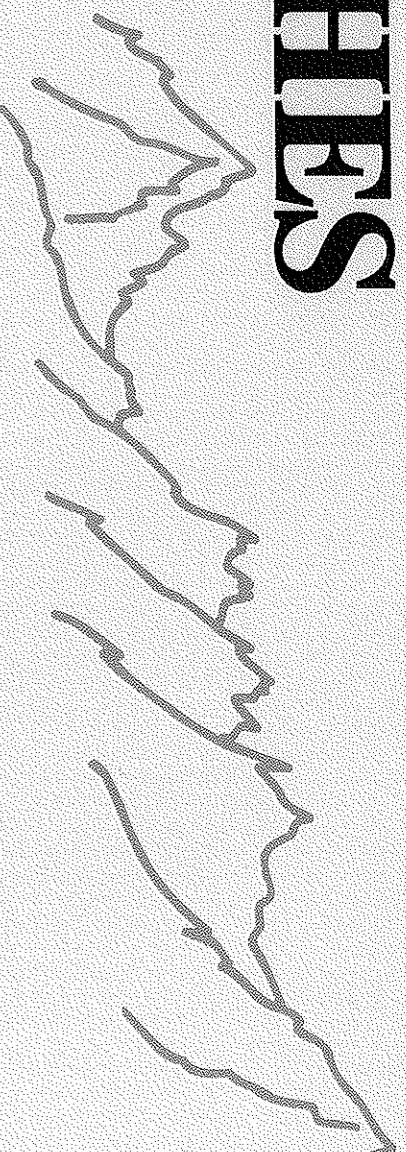
**ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE - F - 74310 LES HOUCHEs**  
**FAX: 33/50.55.53.25 - INFORMATION ON SCIENTIFIC PROGRAM : nif@frcpn11.in2p3.fr**

Complete files (admission forms and recommendatory letters) must have reached this address before **March 1, 1996**.

The first 1996 session will be entitled "Topics in Cell Biology for the development of Physical Approaches: from Cell to Central Nervous System".  
Two sessions will be held in 1997, one on "Climate Modeling and Variability", the other on Standard model in Particles Physics".



# LES HOUCHEES



SESSION IX  
1<sup>er</sup> septembre – 13 septembre 1996

École pré-doctorale de physique

## FÉDÉRATION FRANÇAISE DES MAGISTÈRES DE PHYSIQUE

### MATIÈRE MOLLE : SYSTÈMES COMPLEXES ET INTERFACES

PHYSIQUE DES POLYMÈRES : **M. DAOUD** (CEN, Saclay)

INTERFACES FLUIDES : **J. MEUNIER** (ENS, Paris)

SCANNING PROBE MICROSCOPIES AT SOFT SURFACES AND INTERFACES :

**J. RABE** (HUB, BERLIN)

SYSTÈMES MOLÉCULAIRES ORGANISÉS : **G. PORTE** (USTL, Montpellier)

VERS LES APPLICATIONS INDUSTRIELLES : **D. JOUSSET** (Atochem)

Le dynamisme actuel des recherches portant sur les fluides complexes, les systèmes organisés et les interfaces résulte d'une collaboration exemplaire entre théorie et expérience. L'émergence récente de nouvelles techniques et le développement des moyens de calcul ont ouvert des voies dans le domaine des tensioactifs et membranes, des polymères, et de la Physique des interfaces. Le but de cette Ecole est d'illustrer la richesse et la vitalité de ce champ de recherche. Les cours des Ecoles pré-doctorales sont approfondis mais de caractère suffisamment général. Ils sont destinés principalement aux jeunes chercheurs venant de terminer un DEA ou un Magistère, à ceux qui sont en cours de Thèse et, plus généralement, aux jeunes chercheurs étrangers dans une situation d'études analogue. Ils doivent permettre de compléter la formation des participants à la fois dans leur domaine de recherche et dans d'autres disciplines à un niveau plus accessible et moins spécialisé que celui des autres Ecoles. Un effort pédagogique y est effectué tant pour les cours eux-mêmes que par les échanges entre étudiants et enseignants et par les interactions entre étudiants. En dehors des cours et séminaires effectués par les enseignants, chacun des participants fera un court exposé sur son sujet de recherche ou de stage (DEA, Magistère).

### Candidatures et financement

Cette Ecole est ouverte aux étudiants de toute nationalité. Les candidats doivent envoyer un dossier qui sera examiné par un Comité de Sélection. Ce dossier doit comprendre un curriculum vitæ détaillé, une lettre de recommandation et éventuellement une demande de bourse.

Le Comité de Sélection attribuera des bourses couvrant totalité ou partie des frais d'inscription et de séjour lesquels s'établissent à 2 600 FF.

Le dossier d'inscription doit parvenir :

**avant le 15 Juin 1996**

à A.M. CAZABAT, Université Paris VI

Laboratoire de Physique de la Matière Condensée du Collège de France, 11 place M. Berthelot, 75231 Paris Cedex 05

Tél. 44.27.10.81 - Fax 44.27.10.82 - email : cazabat@ext.jussieu.fr

### Comité d'organisation

A.M. CAZABAT (Université Paris VI), Directeur Scientifique

J.C. LE GUILLOU (IUF, ENSLAPP, Univ. de Savoie) - R. MAYNARD (EN, Univ. de Grenoble I)

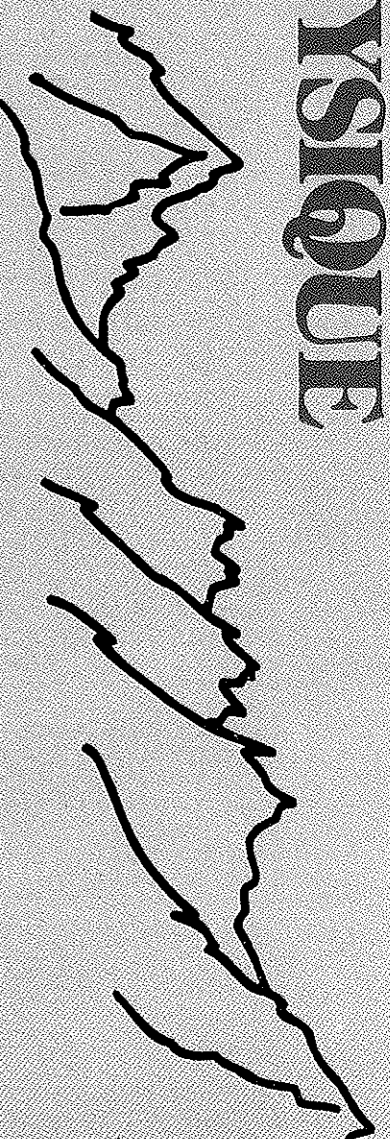
L'Ecole pré-doctorale des Houches est organisée par la Fédération Française des Magistères de Physique qui regroupe les Magistères de l'Université Joseph-Fourier (Grenoble I), de Paris-Sud (Orsay), de l'Université Paris 7, de l'Université Claude-Bernard et de l'ENS de Lyon, de l'Université de Rennes, le Magistère Interuniversitaire de Physique (Paris 6, 7, 11 et 13 et ENS).

*Les Houches est un village de la vallée de Chamoni, dans les Alpes françaises. L'Ecole a lieu dans un groupe de chalets montagnards entourés de prairies et de bois. Il est situé à une altitude de 1150 m. L'hébergement et les repas sont assurés pour tous les participants. Les étudiants bénéficieront en permanence de salles de réunion et d'une bibliothèque.*

*L'Ecole de Physique des Houches est affiliée à l'Université Joseph Fourier et à l'Institut National Polytechnique de Grenoble. Elle est subventionnée par le Ministère de l'Enseignement Supérieur et de la Recherche, le CNRS et le Commissariat à l'Energie Atomique.*



# CENTRE DE PHYSIQUE DES HOUCHEs



74310 LES HOUCHEs  
France

## Starbursts : Triggers, Nature and Evolution

September 17 - 27, 1996

### Organizers

Bruno Guiderdoni (IAP, Paris)

Ajit Kembhavi (IUCAA, Pune)

Starbursts are regions of unusually rapid star formation, often located in the central parts of galaxies. They differ from more normal regions of star formation in terms of the throughput of mass and the rapidity with which the gas is consumed. In recent years, extensive observational data at many wavelengths have become available on starbursts, but many important issues remain to be addressed, observationally as well as theoretically: How are strong episodes of star formation triggered? How do molecular clouds collapse and fragment to give birth to stars? What is the initial mass function of stars in these events? How does the feedback from stars influence the interstellar medium and self-regulate star formation? What is the subsequent chemical and photometric evolution? How do starbursts affect the formation and evolution of galaxies? What is the relationship between nuclear starbursts and active galactic nuclei? The purpose of the Summer School at the Centre de Physique des Houches: **Starbursts : Triggers, Nature, and Evolution**, is to gather theorists and observers, with complementary approaches to the starburst phenomenon, to summarize the state-of-the-art of the models and observations, emphasizing the consistency of the various viewpoints.

### Scientific Committee

**J.P. Chièze** (CEA, Bruyères-le-Châtel); **R. Kennicutt** (University of Arizona); **D. Kuntz** (IAP, Paris); **A. Maeder** (Observatoire de Genève);

**C. Norman** (STScI, Baltimore); **A. Omont** (IAP, Paris); **F. Palla** (Osservatorio Astronomico di Arcetri, Firenze);

**T. Prabhu** (Indian Institute of Astrophysics, Bangalore); **J.L. Puget** (IAS, Paris); **J. Silk** (University of California, Berkeley);

**R. Terlevich** (RGO, Cambridge)

### Main Speakers

**J.P. Chièze** (CEA, Bruyères-le-Châtel); **F. Combes** (Observatoire de Paris); **E. Falgarone** (ENS, Paris); **R. Kennicutt** (University of Arizona);

**G. Meynet** (Observatoire de Genève); **F. Palla** (Osservatorio Astronomico di Arcetri, Firenze); **J. Silk** (University of California, Berkeley);

**R. Terlevich** (RGO, Cambridge)

The main speakers will deliver courses of 3-5 lectures each. A number of specialized seminars and discussions will also be organized.

*Application forms can be obtained in the following ways :*

- Send E-mail to [houches@lucaa.ernet.in](mailto:houches@lucaa.ernet.in) with the word **form** under subject and your name and address as the message.
- Obtain the form by anonymous ftp from [144.16.31.1](ftp://144.16.31.1/pub/houches) under the directory **/pub/houches**.
- Obtain it from the World Wide Web at <http://lucaa.lucaa.ernet.in/~houches> or <http://www.iap.fr/coll/leshouches>

Completed application forms are to be submitted by E-mail to [houches@lucaa.ernet.in](mailto:houches@lucaa.ernet.in) or by fax or post to either of the organizers :

**Dr. Bruno Guiderdoni**, Institut d'Astrophysique de Paris, 98 bis Boulevard Arago, F-75014 Paris, France

Phone : (33) 1 44 32 80 98, Fax : (33) 1 44 32 80 01, E-mail : [guider@iap.fr](mailto:guider@iap.fr)

**Prof. Ajit Kembhavi**, Inter-University Centre for Astronomy and Astrophysics, Post Bag 4, Ganeshkhind, Pune 411 007, India

Phone : (91) 212 33 64 15, Fax : (91) 212 35 07 60, E-mail : [akk@lucaa.ernet.in](mailto:akk@lucaa.ernet.in)

Further information can also be obtained from these addresses. **The deadline for applications is June 15, 1996.**

The total price of the registration fees including a copy of the Proceedings and of full-board accommodation is FF 4700. Some grants are available, in particular for young European scientists.

This Session is sponsored by the Centre National de la Recherche Scientifique, Formation Permanente; the Inter-University Centre for Astronomy and Astrophysics, Pune, India; the Training and Mobility of Researchers Programme of the European Commission; the Commissariat à l'Energie Atomique; The Centre National d'Etudes Spatiales; the Ministère des Affaires Étrangères; the AACES Programme of the Ministère de l'Enseignement Supérieur et de la Recherche.

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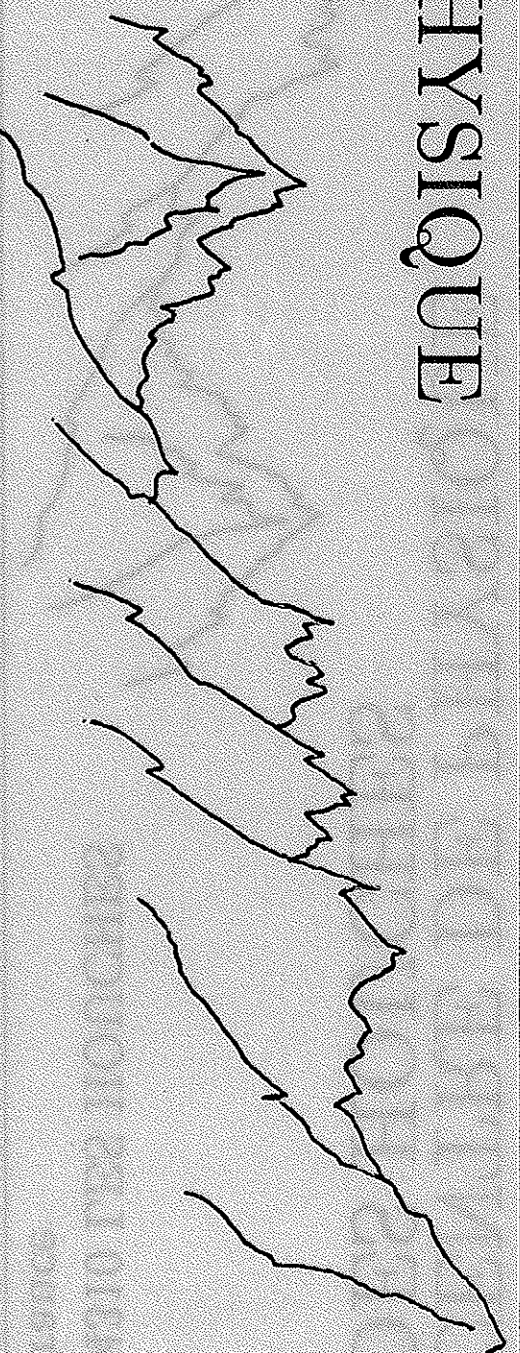
Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches.

Director: Michèle Leduc. Phone: (33) 50 54 40 69 or (33) 1 44 32 20 23. Fax: (33) 50 55 53 25.



# CENTRE DE PHYSIQUE DES HOUCHES

74310 LES HOUCHES  
France



## PERSPECTIVES OF MR IMAGING USING POLARISED GASES

9 - 11 October 1996

The purpose of this international workshop is to elucidate potential interest of using spin polarised noble gases for biological and medical diagnosis. The different polarisation methods, which rely on optical pumping, will be discussed along with possible improvements on Magnetic Resonance imaging. The workshop will explore these topics through invited and contributed presentations. The scientific program contains the following topics:

- Optical pumping to polarise noble gases
- Technical problems on MR imaging using noble gases
- Medical diagnosis and other biomedical applications
- Comparison  $^3\text{He}$  /  $^{129}\text{Xe}$
- MR imaging contra established nuclear medicine methods

A number of round table discussions is also planned on subjects such as non-medical applications, industrial and cost issues, cross polarization phenomena, etc...

The number of participants is limited to approximately 70. The workshop is sponsored by the EC Program "Human Capital and Mobility" and by the french Direction de la Recherche et de la Technologie. Unless the final number of participants is too large, there will be no registration fee, and full board and lodging for all participants will be charged on the workshop budget.

The final program including the list of speakers and other detailed information will be released later. The workshop is organised by Werner Heil (Mainz) and Pierre-Jean Nacher (Paris). Title and abstract of oral or poster contributions should be sent before July 20 1996. Correspondence should preferably be conducted via E-mail to [nacher@physique.ens.fr](mailto:nacher@physique.ens.fr), or mail to P.J. Nacher, Laboratoire Kastler Brossel, 24 rue Lhomond, F-75231 Paris, FRANCE. Fax: (33) (1) 45 35 00 76.

Les Houches is a resort village in the Charmonix valley of the french Alps. Established in 1951, the school is housed in mountain chalets, surrounded by meadows and woods at 1150 m elevation. It is ideally located for mountaineering, skiing or touring as well as for intellectual pursuits.

The physics school in Les Houches is affiliated to University Joseph Fourier and National Polytechnical Institute in Grenoble. It is subsidized by the Ministry of Superior Education and Research, CNRS and CEA.

Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches. Director: Michèle Leduc.

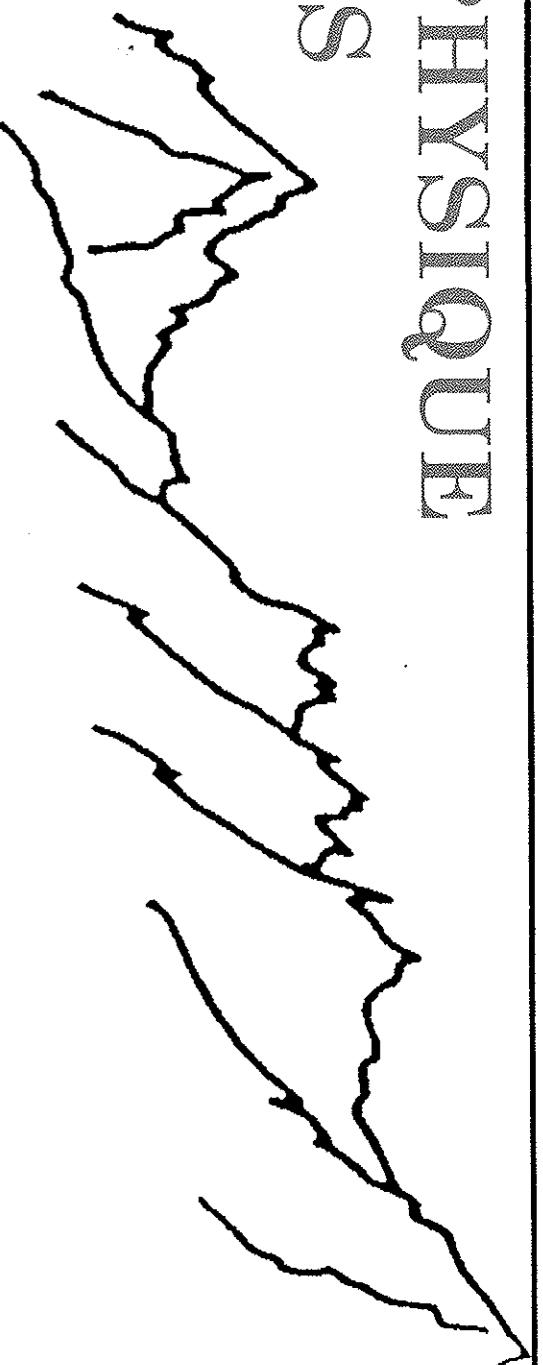
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# CENTRE DE PHYSIQUE DES HOUCHES

74310 LES HOUCHES

France



## INTERACTIONS INDUITES PAR LES FLUCTUATIONS EN MATIÈRE MOLLE

*Conférence internationale en l'honneur du Professeur Phil Pincus à l'occasion de son 60e anniversaire*

14-18 Octobre 1996

Dans la matière condensée, les énergies d'interaction entre les molécules, les macromolécules et des structures de plus grande échelle sont souvent de l'ordre de grandeur de l'excitation thermique. C'est pourquoi les fluctuations thermiques et les effets entropiques jouent un rôle majeur dans la plupart des propriétés physiques de la matière "molle". Les forces d'origine entropique permettent la stabilisation d'une grande variété de phases complexes à l'équilibre et hors équilibre à fonctions (biologiques) hautement spécifiques et peuvent induire des réponses non-linéaires à des champs extérieurs. Le but de cet atelier est de rassembler des experts dans le domaine de la physique statistique de la matière "molle" (polymères, cristaux liquides, membranes, protéines... tous pris au sens large) pour discuter de contributions à des domaines aussi variés que les polymères aux interfaces, l'adhésion, les forces de déplétion, les suspensions colloïdales, les microémulsions, les micelles géantes, les lits fluidisés, les biomatériaux, les moteurs biomoléculaires, les membranes et les interactions de protéines dans les membranes...

### Comité Scientifique

*P. Chaikin (Princeton), G. Deutscher (Tel Aviv), J.M. Di Meglio (Strasbourg),  
P.G. de Gennes (Paris), J.F. Joanny (Strasbourg), K. Kremer (Mainz),  
G. Maret (Strasbourg), D. Pine (Santa Barbara)*

### Conférenciers invités

*S. Alexander (Rehovot), F. Brochard (Paris), R. Bruinsma\* (Los Angeles), S. Candau (Strasbourg),  
M. Cates (Edinburgh), M. Daoud (Saclay), H. Gaub (München), G. Grest\* (Annandale)  
A. Halperin (Mulhouse), J. Israelachvili (Santa Barbara), J. Klein\* (Rehovot), R. Klein (Konstanz),  
T. Lubensky (Philadelphia), J. Prost (Paris), M. Robbins\* (Baltimore), G. Rossi (Dearborn),  
C. Safinya (Santa Barbara), S. Safran (Rehovot), U. Seifert (Berlin), S. Sinha (Argonne)*

**Organisée par :** Centre National de la Recherche Scientifique, Max Planck Gesellschaft, National Science Foundation\*

**Egalement subventionnée par:** Rhône Poulenc, Ford Corp. et autres\*

La station du village des Houches (altitude 1150 m) se trouve au centre des Alpes, dans la vallée de Chamoniix. Fondée en 1951, l'Ecole est située dans un groupe de chalets de montagne entouré de prairies et de bois. C'est un lieu idéal pour le travail intellectuel et les sports de montagne. L'Ecole est affiliée à l'Université Joseph Fourier et à l'Institut National Polytechnique, Grenoble. Elle est subventionnée par le Ministère de l'Enseignement Supérieur et de la Recherche, le CNRS et le Commissariat à l'Energie Atomique.

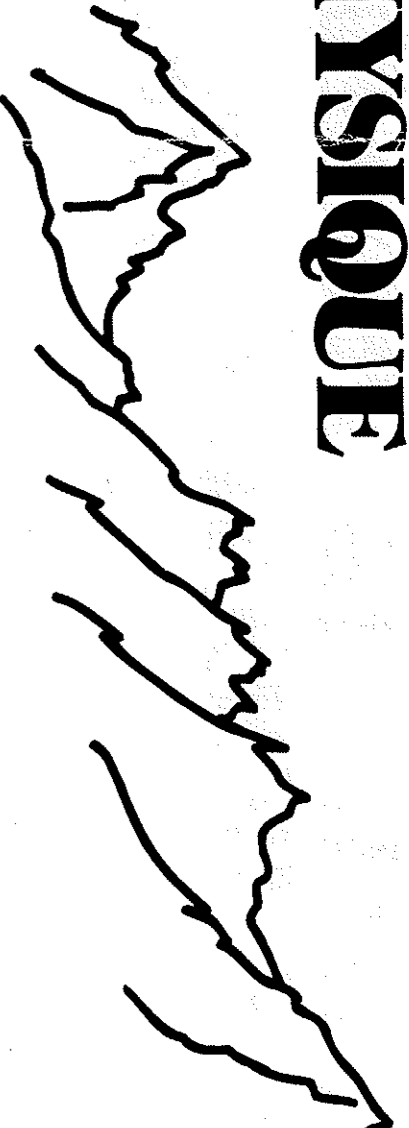
Centre de Physique des Houches, Côte des Chaavants F - 74310 Les Houches. Directeur Michèle Leduc  
Tél. +33 50 54 40 69 - Fax +33 50 55 53 25

Les candidatures sont à adresser à Georg Maret - Institut Charles Sadron - 6 rue Boussingault -  
F67083 Strasbourg Cedex (Fax +33 88 41 40 20, Email [fy@ics.u-strabg.fr](mailto:fy@ics.u-strabg.fr)) avant le  
1er septembre 1996. Les droits d'inscription (2 200 F) incluent la pension complète.

\* à confirmer



# CENTRE DE PHYSIQUE DES HOUCHEES



74310 LESHOUCHES

France

## ADVANCES IN OXIDE SURFACE PHYSICS January 13-17, 1997

The recent developments of the Surface Science of Insulating Oxides has raised a diversity of fundamental questions, such as the understanding of atomic, electronic and magnetic properties associated with a reduced atomic environment of the atoms, in mixed ionic-covalent materials. From a more applied point of view, many fields of research (geology, colloid physics...) and applications (catalysis, glass industry, aluminium industry, electronics...) are concerned. The scientific aim of this conference is to summarize the state of the art in the field and to stress promising research tracks for the future. Among these, the study of understoichiometric surfaces in relation with their reactivity, the growth processes of metal overlayers and their use in catalysis and in industry, and the nascent techniques for the fabrication of ultrathin oxide films will be the subject of intensive discussions with specific sessions devoted to each of them.

### Organisers

**Fabio FINOCCHI and Claudine NOGUERA**, Laboratoire de Physique des Solides,  
Université Paris Sud, 91405 Orsay, France.  
Phone: (33) 1 69 15 69 39 or (33) 1 69 15 60 97 - Fax: (33) 1 69 15 60 86.

### Invited lecturers

H. ARRIBART (Aubervilliers, F), S. COLUCCIA (Torino, I), R. DOVESI (Torino, I), M. FINNIS (Belfast, UK),  
H.J. FREUND (Berlin, D), M. GAUTIER (Saclay, F), M. GILLAN (Keele, UK),  
J. GONIAKOWSKI (Marseille, F), D.W. GOODMAN (Texas, USA), J. HARDING (London, UK),  
N. HARRISON (Daresbury, UK), V.J. HENRICH (Yale, USA), C. HENRY (Marseille, F),  
J. JUPILLE (Aubervilliers, F), J.P. LAFEMINA (Richland, USA), R.M. LAMBERT (Cambridge, UK),  
W.C. MACKRODT (St Andrews, UK), T.E. MADEY (Piscataway, USA), H. NEDDERMEYER (Halle, D),  
S. PARKER (Bath, UK), G.S. ROHRER (Pittsburgh, USA), G. SAWATZKY (Gröningen, NL),  
J.L. DE SEGOVIA (Madrid, E), G.A. SOMORJAI (Berkeley, USA), G. THORNTON (Manchester, UK).

This session is sponsored by the European Community (Training and Mobility of Researchers), the Centre National de la Recherche Scientifique (CNRS), the Délégation Générale à l'Armement (DGA), the Ministère des Affaires Étrangères, and Saint-Gobain Recherche.

### Information for participants

Application forms and information can be obtained by email at:  
noguera@lps.u-psud.fr or at the address of the organisers.

The total price for full board lodging and registration is FF 2500. A partial support for CNRS or CEA participants is available. Some grants for young scientists of the EEC are also available. The total number of participants being limited to 70, admission will be decided by the Scientific Committee composed by Prs. W.C. MACKRODT, H. NEDDERMEYER, F. FINOCCHI and C. NOGUERA.

**The dead line for application is december 1, 1996.**

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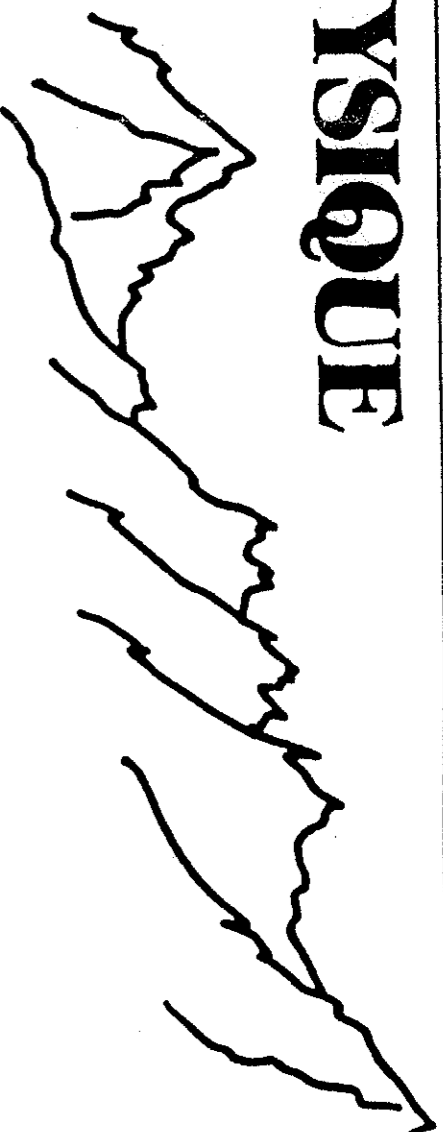
*Centre de Physique des Houches, Côte de Chavants, F-74310 Les Houches, France.*

*Director: Michèle LEDUC, Tel.: (33) 1 44 32 20 23 or (33) 4 50 54 40 69*

*Fax.: (33) 4 50 55 53 25*



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES  
France

## ATOMES ET ELECTRONS DANS DES POTENTIELS PERIODIQUES ET QUASI-PERIODIQUES

27 janvier - 31 janvier 1997

### Organisateurs

Jean-Yves Courtois (France) - Jean-Michel Gérard (France) - Philippe Verkerk (France)

### Comité Scientifique

G. Grynberg (France) - T. W. Hänsch (Allemagne) - W. D. Phillips (USA)  
M. Voos (France) - C. Weisbuch (France)

Le but de l'atelier est de confronter les expériences acquises en physique des solides et en physique atomique, sur les problèmes touchant aux propriétés de particules soumises à des potentiels périodiques ou quasi-périodiques. Cinq ans après la découverte des premiers réseaux optiques, cette rencontre devrait permettre de dégager des voies d'avenir pour cette discipline, tout en apportant des éclairages intéressants pour la communauté des physiciens du solide. L'atelier sera également l'occasion d'identifier les apports possibles de la manipulation d'atomes par laser à la lithographie.

### Liste Prévisionnelle des Conférenciers

C. Berger (Grenoble)	J. Hegarty (Dublin)	W. D. Phillips (Gaithersburg)
V. Berger (Orsay)	A. Hemmerich (Hamburg)	M. Raizen (Austin)
J.-Y. Courtois (Paris)	A. Lagendijk (Amsterdam)	C. Salomon (Paris)
K. Ensslin (Zürich)	F. Laruelle (Bagneux)	G. Timp (Murray Hill)
J.-M. Fournier (Cambridge)	S. A. Lee (Fort Collins)	P. Verkerk (Paris)
J.-M. Gérard (Bagneux)	J. J. McClelland (Gaithersburg)	C. Vieu (Bagneux)
D. Gratias (Vitry)	E. Mendez (New-York)	C. Weisbuch (Palaiseau)
G. Grynberg (Paris)	J. Mlynek (Konstanz)	Pr. Wilkinson (Glasgow)
T. W. Haensch (München)	E. Molinari (Modena)	
Dr. Haond (Grenoble)	T. Pfau (Konstanz)	

Deux présentations de posters seront organisées. Le nombre de participants est limité à 65. Des formulaires d'inscription sont disponibles auprès de : Jean-Yves Courtois, Atelier des Houches, Laboratoire Kastler-Brossel, 24 rue Lhomond, 75231 PARIS cedex 05, FRANCE. Fax : +33 1 45 35 00 76, E-mail : [jyc@physique.ens.fr](mailto:jyc@physique.ens.fr).

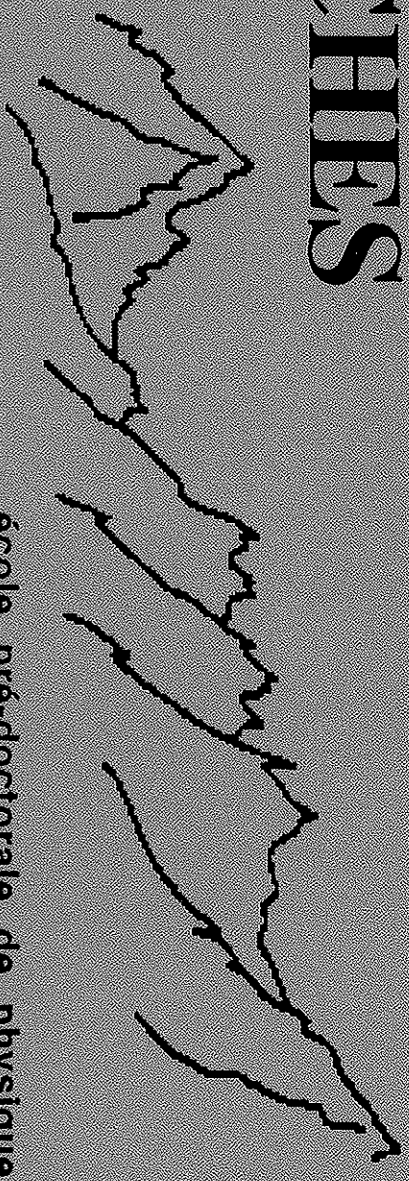
**Les formulaires d'inscription devront parvenir à cette adresse avant le 15 novembre 1996**

*Le Centre de Physique des Houches est situé dans un groupe de chalets de montagne près de Chamonix, dans un site magnifique au pied de la chaîne du Mont-Blanc. C'est un lieu idéal pour conjuguer travail et activités de montagne. Il est affilié à l'université Joseph Fourier et à l'INP de Grenoble, et subventionné par le ministère de l'éducation nationale, de l'enseignement supérieur et de la recherche, le CNRS et le CEA.*

Centre de Physique des Houches, Côte des Charvants, F-74310 Les Houches, France. Directrice : Michèle Leduc.  
Tél : +33 50 54 40 69 ou +33 1 44 32 20 23. Fax : +33 50 55 53 25. E-mail : [leduc@physique.ens.fr](mailto:leduc@physique.ens.fr)



# LES HOUCHEs



école pré-doctorale de physique

## OBJETS ASTROPHYSIQUES COMPACTS : FORMATION, STRUCTURE ET ENVIRONNEMENT

Du 4 au 12 février 1997

Université de Lausanne

Université de Genève

Université de Lyon 1 (Claude Bernard)

Université de Grenoble 1 (Joseph Fourier)

Ecole Normale Supérieure de Lyon

Dans le cadre de la convention transfrontalière signée par les quatre universités sus-mentionnées et l'ENS de Lyon, un cycle de cours communs d'astrophysique est organisé chaque année rassemblant les étudiants des régions Rhône-Alpes française et suisse. Cette session d'enseignement prédoctoral en langue française s'adresse aux étudiants inscrits au **Certificat International d'Astronomie et d'Astrophysique**. Elle est également ouverte aux étudiants préparant une thèse de doctorat.

### Programme :

\* Cours de **Willy BENZ** (Observatoire de Genève et Tuscon)

Thème : Formation des objets compacts. Structure des étoiles à neutrons. Systèmes binaires avec objet compact

Durée : 10 heures

\* Cours de **Jean Marie HAMMERY** (Observatoire de Strasbourg)

Thème : Sources binaires X. Sursauts Gamma. Environnement des étoiles à neutrons. Objets compacts de la Galaxie

Durée : 10 heures

\* Cours de **Gilles HENRI** (Observatoire de Grenoble)

Thème : Physique de l'environnement des trous noirs. Processus de rayonnements de haute énergie dans les Noyaux Actifs de la Galaxie

Durée : 10 heures

Les étudiants qui se sont inscrits au Certificat International d'Astronomie et d'Astrophysique dans l'une des universités sus-mentionnées seront accueillis gratuitement à cette école. Une participation de 1.000 FF, couvrant les frais d'inscription et d'hébergement est demandée aux autres étudiants qui pourront s'en acquitter au moyen d'un bon de commande émanant de leur laboratoire, à adresser au secrétariat du Professeur Pelletier.

Les inscriptions devront être adressées avant le 15 janvier au Professeur Guy Pelletier, Secrétariat du DEA d'astrophysique et Milieux Dilués, Laboratoire d'Astrophysique de l'Observatoire de Grenoble, Domaine Universitaire, BP 53, 38041 Grenoble Cedex 9, France, ou par e-mail à [reuze@gag.observ-gr.fr](mailto:reuze@gag.observ-gr.fr),  
tél : 04 76 51 49 81.

Professeurs responsables du programme, de l'organisation et de la délivrance du diplôme du certificat.

MC. Artru, Ecole Normale Supérieure de Lyon

G. Patuel, Université de Lyon 1

B. Hauck, Université de Lausanne

L. Martinet, Université de Genève

G. Pelletier, Université de Grenoble 1

Professeur responsable des écoles prédoctorales des Houches : J.C. Le Guillou

L'Ecole de Physique des Houches est affiliée à l'Université Joseph Fourier et à l'Institut National Polytechnique de Grenoble. Elle est subventionnée par le Ministère de l'Enseignement Supérieur et de la Recherche, le CNRS et le Commissariat à l'Energie Atomique.

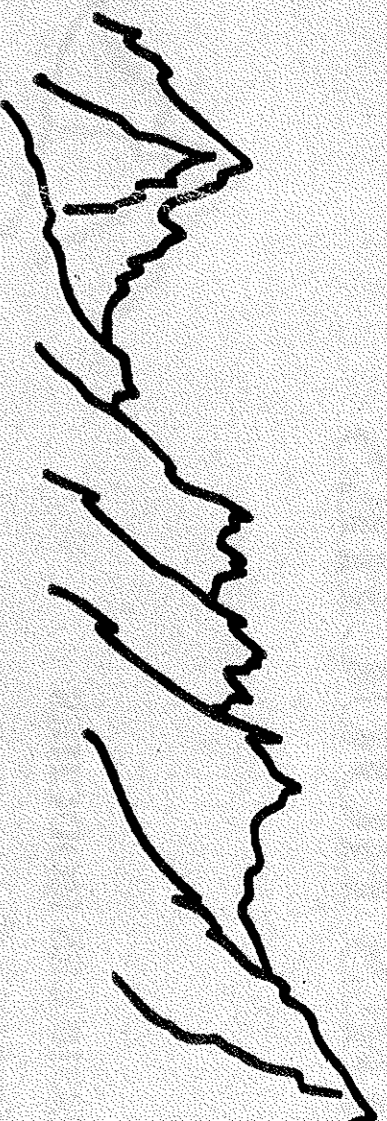
Centre de Physique des Houches, Côte des Chavants, 74310 Les Houches. Directeur : Michèle Leduc

Tél : 04 50 54 40 69 Fax : 04 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHES

74310 LES HOUCHES  
France



## NEW NON PERTURBATIVE METHODS and QUANTISATION ON THE LIGHT CONE

February 24-March 7, 1997

Recently new renormalisation techniques and numerical methods have been developed in an hamiltonian framework, opening new ways in strong interactions studies. The use of light cone coordinates introduces essential simplifications and allows for a non-perturbative determination of an hadronic effective hamiltonian. The revival of Dirac's approach has led to many research activities in the domain of strong interactions, in the USA, in Europe, and in Japan. These results will be presented and discussed.

*Organizing committee* : **P. GRANGE** (Chair, Montpellier), **A. NEVEU** (Montpellier), **H.C. PAULI** (Co-chair, Heidelberg), **S. PINSKY** (Ohio), **E. WERNER** (Regensburg).

**Quantisation of constrained systems** (A. Marinov, Haifa)  
**Effective hamiltonians and renormalisation group** (R. Perry, Ohio)  
**Gauge theories and topological issues** (Y. Frishman, Weizmann)  
**Condensate and chiral symmetry breaking** (S. Pinsky, Ohio)  
**Light cone quantisation under scrutiny** (J. Zinn-Justin, Saclay)  
**Phenomenological applications** (G. McCartor, Dallas)  
**Structure functions : Theory and Experiments** (P. Chiappetta, Marseille)  
**New directions** (S. Dalley, Oxford)  
**Numerical results at D=3+1** (H.C. Pauli, Heidelberg)

*Invited speakers* : V. Braun, S. Brodsky, St. Glazek, J. Gomis, T. Heinzl, J. Klauder A. Klevansky, D. Kutasov, P. Landshof, F. Lenz, L. Lusana, L. Mankiewicz, R. Marchesini, M. Marnelius, M. Moshe, A. Neveu, Y. Pang, G. Parisi, H. Pirner, C. Royon, W.J. Sterling, U. Tritman, P. Van Baal, B. Van de Sande, A. Vogt, J. Verbaarschot, F. Wegner, D. Wyler, K.G. Wilson, Y. Yamawaki, D. Zwanziger.

Participation is by invitation. The number of participants is limited to 60 and registration fees are FF750. Room and Board is provided by the Center (FF4220 for 10 days). For more information contact P. Grangé, LPM, Université de Montpellier II, Case 50, F-34095 Montpellier cedex 5. E-mail : [grange@lpm.univ-montp2.fr](mailto:grange@lpm.univ-montp2.fr)

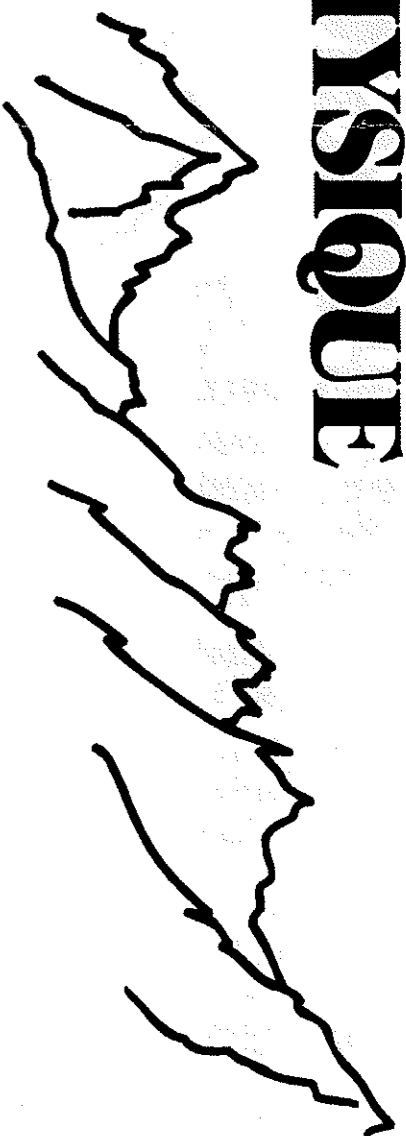
The Physics School in Les Houches is affiliated to University Joseph Fourier and National Polytechnical Institute in Grenoble. It is subsidized by the Ministry of Superior Education and Research, CNRS and Atomic Energy Commission. This session is supported by the NSF-CNRS exchange program, the European Community (TMR program) and DFG.

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Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches.  
Directeur : Michèle Leduc, tél. (33) 04 50 54 40 69, fax (33) 04 50 55 53 25.  
<http://www.ujf-grenoble.fr/HOUCHES>



# CENTRE DE PHYSIQUE DES HOUCCHES



74310 LES HOUCCHES  
France

## Scale invariance and beyond CNRS Thematical School

**March 10-14, 1997**

The concept of scale invariance has introduced fruitful descriptive tools into physics such as fractals and scaling laws. This field is now ripe to advance one step further. Recent work has raised concerns which include, among others,

- (i) axiomatic generalizations,
- (ii) partial symmetry breaking appearing for instance as complex exponents,
- (iii) identification of underlying physical mechanisms.

Beyond the powerful descriptive aspects, this school will address the problems of interpretation and prediction. We thus hope to encourage the development of new methods of analysis and synthesis that are common to various fields of application. Special importance will be given to communication by experts with different backgrounds and representing different fields. Following pedagogical lectures on specific topics, carefully prepared round-table discussions will synthesize their relationship and consider the most exciting unsolved problems. The school is open to advanced graduate students as well as to senior physicists.

### Organizers

**B. Dubrulle (CNRS, Saclay), F. Graner (CNRS, Grenoble),  
D. Sornette (CNRS, Nice and UCLA Los Angeles).**

### Lecturers and round-table chairpersons include

**A. Arnéodo (Bordeaux), P. Bak (New York), J-Ph. Bouchaud (Saclay), Y. Brechet (Grenoble),  
B. Castaing (Grenoble), B. Chopard (Genève), B. Derrida (Paris), M. Droz (Genève),  
B. Dubrulle (Saclay), J. F. Elmer (Basel), U. Frisch (Nice), L. Gil (Nice), F. Graner (Grenoble),  
R. Henriksen (Toronto), H.J. Herrmann (Paris and Stuttgart), R. Hilfer, L. Knopoff (Los Angeles),  
L. Nottale (Meudon), R. Peltier (Toronto), A. Pocheau (Marseille), M. Potters (Paris), I. Proccacia  
(Rehovot), D. Rothman (Boston), H. Saleur (Los Angeles), J. Sethna (Ithaca),  
D. Sornette (Nice and Los Angeles), H.E. Stanley (Boston), D. Stauffer (Kohn), M. Vergassola (Nice),  
D. Zajdenweber (Nanterre), Y.C. Zhang (Fribourg), G.M. Zaslavsky (New York).**

Application forms can be obtained by E-mail at [scale@coucou.grenet.fr](mailto:scale@coucou.grenet.fr)  
Completed application forms are to be submitted by E-mail to [scale@coucou.grenet.fr](mailto:scale@coucou.grenet.fr) or post to:

**François GRANER** Laboratoire de Spectrométrie Physique, BP 45, F-38402 Saint Martin d'Hères Cedex, France  
Phone : (33) 76.51.47.74, fax : (33) 76.51.45.44 (before October 18, 1996)  
Phone : (33) 4. 76.51.47.74, fax : (33) 4. 76.51.45.44 (after October 18, 1996)

**The deadline for application is January 1, 1997.**

The total price of the registration fees including a copy of the Proceedings and full-board accommodation is FF 3000. Some grants might be available.

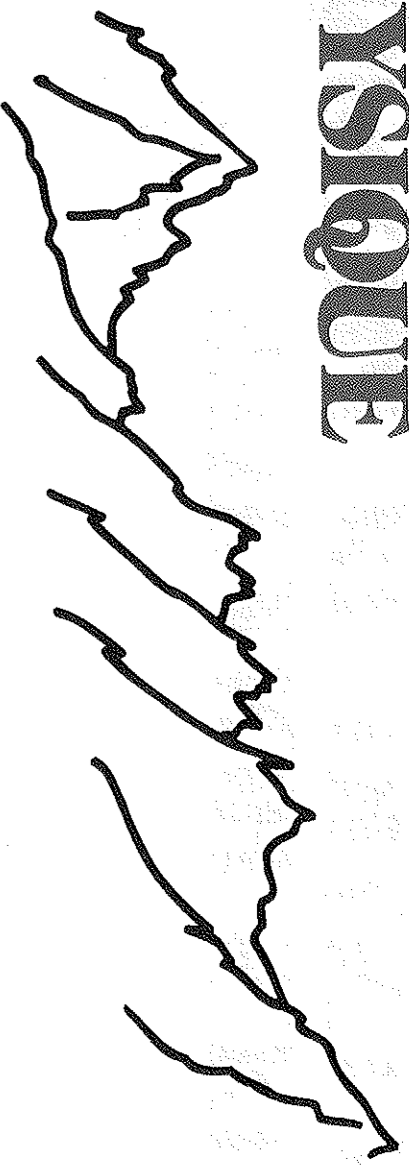
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*Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches*  
*Director: Michèle Leduc. Phone: (33) 4. 50. 54. 40. 69. or (33) 1. 44. 32. 20. 23. Fax: (33) 4. 50. 55. 53. 25.*



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LESHOUCHES

France

## DYNAMICAL NETWORKS IN PHYSICAL AND BIOLOGY

**16-21 March 1997**

What determines the electrical conductivity of an amorphous material? How does a signal from the surface of a living cell arrive at the nucleus to trigger a change in gene activity? As recognized by a growing number of physicists and biologists, a general framework for studying such distinct questions may be network formation. While in the physical sciences networks have been employed to understand the properties of systems lacking an obvious repetition of elements, networks have not traditionally been part of the conceptual framework of cell and developmental biology. In recent years, however, networks have taken an increased importance as explanations of biological properties have been sought in the global properties of many-component systems. The basic unifying theme of the workshop is the recognition that methods used in physics to study the characteristics of networks may also be employed in biology. Physicists will be brought together with cellular-, immuno-, developmental- and neurobiologists to benefit from one another's expertise in their approaches to studying the complexity of dynamical networks. Special emphasis will be put on the following topics: genetic networks, metabolic networks, cytoskeletal networks, neuronal networks, immune network, extracellular matrix networks, structure formation in tissues and other complex fluids, percolation and its applications in physics, biology and chemistry.

### Organizers

**D. BEYSENS** (CEA-Grenoble), **G. FORGACS** (Clarkson University, Potsdam),  
**E. SACKMANN** (Technische Universität, München).

### Advisory Committee

**U. AEBI** (Müller Institute of Structural Biology, Basel),  
**E. EVANS** (University of British Columbia, Vancouver),  
**F. GALL** (Biologie Marine, Paris), **P.-G. de GENNES** (Collège de France, Paris),  
**S. NEWMAN** (New York Medical College, Valhalla).

### Among the Invited Contributors

**D. ANDLER**, **M.-C. BELLISSENT-FUNEL**, **D. BENSIMON**, **A. BEN-Z'EEV**, **E. BEN-JACOB**, **M. BORNENS**,  
**R. BRUNSMMA**, **S. CORTASSA**, **P. DAVIES**, **A. ELGSAETER**, **J. ENGEL**, **P. FROMHERZ**,  
**A. GARCIA-BELLIDO**, **G. GERISCH**, **R. GOLDMAN**, **D. INGBER**, **P. JANMEY**, **E. KANDEL**, **W. LOOMIS**,  
**D. LOUVARD**, **O. MOURITSEN**, **G. NICOLIS**, **L. PELITI**, **J. ROSS**, **M. SCHLIWA**, **A. SEMENOFF**,  
**L. SHAPIRO**, **V. SMALL**, **J.-P. TIERY**, **L. VAN HEMMEN**, **K. WEIJERN**.

*Les Houches is a resort village in the Chamonix valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at 1150 m. elevation. It is ideally located for mountaineering, skiing or touring as well as for intellectual work.*

Participants will be requested to pay a fee of 2110 FF which includes boards, lodging at the Center during the workshop, and the proceedings. Attendance is limited to 60 participants.

To apply send a brief C.V. and description of research interest to:

Mme J. GLENAT,  
Workshop "Dynamical Networks", DRFMC, CEA-Grenoble, 38054 Grenoble Cedex 9 (France)  
Fax: 33 04 76 88 51 53 - email: glenat@drfmc.ceg.fr

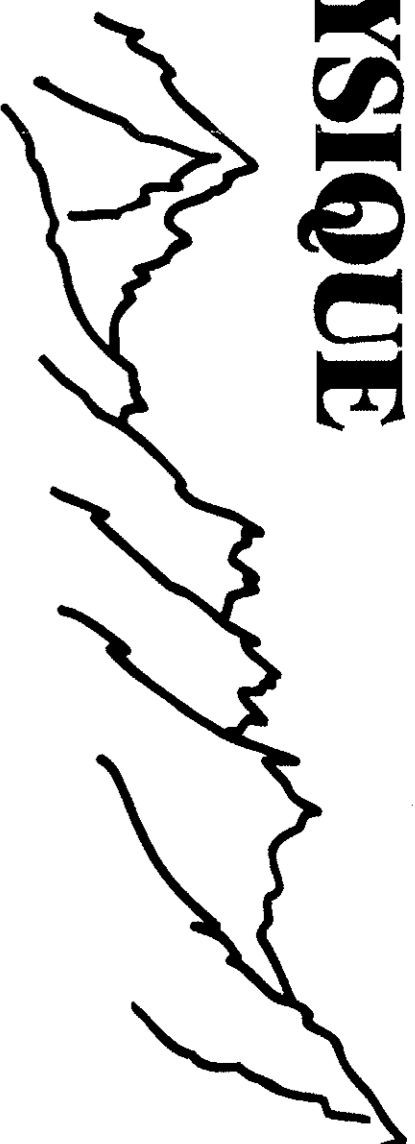
The Physics School in Les Houches is affiliated to University Joseph Fourier and National Polytechnical Institute in Grenoble. It is subsidized by the Ministry of Superior Education and Research, CNRS and Commissariat à l'Energie Atomique.

*For information on the other meetings to be held in the Centre contact:*

*Centre de Physique des Houches, Côte de Chavants, F-74310 Les Houches.  
Directrice Michèle LEDUC, Tél.: 33 01 44 32 20 23 ou 33 04 50 54 40 69  
Fax.: 33 04 50 55 53 25*



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES  
France

**1st Workshop of the TMR Research Network  
(Première rencontre du réseau TMR:)**

***Microlasers and Cavity QED  
(Microlasers et Electrodynamique Quantique en Cavité)***

**21-25 April 1997**

The micromaser has opened a completely new way to test the interaction of light with matter and the fundamental concepts of quantum mechanics. Current technology has brought the experimental realization of the most important features of this maser and of cavity quantum electrodynamics (QED) within reach. Another objective of the network relies on the development of a new and important quantum optical device: The "microscopic optical cavity", or "microcavity". We emphasize the broad conceptual interest in this device, since it provides the tools for a series of refined tests of fundamental principles of quantum mechanics. In addition the microcavity has already provided important new technical advances in the domain of modern optics and optoelectronics. A third objective of the network is to study the phase noise, intensity noise and polarization noise of Vertical Cavity Surface Emitting Lasers (VCSEL). The workshop gathering partners and young researchers in the network will strengthen collaboration and communication between all participants.

## **Tentative list of participants and speakers**

I. Abram, France Telecom, France; F. De Martini, University of Rome, Italy; E. Giacobino, Université Pierre et Marie Curie, France; P. Grangier, Institute d'Optique Théorique et Appliquée, France; E. Hinds, University of Sussex, Great Britain; A. Karlsson, Royal Institute of Technology, Sweden; P. Knight, Imperial College London, Great Britain; G. Kurizki, Weizmann Institute, Israel; R. Loudon, University of Essex, Great Britain; J.-M. Raimond, Ecole Normale Supérieure, France; G. Rempe, Universität Konstanz, Germany; M. San Miguel, Universidad de las Islas Baleares, Spain; W. Schleich, Universität Ulm, Germany; P. Tombesi, Università di Camerino, Italy; H. Walther, Max-Planck-Institut für Quantenoptik, Germany; J. P. Woerdman, University of Leiden, The Netherlands; P. Zoller, Universität Innsbruck, Austria. Furthermore, the young researchers (postdocs) working on the projects of the network will, of course, join the meeting too.

## **Organizers**

W. Schleich and M. Freyberger  
Universität Ulm, Abteilung für Quantenphysik  
89069 Ulm, Germany  
Phone: +731 502 3085  
Fax: +731 502 3086  
email: fre@physik.uni-ulm.de

Les Houches is a resort village in the Chamoniix valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at 1150m elevation. It is ideally located for mountaineering, skiing or touring as well as for intellectual pursuits.

*The Physics School in Les Houches is affiliated to University Joseph Fourier and National Polytechnical Institute in Grenoble. It is subsidized by the MENESR, CNRS, Atomic Energy Commission. This Workshop is subsidized by the European Commission within the TMR program "Research Training Networks".*

*Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches.*

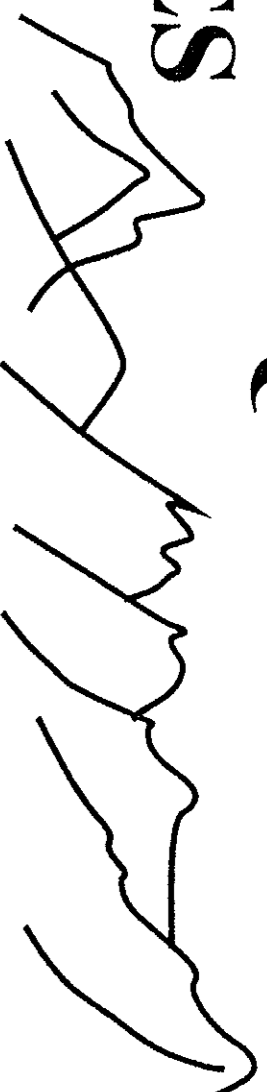
*Director: Michèle Leduc, Phone: (33) 1 44 32 20 23 or (33) 4 50 54 40 69*

*Fax: (33) 4 50 55 53 25*

For further informations about the workshop, please contact the organizers.



# CENTRE DE PHYSIQUE DES HOUCHES



F-74310 LES HOUCHES  
France

## EMBO Workshop Nature and Nurture in Bacterial Evolution

April 28- May 2 1997

Organisers: Ariane TOUSSAINT, Université J. Fourier,  
Grenoble, France and N. Patrik HIGGINS, University of  
Alabama at Birmingham, Birmingham, U.S.A.

Recent developments in bacterial genetics shed a new light on DNA sequences and enzymatic machinery's that influence the integrity of bacterial genomes. The aim of this meeting is, to evaluate the significance of various prokaryotic systems, in terms of molecular mechanisms, for genome flexibility and evolution. Topics discussed will include basic regulatory mechanisms (post-transcriptional and post-translational regulation, communication between bacterial cells, bridges between global regulatory networks which control complex cellular processes as the cell cycle, stress responses or growth phase), horizontal gene transfer, adaptation to new toxic compounds, stationary phase life style and behaviour of bacterial cells on solid supports.

**Tentative list of speakers:** Atkins, J., Salt-Lake City, Bickel, T., Basel, Blot, M., Grenoble, Budrene, E., Cambridge, Carpousis, A., Toulouse, Chakrabarty, A., Chicago, Chandler, M., Toulouse, Chater, K., Norwich, Cornelis, G., Louvain, Crooke, E., Georgetown, D'Ari, R., Paris, Debruijn, F., East-Lansing, Dijkhuizen, L., Gent, Donachie, W., Edinburgh, Forney, L., East-Lansing, Frost, L., Alberta, Gerdes, K., Copenhagen, Hendrix, R., Pittsburgh, Hengge-Aronis, R., Konstanz, Kaiser, D., Stanford, Leach, D., Edinburgh, Maenhaut-Michel, G., Bruxelles, Mergeay, M., Mol, Molin, S., Lyngby, Nakai, H., Georgetown, Pansegrau, W., Lena, Perler, F., Beverly, Rosenberg, S., Alberta, Roth, J., Salt-Lake City, Salmon, G., Cambridge Salyers, A., Urbana, Shapiro, J.A., Chicago, Sherratt, D., Oxford, Skarstad, K., Oslo, Taddei, F., Paris, Thilly-Couturier, M., Bruxelles, Wimpenny, J., Cardiff, Zylicz, M., Gdansk,

**Contact for additional information:** Ariane TOUSSAINT, Laboratoire de Microbiologie,  
CERMO, Université J. Fourier, BP 53, F38041 Grenoble cedex 9 Franc; Tel: (33) 4 76 51 43 46,  
email: [toussain@bio.grenet.fr](mailto:toussain@bio.grenet.fr)

Les Houches (elevation 1150 m) is a resort village in the ChamoniX Valley, in the middle of the french Alps. Established in 1951, the school is located in a group of mountain chalets surrounded by meadows and woods. It is ideally located for intellectual pursuits , mountaineering, skying and hiking.

The Physics School in les Houches is affiliated to University J. Fourier and the National Polytechnical Institute in Grenoble. It is supported by The Ministère de l'Education Nationale, de l'Enseignement Supérieur et de la Recherche, CNRS and the Atomic Energy Commission.

Centre Physique des Houches, Côtes de Chavants, F-74310 Les Houches

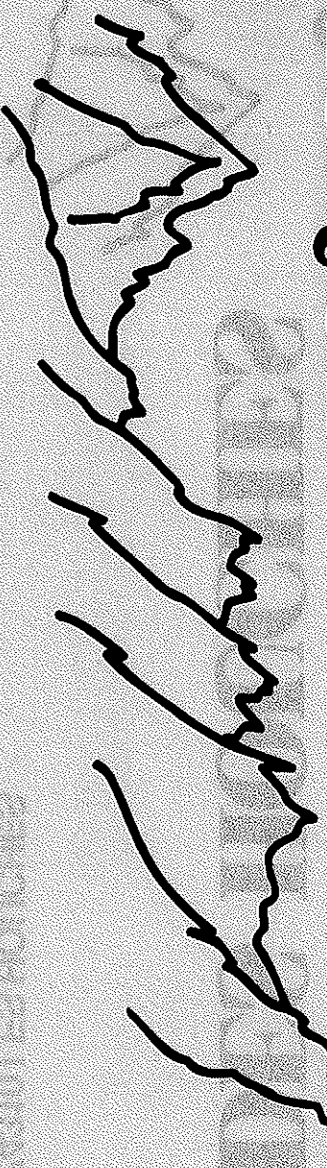
Directeur: Michèle Leduc

Tel: (33) 1 44 32 20 23 ou (33) 4 50 54 40 69

Fax: (33) 4 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHEES



74310 LES HOUCHEES  
France

## HIGH INTENSITY LASERS, PHYSICS AND APPLICATIONS May 5-7 1997

### Chairs

François Salin (France) - Arnold Migus (France)  
André Ducasse (France) - Didier Normand (France)

This school will summarize the development of high power pulsed laser systems in France, with a particular emphasis on femtosecond and picosecond domains. The future of sources as well as numerous applications such as high field atomic or molecular physics, plasma physics, X-ray generation and application will be presented.

### Preliminary list of speakers

F. Amiranoff (Palaiseau) - P. Agostini (Saclay) - E. Berthier (Bruyère-le-Châtel)  
J.P. Chambaret (Palaiseau) - C. Cornaggia (Saclay) - A. Ducasse (Bordeaux)  
J. C. Gauthier (Palaiseau) - J.P. Geindre (Palaiseau) - M. Gaillard (Orsay) - D. Gogny (Bordeaux)  
J. C. Kieffer (Montréal) - A. Klisnick (Orsay) - G. Laval (Palaiseau) - A. L'huillier (Lüüd)  
A. Migus (Palaiseau) - P. Mora (Palaiseau) - I. Nenner (Saclay) - D. Normand (Saclay)  
F. Salin (Palaiseau)

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A poster presentation is scheduled. Attendance is limited at 70 persons. Registration forms available at: François Salin, Ecole des Houches, Laboratoire d'Optique Appliquée, Batterie de l'Yvette, 91761 Palaiseau Cedex, France. Fax: 01 60 14 72 52, e-mail: salin@ensta.ensta.fr. All the presentations will be given in french

### Registration fees

Living expenses: 1266 FF (half price for CEA or CNRS members).  
Some student grants are available. Ask François Salin at the address above for more details.

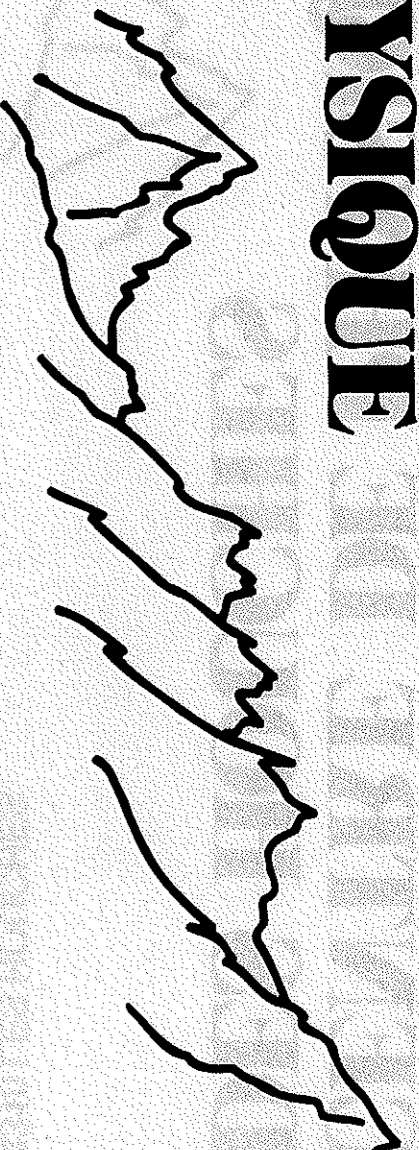
**Supports:** GDR POAN du CNRS  
Cellule formation CNRS Aquitaine

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Centre de Physique des Houches, Côte de Chavants, F-74310 Les Houches.  
Director: Michele LEDUC, Tel.: 33 1 44 32 20 23 or 33 4 50 54 40 69  
Fax: 33 4 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHEES



74310 LES HOUCHEES  
France

## LASER CRYSTALS 12-16 MAY 1997

The purpose of this Workshop is to give the state of art and to think about perspectives of development in the area of Inorganic Solid-State Laser-Type Materials for which interest is always increasing. The involved fields are chemistry of materials, crystal growth, optical properties and laser performances. The main topics are connected with both studies of doped or undoped nonlinear solid state lasers, rare-earth doped crystals, transition metal ions doped crystals with broad absorption band under diode-laser pumping, eye-safe lasers and tunable lasers within uv, blue or ir spectral ranges. We hope that such meeting gathering researchers from University and Industry working in multidisciplinary domains of solid-state lasers will raise up innovating ideas both in basic and applied research, will strengthen actual collaborations and will also improve communication between all actors.

### Organizers

Sylvie ALABLANCHE (DRET-Paris),  
Georges BOULON (Université Claude Bernard, Lyon I).

### Scientific Committee

Jean-Jacques AUBERT (CEA-LETI - Grenoble), François AUZEL (CNET - Bagnaux),  
Pierre LAPORTE (UJM - St Etienne), Jean MARGERIE (ISMRA - Caen), Gérard MARNIER (UB - Dijon),  
Richard MONCORGE (UCB Lyon I), Daniel VIVIEN (ENS Chimie Paris).

### Tentative list of speakers

#### From Universities

G. AKA (Paris), B. BOULANGER (Dijon), G. BOULON (Lyon), A. BRENIER (Lyon),  
M.T. COHEN-ADAD (Lyon), J.L. DOULAN (Caen), M. FERRIOL (Lyon), J.Y. GESLAND (Le Mans),  
S. GIRARD (Caen), P. GEORGES (Orsay), P. LAPORTE (St Etienne), J. MANGIN (Dijon),  
G. MARNIER (Dijon), J. MARGERIE (Caen), R. MONCORGE (Lyon), P. PORCHER (Meudon),  
F. SALIN (Paris), J. THERY (Paris), B. VIANA (Paris), D. VIVIEN (Paris).

#### From Industries

J.J. AUBERT (CEA), F. AUZEL (CNET), M. AUBOURG (QUANTEL), G. BRASSART (BMI),  
H. BRUNET (CILAS), M. ESTRAILLIER (CEA), J.P. FAURIE (SOPHIA-ANTIPOLIS), M. HIRTZ (THOMSON),  
D. LUPINSKI (CRISTAL LASER), J. de MONTLAUR (BMD), D. PELLENC (CRISMATEC),  
M. PIERRARD (SFIM), J.P. POCHOLLE (THOMSON).

#### From Abroad

T. FUKUDA (Sendai-JAPON), A. KAMINSKII (Moscou-RUSSIE),  
D. RYTZ (Fee-EDELSTEIN-ALLEMAGNE), R. WEBER (Bern-SUISSE)  
Other distinguished scientists have been contacted.

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The registration fee is 2 110 FF TTC.

*The Physics School in Les Houches is affiliated to University Joseph Fourier and National Polytechnical Institute in Grenoble. It is subsidized by the MENESR, CNRS, Atomic Energy Commission. This session is subsidized by Research Group on Laser Materials sponsored by CNRS and private industrial Companies.*

*Centre de Physique des Houches, Côte de Chavants, F-74310 Les Houches.*

*Director: Michèle LEDUC, Phone: (33) 1 44 32 20 23 or (33) 4 50 54 40 69*

*Fax: (33) 4 50 55 53 25*

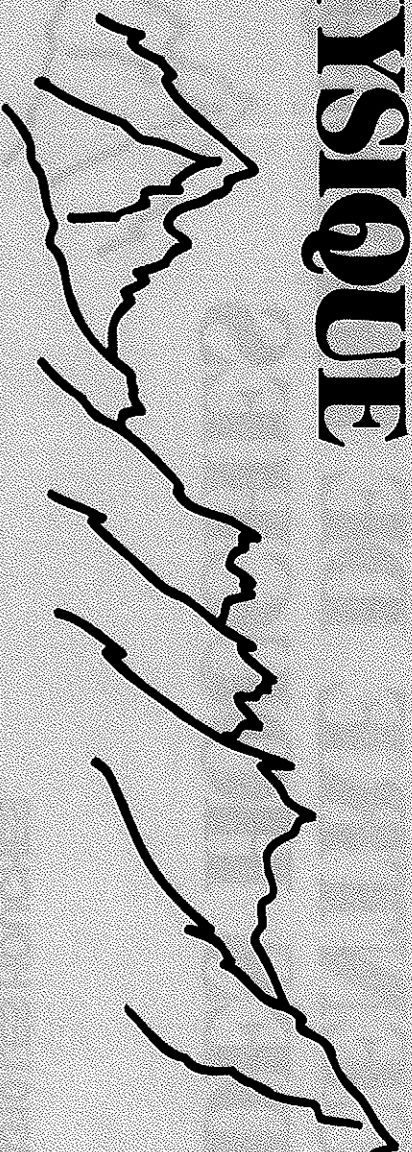
For information and applications, contact Georges BOULON:

E-mail: [boulon@pcml.univ-lyon1.fr](mailto:boulon@pcml.univ-lyon1.fr) - Fax: (33) 4 72 43 11 30

The dead line for application is march 15, 1997



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LESHOUCHES

France

## MINIATURE COHERENT LIGHT SOURCES IN DIELECTRIC MEDIA 2-6 June 1997

Miniature solid-state lasers are becoming increasingly important in a wide range of applications, ranging from optical waveguide amplifiers and lasers for telecommunications or short wavelength (blue or UV) coherent sources. However, these developments raise fundamental physics problems associated with the high degree of light confinement, i.e. multiphoton absorption (upconversion), thermal effects, non linear properties, photorefractive effects, quantum effects in photonic materials... New approaches will be needed to provide solutions and exploitation. In turn, these considerations emphasise a high degree of control of material and chemical composition of the dielectric materials at micro or nano scale. This summer school aims to address these needs by bringing together the current generation of experts from universities and industry and at the same time the next generation : students and postdocs, to the process of identifying possible new ways forward in the development of miniature coherent light sources.

### Chairmen

David C. HANNA (ORC Southampton),  
Bernard JACQUIER (LPCML-CNRS Villeurbanne).

### Scientific committee

W.S. BROCKLESBY (ORC, Southampton), G. HUBER (Hamburg),  
J.P. POCHOLLE (Thomson-CSF, Orsay), A. POLMAN (FOM, Amsterdam), O. SVELTO (Milan),  
H.P. WEBER (Bern).

### Tentative list of speakers

W.S. BROCKLESBY (Southampton), B. FERRAND (Grenoble), S. GRUBB (San José),  
D.C. HANNA (Southampton), S. HOUDE-WALTER (Rochester), G. HUBER (Hambourg),  
B. JACQUIER (Villeurbanne), J. KNIGHT (Bath), P. LAPORTA (Milan), V. LEFÈVRE (Paris),  
E. MOLVA (Grenoble), P. NIAY (Lille), A. POLMAN (Amsterdam), B. SINCLAIR (St Andrews),  
A. TROPPER (Southampton), J.J. ZAYHOWSKI (Boston).

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The fees of 2 110 FF include board and lodging at the centre. Attendance is limited to 70 participants. The school is funded by the European Community, the CNRS and France Telecom which allow to grant a number of participants. Applications, including a brief CV, should be sent, before April 18, 1997, by E-mail to : [houches@pcml.univ-lyon1.fr](mailto:houches@pcml.univ-lyon1.fr) (in case of problem use fax : 33 4 72 43 11 30).

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*Centre de Physique des Houches, Côte de Chavants, F-74310 Les Houches.*

*Director: Michèle LEDUC, Tel.: 33 1 44 32 20 23 or 33 4 50 54 40 69*

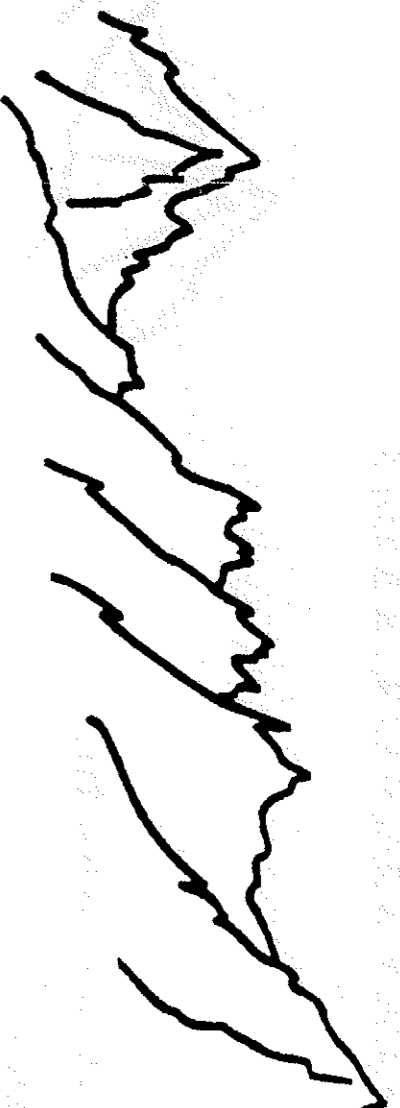
*Fax: 33 4 50 55 53 25*



# CENTRE DE PHYSIQUE DES HOUCHES

74310 LES HOUCHES

France



## HIGH SENSITIVITY MAGNETOMETERS AND APPLICATIONS

June 9-13, 1997

CNRS Thematical School

(supported by DRET, ISMRA and Ministry of Foreign Affairs\*)

(\*to be confirmed)

High sensitivity magnetometry is the name for techniques and sensors allowing measurements of magnetic field or their variations at the pico or femto Tesla level. The most sensitive magnetometers are represented by SQUID magnetometers, optically pumped magnetometers, RMN magnetometers..Major applications range from magnetic anomaly detection (for military applications), geomagnetism (volcanology, ore and petroleum exploration), spatial studies to medical applications. The scope of this school is to sum up research activities involving magnetic sensors and to consider future prospects for applications.

Conferences on different families of sensors and applications will be given by experts originating from the different domains of research. The session is open to advanced graduate students as well as researchers, engineers and industry managers.

### ORGANISING COMMITTEE

H. GILLES, B. CHERON, J. HAMMEL, D. ROBBES (ISMRA Caen)

### TENTATIVE LIST OF LECTURERS

E. ALEXANDROV (Russie), F. AVELA (Grenoble), F. BRETENAKKER (Rennes), J.Y. BRUXELLE (Brest), C.L. BOHLER (Texas), P. CARELLI (Rome), G.H. DONALDSON (Glasgow), D. DRUNG (Berlin), A. FIFE (Canada), V. KOREPANOV (Ukraine), M. LEDUC (Paris), F. LEFFEVRE (Orléans), J.M. LEGER (Grenoble), H. NOVAK (Jéna), V.N. PHAM (Jussieu), E. PULZ (Berlin), P. SEIDEL (Jéna), J.C VILLEGIER (Grenoble), F. WELLSTOOD (Maryland)...

Participants will be requested to pay a 2200FF fee covering full board lodging during the workshop. Some grants might be available for students. For more informations, please contact:

H. GILLES - ISMRA - Laboratoire-de Spectroscopie Atomique - Bd Maréchal Juin -14050 Caen cedex - France

Tél : (33) (0)2-31-45-25-65 ; Fax : (33) (0)2-31-45-25-57 ; Email : HERVE.GILLES@ISMRA.FR

The deadline for applications is april 10th 1997.

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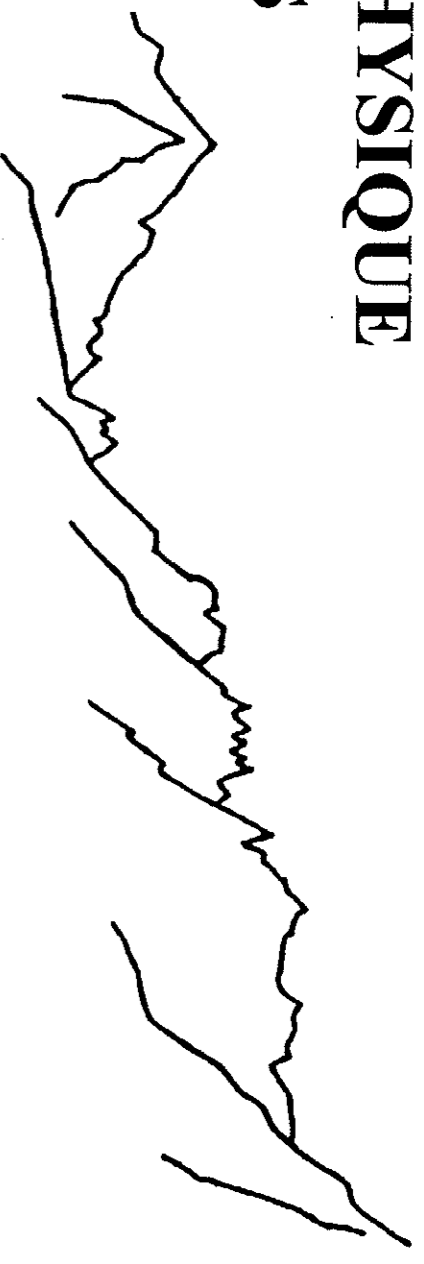
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Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches; Directeur: Michèle Leduc  
Tél: (33) (0)4-50-54-40-69; Fax : (33) (0)4-50-55-53-25



# CENTRE DE PHYSIQUE DES HOUCHES

74310 LES HOUCHES  
France



## Ecole Thématique " Biologie Végétale - Plant Biology "

### Les Protéines des Membranes Végétales - *Proteins of Plant Membranes*

16 - 20 Juin 1997

- Diversité structurale et fonctionnelle des membranes végétales  
*Structural and functional diversity of plant membranes*  
Plasmalemme et tonoplaste (canaux ioniques et électrophysiologie) • systèmes endomembranaires (flux membranaires, adressage) • membranes des mitochondries et des plastes • Interactions membranes-cytosquelette • adhésion cellulaire et pollinisation • membranes dans la symbiose *Rhizobium*-légumineuses • membranes et signalisation
- Etudes biochimiques des protéines membranaires  
*Biochemical analyses of membrane proteins*  
Interactions lipides-protéines • solubilisation et détergents • purification • électrophorèse bidimensionnelle • microséquençage • cristallisation et études structurales • anticorps et immunocytochimie
- Expression fonctionnelle des protéines membranaires  
*Functional expression of membrane proteins*  
Systèmes Baculovirus/cellules sf9 • Levure • ovocytes de Xénope • cellules COS
- Séquençage et approche génétique  
*Sequencing and genetic approaches*  
Protéines membranaires et séquençage systématique des protéines et des génomes  
*Arabidopsis* et *Chlamydomonas*, systèmes modèles

L'Ecole de Physique des Houches est affiliée à l'Université Joseph Fourier et à l'Institut National Polytechnique de Grenoble. Elle est subventionnée par le MENESR, le CNRS et le Commissariat à l'Energie Atomique

*Centre de Physique des Houches, Côte des Chavants, F-74310, Les Houches*  
Directrice: Michèle Leduc • Tel 04 50 54 40 69 ou 01 44 32 20 23 • Fax 04 50 55 53 25

#### Inscriptions



Productions végétales

Jacques JOYARD

DBMS-PCV

CEA-Grenoble

17 rue des martyrs

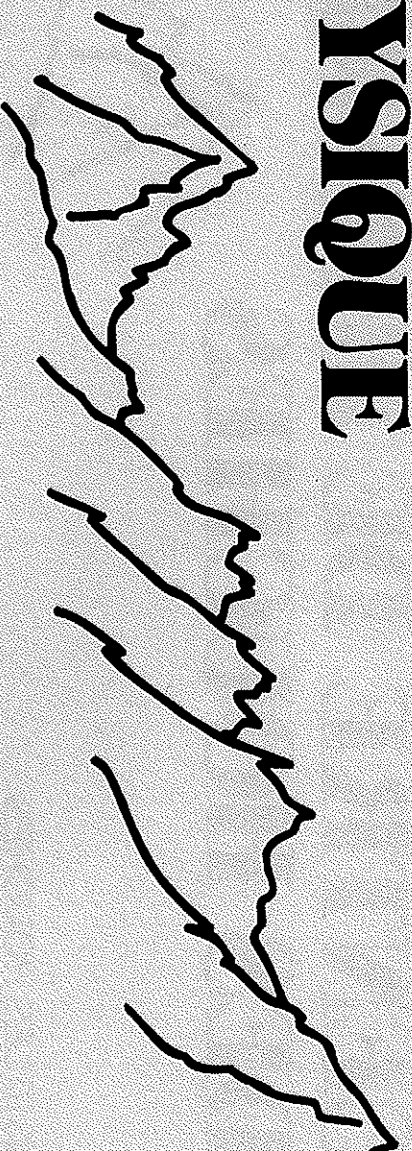
38 054 Grenoble-Cedex 9

e-mail : joyard@dsvgre.cea.fr

Sciences  
de la Vie  
**DRS**  
CENTRE NATIONAL  
DE LA RECHERCHE  
SCIENTIFIQUE



# CENTRE DE PHYSIQUE DES HOUCHEES



74310LES HOUCHEES

France

## CROSSING THE BORDER BETWEEN BOUND STATES AND THE CONTINUUM OF MOLECULES: DISSOCIATION, ASSOCIATION, IONISATION, RECOMBINATION

**June 22-27 1997**

This European school is open to graduate students and young postdoctoral researchers working in the field of atomic collision and molecular physics, both in theory and experiments. Recent progress (photoassociation spectroscopy in cold atomic samples, experiments with ion storage rings...) have brought new insight on the coupling between bound and continuum molecular states. Due to the complexity of experiments and theory, many young researchers are working in a very narrow area of the field: the aim of this school is to provide them with a broader view, taking advantage of the various traditions in the European laboratories. The lectures will focus on fundamental molecular processes such as ionisation or recombination, photodissociation, predissociation and photoassociation. With the aim of unifying the different approaches, spectroscopy and collision studies will be considered in parallel, both from experimental and theoretical points of view. The program will be limited to small molecules. The courses will take place during morning and late afternoon sessions. Participation of the young researchers will be encouraged in the form of short presentations of their own work. One evening lecture will place the field in an historical perspective.

### Organizers

**F. MASNOU-SEEUWS, A. CRUBELLIER** (laboratoire Aimé Cotton, Orsay, France),  
**W.J. van der ZANDE** (FOM Institute, Amsterdam, the Netherlands).

### International Scientific Committee

The board of the Molecular Physics Section (MPS) in the Atomic and Molecular Physics Division  
of the European Physical Society:

**F. MASNOU-SEEUWS** (chairperson, Orsay, France),

**W.J. van der ZANDE** (secretary, Amsterdam, the Netherlands), **M. ASHFOLD** (Bristol, United Kingdom),

**K. BERGMANN** (Kaiserslautern, Germany), **R. DONOVAN** (Edinburgh, United Kingdom),

**M. JANSON** (Riga, Latvia), **M. LARSSON** (Stockholm, Sweden), **H.-J. LOESCH** (Bielefeld, Germany),

**I. NENNER** (Saclay, France), **E.E. NIKITIN** (Haifa, Israel), **F. VECCHIOCATIVI** (Perugia, Italy).

### Lecturers

**F. GIANTURCO, H. HOTOPI, C. JUNGEN, M. LARSSON, F. MASNOU-SEEUWS,**

**E.E. NIKITIN, E. TIEMANN, J. VIGUE, W.J. van der ZANDE.**

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Detailed information on the Summer school can be found on the web site:  
<http://www.lac.u-psud.fr/ecole>

A limited number of 50 participants from the EC will be selected after sending application. They will be given a grant from the TMR program of the European Commission covering the staying expenses in the Centre de Physique des Houches and a participation of the European Commission to travel expenses. The candidates should ask for application forms at the following addresses: Anne Crubellier, Ecole d'été de juin 1997, laboratoire Aimé-Cotton, bât. 505, F91405 Orsay Cedex, France - Fax (33) 1 69 35 21 00 e-mail: [ecole@lancelot.lac.u-psud.fr](mailto:ecole@lancelot.lac.u-psud.fr)

**Deadlines:** April 25: request for application forms, May 2: submission of application forms, May 10: final selection of participants.

**Funding:** the school is funded by the TMR programme of the European Commission, under contract ERBSMMACT960171.

*The Physics School in Les Houches is affiliated to the Joseph Fourier University and the National Polytechnic Institute in Grenoble. It is subsidized by the MENESR, the CNRS and the Atomic Energy Commission.*

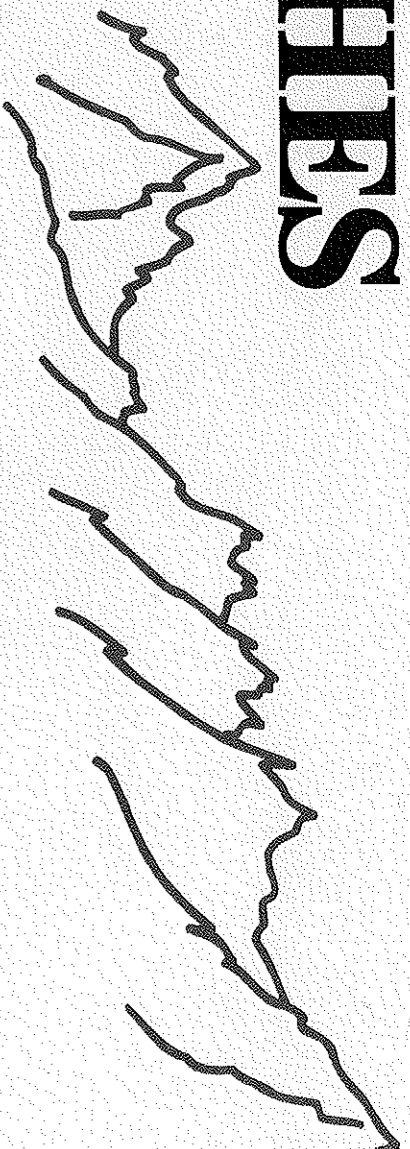
*Centre de Physique des Houches, Côte de Chavants, F-74310 Les Houches.*

*Director: Michele LEDUC, Tel.: 33 1 44 32 20 23 or 33 4 50 54 40 69*

*Fax: 33 4 50 55 53 25*



# LES HOUCHEES



SESSION LXVII  
NATO ADVANCED STUDY INSTITUTE  
June 30 - July 25 1997

école d'été de physique théorique

## "MODELING THE EARTH'S CLIMATE AND ITS VARIABILITY" "MODÉLISATION DU CLIMAT DE LA TERRE ET DE SA VARIABILITÉ"

Scientific Direction: **William R. HOLLAND** (NCAR, USA),  
**Sylvie JOUSSAUME** (CNRS, LMCE, France),

- The Observed Climate System : **E. RASMUSSEN** (U. Maryland, USA)
- Atmospheric Modeling and Climate Variability : **L. BENGTTSSON** (MPI, Hamburg, Germany)
- Ocean Modeling and the Role of the Ocean in Climate Change : **P. DELECLUSE** (LODYC, France)
- Past Climate Variations and the Mechanisms of Climate Change : **J.C. DUPLESSY** (CFR, France)
- Modeling Long Term Climate Change : **T.J. CROWLEY** (Texas Univ., USA).

In addition to these general courses, a number of more specific lectures or seminars will be given, either by invited speakers or by school-attendees. In particular, lectures will include such topics as the role of biogeochemical cycles in the climate system (**W. BROECKER**, LDGO, USA), aspects of decadal variability and the importance of greenhouse gas scenarios for understanding future climate change (**S. MANABE**, GFDL, USA), the contribution of satellite observations to oceanography (**J.F. MINSTER**, GRGS, France).

Understanding the climate of planet Earth and particularly its variability on both short and long time scales is a daunting but essential task. The problem is difficult because it is made up of a complex set of interactions between the components of the physical system—the atmosphere, the ocean, land processes and ice—and the chemical and biological systems that contribute to climate equilibrium. The basis for our present understanding relies upon indirect evidence from past climatic states, direct observations of the present climate, and the use of sophisticated numerical models of the fluid dynamical behaviors of the global ocean and the atmosphere. Recently, coupled climate system models that include many or all of these subcomponents have been developed, allowing scientists to investigate past climate scenarios, present climate variability, and future climate predictions. The aim of the school is to provide a thorough presentation of both the observations and the models that are necessary to rationalize the complex behavior of the climate system. The school will be open to advanced graduate students as well as to more senior researchers in climate studies, including atmospheric scientists, oceanographers, and paleoclimate researchers.

*Les Houches is a resort village in the Chamonix valley of the french Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at an altitude of 1 150 m. It is above the village, facing the Mont-Blanc range. It is ideal for mountaineering, hiking or touring as well as for more intellectual work. Accommodation and meals are provided within the School for both participants and lecturers. A financial contribution of FF 4500 is requested from each participant. Some possibilities for grants exist. Participants who intend to rent lodging should inquire directly at : Office du Tourisme, F-74310 Les Houches (tel. +33-4-50 55 50 62). The School is affiliated to the University Joseph Fourier and Institut National Polytechnique de Grenoble. It is subsidized by the MENESR, CNRS and the Commissariat à l'Energie Atomique.*

Admission forms and additional information are available from:

**ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE - F - 74310 LES HOUCHEES**

**PHONE: +33-4-50 54 40 69 - FAX: +33-4-50 55 53 25**

**E-MAIL: secretariat.houches@ujf-grenoble.fr W3:http://www.ujf-grenoble.fr/HOUCHES/**

Please if you asked for admission forms by e-mail, mention your mailing address or fax number.

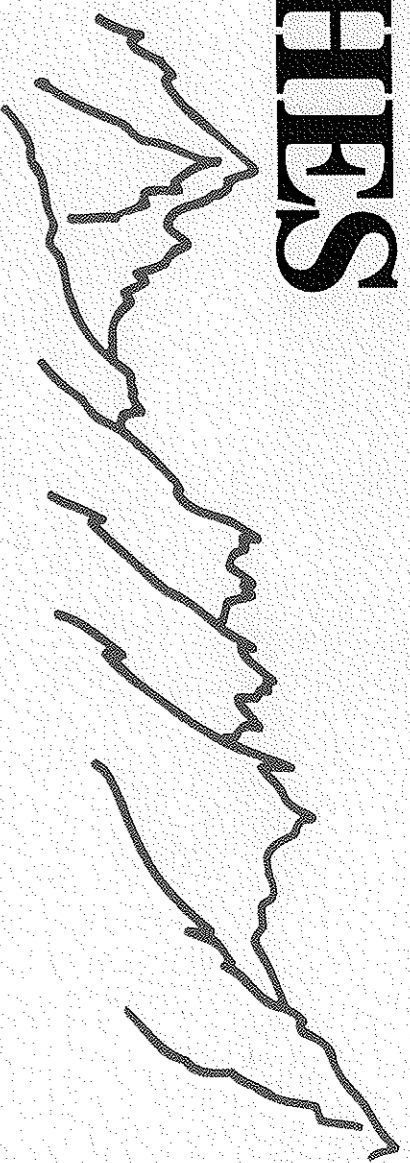
Complete files (admission forms and letters of recommendation) must have reached this address before **March 1, 1997**.

The second 1997 session will be entitled "Probing the standard model of particle interactions".

Two sessions will be held in 1998, one on "Topological aspects of low dimensional systems", the other on "Infrared Space Astronomy".



# LES HOUCHEES



SESSION LXVIII  
NATO ADVANCED STUDY INSTITUTE  
July 28 - September 5 1997

école d'été de physique théorique

## "PROBING THE STANDARD MODEL OF PARTICLE INTERACTIONS" "PARTICULES ET INTERACTIONS: LE MODÈLE STANDARD MIS À L'ÉPREUVE"

Scientific Direction: **Rajan GUPTA** (Director) (Los Alamos, USA),  
**André MOREL** (Saclay, FR),  
**Eduardo DE RAFAEL** (Marseille, FR).

Electroweak model and LEP physics: Daniel TREILLE (CERN, CH)  
Effective weak hamiltonian and CP violation: Andrzej BURAS (Munich, D)  
Effective field theories in the light and heavy quark limits: Toni PICH (Valencia, E)  
Lattice QCD: (to be announced)  
Perturbative QCD in soft and hard processes: David A. KOSOWER (Saclay, FR)  
Deeply inelastic scattering: Aneesh MANOHAR (UC San Diego, USA)  
Experimental K physics: Louis FAYARD (LAL-Orsay, FR)  
Physics at the LHC: Friedrich DYDAK (CERN, CH)  
Experimental D and B physics: Jeff RICHMAN (UC Santa Barbara, USA)  
QCD at finite temperature: Jean-Paul BLAIZOT (Saclay, FR)  
Models of electroweak breaking: Sekhar CHIVUKULA (Boston U., USA)  
An update on supersymmetry developments: Graham ROSS (U. of Oxford, GB)  
Duality in supersymmetric gauge theories: Paolo DI VECCHIA (Nordita, DK)  
Recent developments in Lattice QCD: Martin LÜSCHER (DESY, D)  
Heavy quark symmetry: Mark WISE (Caltech, USA)  
A few additional lectures or seminars will be given, either by invited speakers or by school attendants.

The standard model of particle interactions has, since its formulation in the early seventies, remained the only serious candidate theory describing three (weak, electromagnetic and strong) of the four forces of nature. All present experimental data are consistent with this theory, however our understanding of the SM is far from complete. There are too many arbitrary parameters like the masses and mixing angles of the quarks. A serious limitation to obtaining accurate values for these parameters is the large uncertainties in quantitative estimates of strong interaction effects in regimes which are governed by the non-perturbative behaviour of the underlying theory, QCD. Thus, over the last twenty years a number of techniques have been developed to obtain quantitative predictions from the standard model. These include perturbative QCD calculations, lattice QCD, chiral perturbation theory, large  $N_c$  QCD sum rules, heavy quark effective theory, and approaches based on simple models that cannot be derived from QCD. The aims of the school are to provide an introduction to the different theoretical approaches and assess their relative strengths and successes, to summarize the existing and planned experiments and the results expected from them, and finally to discuss the important open problems and tests of the SM for which there will be experimental input during the next decade. The School will be open to advanced graduate students and young researchers.

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Admission forms and additional information are available from:

**ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE - F - 74310 LES HOUCHEES**  
**PHONE: +33-4-50 54 40 69 - FAX: +33-4-50 55 53 25**  
**E-MAIL: secretariat.houches@ujf-grenoble.fr W3:http://www.ujf-grenoble.fr/HOUCHEES/**

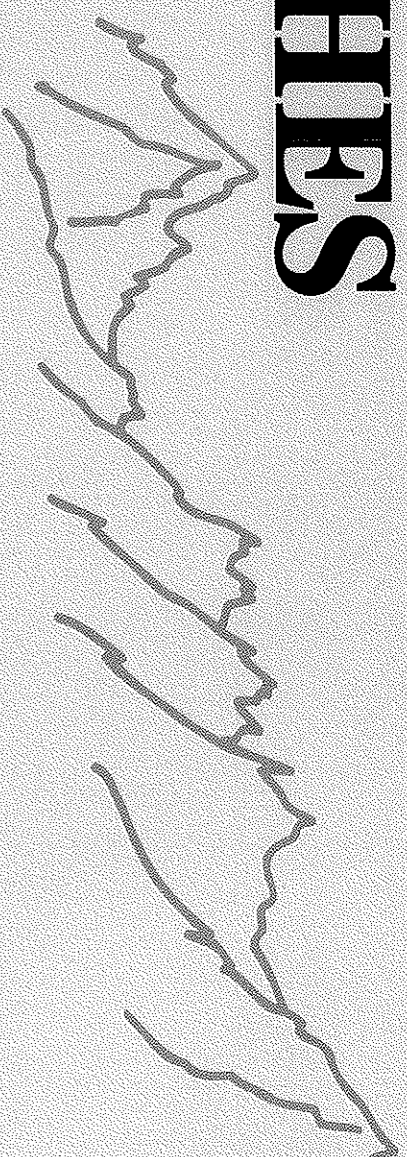
Please if you asked for admission forms by e-mail, mention your mailing address or fax number.

Complete files (admission forms and letters of recommendation) must have reached this address before **March 1, 1997**.

The first 1997 session will be entitled "Modeling the earth's climate and its variability".  
Two sessions will be held in 1998, one on "Topological aspects of low dimensional systems", the other on "Infrared Space Astronomy".



# LES HOUCHES



SESSION X

7 septembre — 19 septembre 1997

école pré-doctorale de physique

## FÉDÉRATION FRANÇAISE DES MAGISTÈRES DE PHYSIQUE PROGRAMME NATIONAL DE COSMOLOGIE

### COSMOLOGIE

**Standard Cosmological Models and the Early Universe :** *John PEACOCK* (Edinburgh)

**The Cosmic Background Radiation and Structure Formation :** *Jim BARTLETT* (Strasbourg)

**Primordial Nucleosynthesis and Dark Matter :** *Vincent ICKE* (Leiden Observatory)

**Topological Defects and Astrophysical Implications :** *Ruth DURRER* (Geneva University)

Le domaine de la cosmologie connaît un développement très rapide depuis plus d'une dizaine d'années. Les travaux sur la matière noire, sur les caractéristiques et l'origine des structures, ainsi que sur la physique de l'univers primordial ont permis de grands progrès dans notre compréhension de l'univers, progrès qui se sont nourris en partie des observations de plus en plus performantes. Les résultats attendus dans les dix prochaines années de la part des grands télescopes, des instruments dédiés et des missions spatiales, apporteront une quantité d'information considérable et s'accompagneront de nombreux développements. Dans ce contexte, le but de cette école est d'offrir un panorama de cette discipline en plein essor. Les cours des Ecoles pré-doctorales sont approfondis mais de caractère suffisamment général. Ils sont destinés principalement aux jeunes chercheurs venant de terminer un DEA ou un Magistère, à ceux qui sont en cours de Thèse et, plus généralement, aux jeunes chercheurs étrangers dans une situation d'études analogue. Ils doivent permettre de compléter la formation des participants à la fois dans leur domaine de recherche et dans d'autres disciplines à un niveau plus accessible et moins spécialisé que celui des autres Ecoles. Un effort pédagogique y est effectué tant pour les cours eux-mêmes que par les échanges entre étudiants et enseignants et par les interactions entre étudiants. En dehors des cours et séminaires effectués par les enseignants, chacun des participants fera un court exposé sur son sujet de recherche ou de stage (DEA, Magistère).

## Candidatures et financement

Cette École est ouverte aux étudiants de toute nationalité. Les candidats doivent envoyer un dossier qui sera examiné par un Comité de Sélection. Ce dossier doit comprendre un curriculum vitae détaillé, une lettre de recommandation et éventuellement une demande de bourse.

Le Comité de Sélection attribuera des bourses couvrant totalité ou partie des frais d'inscription et de séjour lesquels s'établissent à 2 600 FF.

Le dossier d'inscription doit parvenir :

**avant le 1er Juin 1997**

à Alain BLANCHARD

Observatoire astronomique de Strasbourg, 11 rue de l'Université, F-67000 Strasbourg

Tél. 03 88 15 07 31 - Fax 03 88 15 07 50 - e-mail : blanchard@astro.u-strasbg.fr

### Comité d'organisation

**A. BLANCHARD** (IUF, Observatoire astronomique de Strasbourg, Université Louis Pasteur), Directeur Scientifique

**J.C. LE GUILLOU** (IUF, ENSLAPP, Université de Savoie) - **R. MAYNARD** (EN, Univ. de Grenoble I)

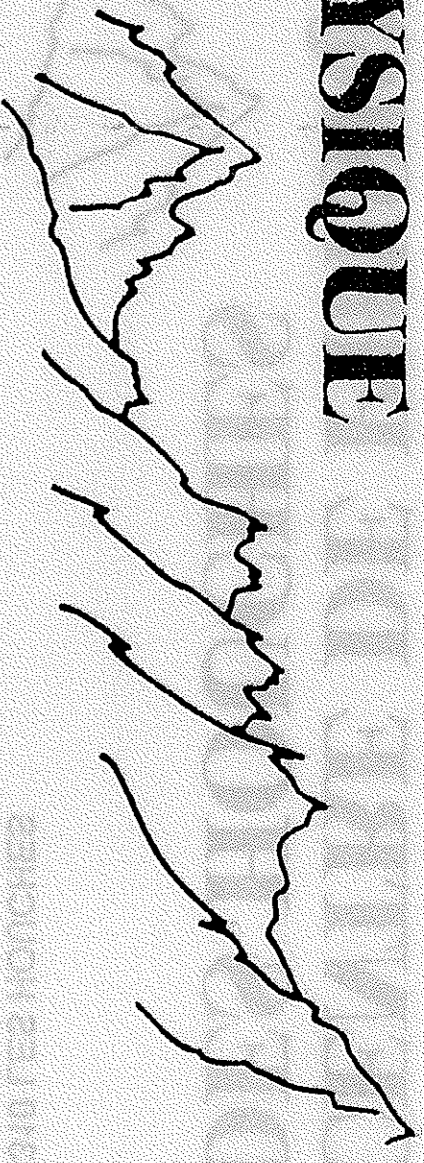
Les écoles pré-doctorales des Houches sont organisées par la Fédération Française des Magistères de Physique qui regroupe les Magistères de l'Université Joseph-Fourier (Grenoble I), de l'Université Paris-Sud (Orsay), de l'Université Paris 7, de l'Université Claude-Bernard et de l'ENS de Lyon, de l'Université de Rennes, et le Magistère Interuniversitaire de Physique (Paris 6, 7, 11, 13 et ENS). La présente Session est également organisée en association avec le Programme National de Cosmologie.

Les Houches est un village de la vallée de Chamoni, dans les Alpes françaises. L'École a lieu dans un groupe de chalets montagnards entourés de prairies et de bois. Il est situé à une altitude de 1150 m. L'hébergement et les repas sont assurés pour tous les participants. Les étudiants bénéficieront en permanence de salles de réunion et d'une bibliothèque.

L'École de Physique des Houches est affiliée à l'Université Joseph Fourier et à l'Institut National Polytechnique de Grenoble. Elle est subventionnée par le Ministère de l'Enseignement Supérieur et de la Recherche, le CNRS et le Commissariat à l'Énergie Atomique.



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES  
France

## Gravitation and Experiment

September 22-26, 1997

An international workshop "Gravitation and Experiment" is being organized by CNRS in Les Houches on the topics related to *Gravitational-wave detection*, *High-precision tests of general relativity* and *Metrology of inertial and gravitational phenomena*. The aims of this meeting are to strengthen the collaboration between experimentalists and theoreticians, to prepare the next generations of experiments and to give rise to new experimental or theoretical ideas. The program will include review talks and specialized oral or poster presentations.

**Organizers:** L. Blanchet (Meudon) and S. Reynaud (Paris)

**Scientific Committee:** C. Bordé, A. Brilliet, T. Damour, J.-P. Lasota, C. Veillet and M. Yvert

**Tentative list of speakers:** (\* to be confirmed)

S. Bonnazola / J.-A. Marck (Meudon), C. Bordé (Paris), P. Bouyer (Orsay),  
B. Carter (Meudon), T. Damour (Bures), K. Danzmann (Hanover), A. Di Virgilio (Pisa),  
P. Fayet (Paris), V. Ferrari (Rome), P. Fridelance / E. Sannain (Grasse), M.-T. Jaekel (Paris),  
Y. Jafry (Noordwijk), F. Mignard (Grasse), B. Mours (Annecy), A. Nobili (Pisa),  
C. Salomon (Paris), M. Sandford\* (London), B. Schmidt (Potsdam), B. Schutz (Cardiff),  
M. Soffel (Tübingen), P. Touboul (Chatillon), P. Tourrenc (Paris), M. Weis (München)

Participants will be requested to pay a fee of FF 2110 corresponding to full-board accommodation for the week. Attendance is limited to 70 participants. A few grants might be available for young scientists.

Application forms including a brief CV and a short description of motivations should be sent to:

Mme Dominique Lopes, Workshop "Gravitation and Experiment",  
DARC Observatoire de Meudon, F-92195 Meudon Cedex

Application forms could also be sent by e-mail to <lopes@obspm.fr>. Further information on the workshop can be obtained at the same address.

**The deadline for application is June 27, 1997**

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*The Physics School in Les Houches is affiliated to University Joseph Fourier and National Polytechnical Institute in Grenoble. It is subsidized by the Ministry of Education and Research, CNRS and CEA. The present workshop is also being supported by CNES.*

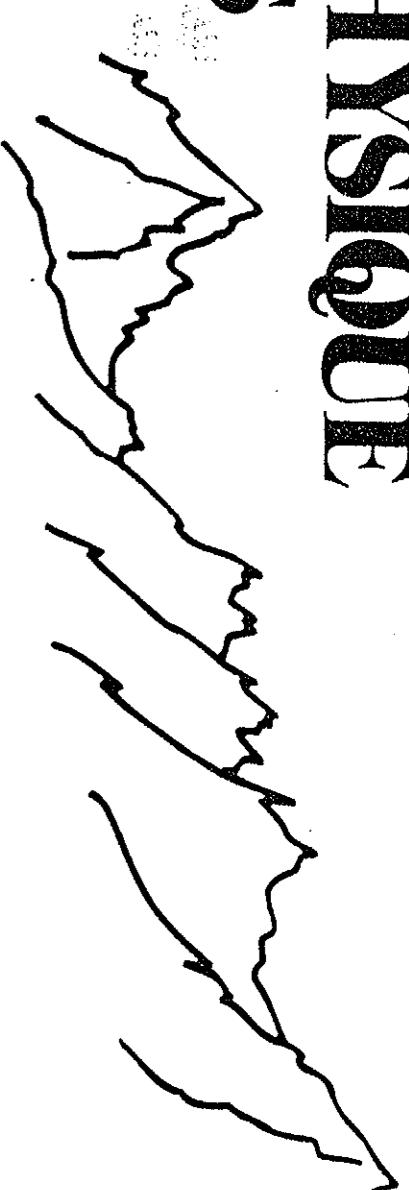
*Further information on the program of the School may be obtained from:*

*Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches*

*Directeur: Michèle Leduc; Tel: 01 44 32 20 23 ou 04 50 54 40 69; Fax: 04 50 55 53 25*



# CENTRE DE PHYSIQUE DES HOUCCHES



74310 LES HOUCCHES  
France

## Workshop

### CONCEPTIONS OF SPACE IN PHYSICS

september 30 - october 3, 1997

This informal pluridisciplinary workshop will gather physicists, mathematicians and philosophers, to discuss about the conceptions of space in physics. The first half will be devoted to exchanges between physicists and mathematicians, concerning the mathematical aspects of the present research in physics (new geometrical aspects in relativity, in quantum physics, and in cosmology; topology; towards quantum gravity and cosmology; non commutative geometry; symplectic geometry).

The second half will be devoted to philosophical and epistemological discussions and presentations, concerning space and related concepts (dimensions and fractals; vacuum and ether; Mach principle, ...).

The workshop is open to advanced graduate students as well as to senior physicists. This workshop belongs to a common project of Service d'astrophysique du CE Saclay (France), Observatoire de Paris (France), FESt (Heidelberg), and Namur University (Belgique).

#### Tentative list of lecturers and round-table chairpersons

Charadin Gabriel \* (Saclay, France), Giulini Domenico (Freiburg), Heller Michael (Poland), Iglesias Patrick (Lyon), Kiefer Claus (Freiburg), Klein E. (Saclay), Lachière-Rey Marc (Saclay), Lambert Dominique (Namur, Belgique), Luminet Jean-Pierre (Observatoire de Meudon), Madore John (Univ. Orsay, France), Mayet Laurent (Univ. Paris), Paty Michel (Univ. Paris), Petitot Jean (Ecole Polytechnique), Reynaud Serge (ENS, Paris), Smadja Ivhan (Univ. Paris), Souriau Jean-Marie (Univ. Aix-Marseille), Stamatescu Ion (FEST, Heidelberg), Szczeciniarz Jean-Jacques (Univ. Paris), Vilain Christiane (Observatoire de Meudon), Wissmann Heinz \* (FEST, Heidelberg)  
(\* to be confirmed)

Application forms can be obtained, and submitted, by e-mail at [marclr@discovery.saclay.cea.fr](mailto:marclr@discovery.saclay cea.fr), or by post to:

Marc Lachière-Rey, DSM - Service d'Astrophysique,  
CE Saclay, 91191 Gif sur Yvette, France  
Tel : (33) 1 69 08 62 92, fax : (33) 1 69 08 92 66

The deadline for application is September, 8, 1997.  
Accommodation fees amount to 1 688 FF for the whole session. Facilities can be offered to young researchers. Registration is free.

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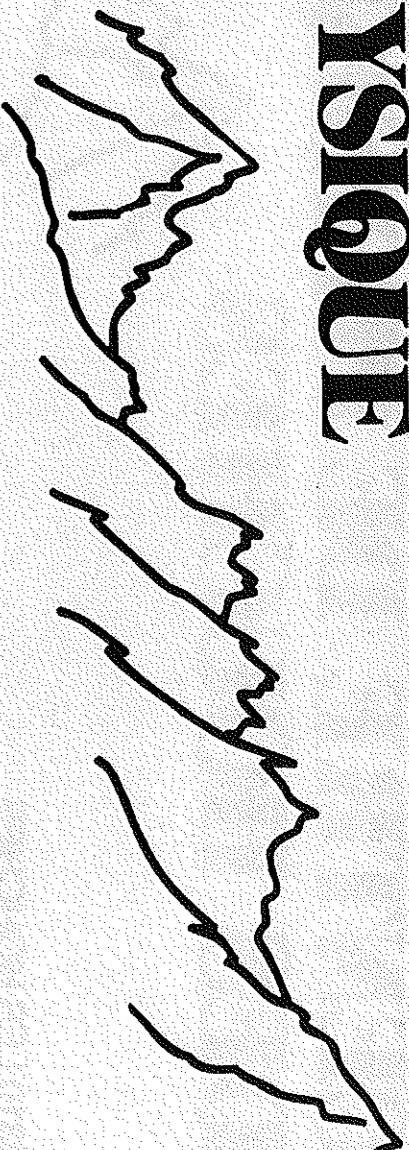
*The Physics School in Les Houches is affiliated to University Joseph Fourier and National Polytechnical Institute in Grenoble. It is subsidized by the Ministry of Superior Education and Research, CNRS and Atomic Energy' Commission.*

Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches  
Director: Michèle Leduc.

Phone: (33) 4. 50. 54. 40. 69. or (33) 1. 44. 32. 20. 23. Fax: (33) 4. 50. 55. 53. 25.



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LE S HOUCHES

France

## ASTROPHYSICS SCHOOL FORMATION AND EVOLUTION OF GALAXIES 14-24 October 1997

### Organizers

Olivier LE FÈVRE (Laboratoire d'Astronomie Spatiale, France) lefevre@astsp-mrs.fr,  
Stéphane CHARLOT (Institut d'Astrophysique de Paris, France) charlot@iap.fr,  
Pascale JABLONKA (Observatoire de Paris-Meudon, France) jablonka@obspm.fr.

### School Goals

Understanding the formation and the evolution of galaxies has motivated generations of astronomers. Considerable progress has been made in theory and simulations. New observing facilities in space or on the ground are providing a more and more detailed picture of the properties of more and more distant galaxies. We are now at a time when interactions between the observational and theoretical perspectives are critical.

This school aims to provide young researchers with an up-to-date view of the formation and evolution of galaxies, from theoretical and observational point of views. Lectures will be given to describe the current theoretical framework, the observational status and the progress expected with new telescopes and instrumentation. The goal is to provide young researchers with the tools to efficiently participate in research programs related to the field, or conduct new programs within the framework of the many new opportunities appearing in the context of galaxy formation and evolution. This will participate in maintaining the high level of European expertise in the field.

### Sponsors

The School is sponsored by the Training and Mobility of Researchers EEC program, the Europeans Space Agency, the Centre de la Recherche Scientifique of France, the Laboratoire d'Astronomie Spatiale, the Gassendi Institute for Astronomical Research in Provence, the Paris Observatory.

### Lectures and Speakers

- Hierarchical galaxy formation (S.D.M. White, G. Kaufmann, Max Planck Institute für Astronomy, Munich, Germany)
- Spectrophotometric models (S. Charlot, Institut d'Astrophysique de Paris, France)
- The evolution of the mass distribution on various scales
- Interactions and mergers (F. Combes, Observatoire de Paris, France)
- The role of dust (J.L. Puget, Institut d'Astrophysique Spatiale, France)
- The new generation of large telescopes and instrumentation (G. Monnet, European Southern Observatory, Germany)
- Current and future space missions : ISO, FIRST, PLANCK, NGST (J.L. Puget, Institut d'Astrophysique Spatiale, France)
- Deep photometric counts (H. Ferguson, Space Telescope Science Institute, USA)
- Deep redshift surveys (O. Le Fèvre, Laboratoire d'Astronomie Spatiale, France)
- Morphology of galaxies (R. Abraham, Institute for Astronomy, UK)
- Gravitational lenses (Y. Mellier, Institut d'Astrophysique de Paris, France)
- Chemical composition of galaxies (F. Matteucci, OAT, Italy)
- Star clusters and galaxies (P. Jablonka, DAEC, Observatoire de Paris-Meudon, France)
- Clustering of galaxies in the local universe (L. Da Costa, European Southern Observatory, Germany)
- Evolution of galaxies since  $z \sim 5$
- Multi-wavelength properties of distant galaxies (B. Guiderdoni, Institut d'Astrophysique de Paris, France)
- Cluster galaxies evolution (M. Dickinson, Space Telescope Science Institute, USA)
- Evolution of clustering (J. Peacock, ROE, UK)
- Quasar absorption systems (P. Petitjean, Institut d'Astrophysique de Paris, France)
- Relationship between galaxies and AGNs (R. Terlevitch, Royal Greenwich Observatory, UK).

### Registration

- A registration form can be obtained by anonymous ftp via <ftp://ftp.astsp-mrs.fr/pub/houches>
- The registration forms must be submitted via e-mail to [houches@astsp-mrs.fr](mailto:houches@astsp-mrs.fr), or send by FAX or direct mail to : Andrée Laloge, Laboratoire d'Astronomie Spatiale, Traverse du Siphon, BP 8, F-13376 Marseille, France. Tel : 33 (0)4 91 05 59 38 - Fax : 33 (0)4 91 66 18 55. **The deadline for registration is 19 september 1997. PhD students and post-docs must arrange for a reference letter from their supervisor to be sent to the organizers. The total number of participants will not exceed 60.**
- The total cost for the complete session, including a copy of the proceedings, and full board accommodation is FF 4 700. Grants are available, in priority for PhD students, post-docs, and young researchers from EEC.

### Les Houches Physics School Location

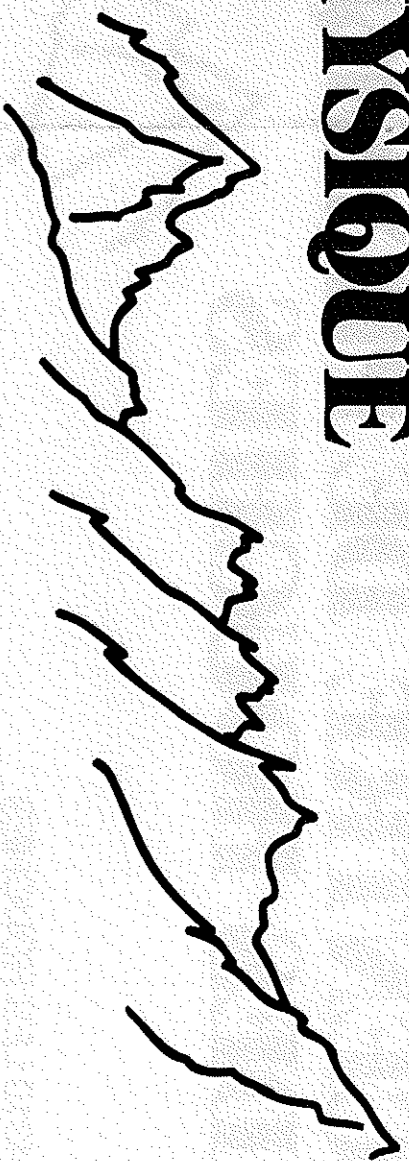
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The Physics School in Les Houches is affiliated to the University Joseph Fourier and the National Polytechnical Institute in Grenoble. It is subsidized by the MENESR, CNRS and the Atomic Energy Center.

Centre de Physique des Houches, Côte de Chavants, F-74310 Les Houches.  
Directeur: Michèle LEDUC, Tel.: (33) 04 50 54 40 69 or (33) 01 44 32 20 23  
Fax: (33) 04 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHEs



74310 LES HOUCHEs  
France

## MATHEMATICAL AND PHYSICAL TOOLS FOR CLIMATE DYNAMICS January 6-16, 1998

The field of climate dynamics is highly interdisciplinary, involving the mathematical, physical, chemical and biological sciences. Understanding and predicting climate variations have become an important scientific challenge because of their socio-economic implications.

The climate system is composed of the atmosphere, the oceans, the cryosphere and the biosphere. Each subsystem possesses its own dynamics and operates at specific scales in time and space. Representing, sampling and simulating climate variations are therefore key issues for climate studies.

We propose to bring together leading scientists in the various disciplines linked to climate studies in order to elaborate a common interdisciplinary framework for understanding the dynamics of climate.

### Organizers

**Prof. Michaël GHIL** (Department of Atmospheric Sciences,  
and Institute of Geophysics and Planetary Physics, University of California, Los Angeles, USA),

**Prof. Thomas STOCKER** (Physikalisches Institut, Universität Bern, Switzerland),

**Dr. Pascal YIOU** (Laboratoire de Modélisation du Climat et de l'Environnement,  
DSM-CEA, CE-Saclay, France).

### Speakers

**A. Berger** (UC, Louvain), **K. Briffa** (U East Anglia), **P. Cessi** (Scripps, La Jolla),

**M.A. Dubois** (CEA, Saclay), **M. Ghil** (UCLA), **R. Hindmarsh** (BAS, Cambridge), **F. Joos** (U Bern),

**P.D. Jones** (U East Anglia), **J. Jouzel** (CEA, Saclay), **L. Labeyrie** (U. Orsay), **H. Le Treut** (CNRS, Paris),

**P. Manneville** (CNRS, Palaiseau), **L.A. Smith** (Oxford), **D. Sornette** (U Nice & UCLA),

**T. Stocker** (U Bern), **P. Yiou** (CEA, Saclay).

### Registration fees

4642 FF per person (including lodging and meals, 2321 FF for CEA affiliates).

Registration form to be mailed before November 7th, 1997 to:

Dr. Pascal Yiou, Laboratoire de Modélisation du Climat et de l'Environnement, DSM-CEA l'Orme des Merisiers,  
91191 Gif-sur-Yvette Cedex, France.

A very limited number of grants will be attributed (applications must have reached the admission committee before  
October 20th, 1997).

Information online: <http://www.atmos.ucla.edu/yiou/houches98>.

**Supports:** European Union (TMR programme), French Ministry of Foreign Affairs,  
French Atomic Energy Commission

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Centre de Physique des Houches, Côte de Chavants, F-74310 Les Houches.

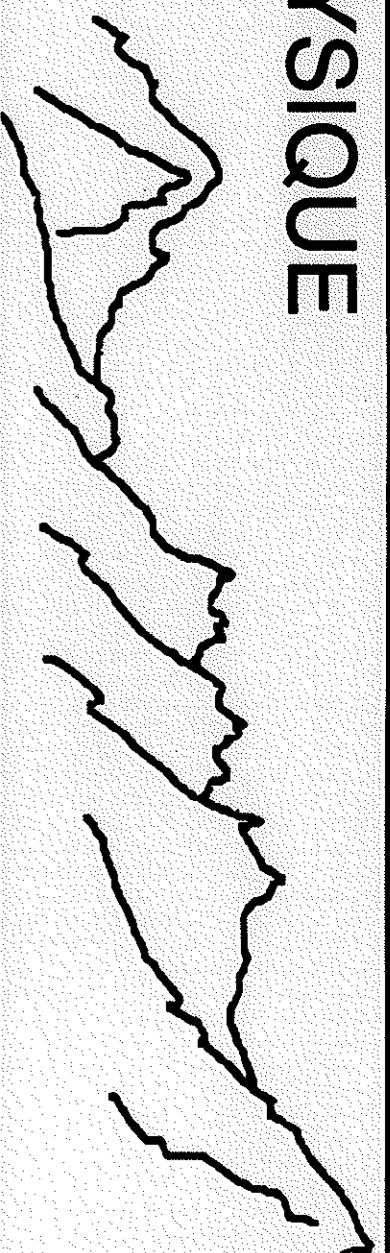
Director: Michèle LEDUC, Tel.: 33 1 44 32 20 23 or 33 4 50 54 40 69

Fax: 33 4 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHEs

74310 LES HOUCHEs  
France



NATO ADVANCED STUDY INSTITUTE

## OCEAN MODELING AND PARAMETERIZATION

January 20 - 30, 1998

### Objectives

- to survey the state of the art in ocean modeling
- to summarize our present knowledge of the processes that require parameterization in ocean models
- to discuss the choices made to parameterize the above processes and their impact on climate modeling

### Scientific Direction

E. P. Chassignet, U. Miami, USA (echassignet@rsmas.miami.edu)  
J. Verron, LEGI, Grenoble, France (verron@hmg.inpg.fr)

### Invited Speakers

J. McWilliams (UCLA, USA), B. Barnier (LEGI, France), J. Toole (WHOI, USA),  
J. Sommeria (ENS Lyon, France), W. Large (NCAR, USA), R. Schmitt (WHOI, USA), J. Price (WHOI, USA),  
U. Send (IfM Kiel, Germany), J. Marshall (MIT, USA), T. Fichefet (U. Louvain, Belgium),  
O. Métais (LEGI, France), T. McDougall (CSIRO, Australia), P. Killworth (Southampton Oc. Ctr., UK),  
K. Richards (U. Southampton, UK), A. Alvarez (U. Palma, Spain), B. L. Hua (IFREMER, France),  
R. Bleck (U. Miami, USA), C. Böning (AWI, Germany), J. Willebrand (IfM Kiel, Germany),  
A. Beckman (AWI, Germany), A. Griffa (CNR La Spezia, Italy), G. Evensen (NERSC, Norway),  
E. Deleersnijder (U. Louvain, Belgium)

### Participants

We encourage the participation of graduate students, post-docs and young researchers. The number of participants will be limited to 50. Completed applications (letter of intent, resume including email address, and two recommendation letters) **must** be received before **November 10, 1997** at LEGI, BP 53, 38041 Grenoble Cedex 9, France (Attn. Ms J. Fagot). Accommodation and meals will be provided to all accepted participants. Some travel funds may be available. For further information: <http://mpo.rsmas.miami.edu/leshouches>.

### Publication

The lectures and conferences will be published in a NATO/ASI series book in 1998.

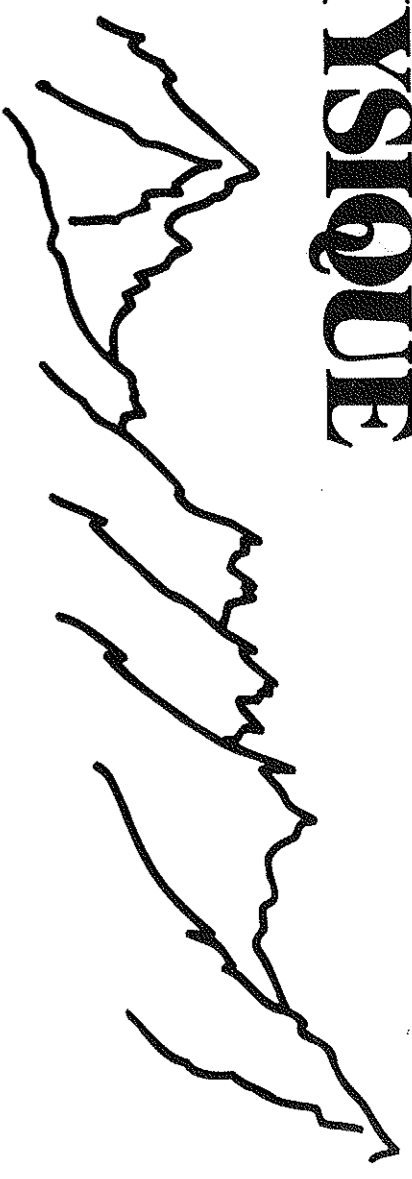
*Les Houches is a resort village in the Chamonix valley of the French Alps. Established in 1951, the Centre de Physique des Houches is located in a group of chalets surrounded by meadows and woods, at an altitude of 1150 m facing the Mont-Blanc range - a very favorable environment for intellectual activity in ideal surroundings for hiking, mountaineering and sightseeing. The Centre is affiliated with the Université Joseph Fourier, and the Institut National Polytechnique in Grenoble, and is supported by the MENESR, the CNRS and the CEA. This session is supported by NATO, EC (TMR Programme), NSF, SHOM and CNES.*

Centre de Physique des Houches, Côte des Chavants, 74310 Les Houches, France  
Director: M. Leduc

Tel: (33) 4 50 54 40 69 or (33) 1 44 32 20 23  
Fax: (33) 4 50 55 53 25  
Web: <http://ujf-ijf-grenoble.fr/HOUCHES/index-en.html>



# CENTRE DE PHYSIQUE DES HOUCHES



74310LES HOUCHES  
France

## "SOLID INTERSTELLAR MATTER: THE ISO REVOLUTION"

**2 - 6 February 1998**

### Organizers

Louis d'HENDECOURT, (Institut d'Astrophysique Spatiale, France) ldh@ias.fr,  
Christine JOBLIN, (Centre d'Etude Spatiale des Rayonnements, France) joblin@cesr.fr,  
Anthony JONES, (Institut d'Astrophysique Spatiale, France) ant@ias.fr

### School Goals

The Infrared Space Observatory (ISO), an ESA mission, is a great success for European technology and Science. It has opened a new spectroscopic window on the Universe by allowing observations from 2.5 to 180 microns. This spectral range is well adapted to the study of solid state interstellar matter. ISO is about to radically change our knowledge of the physico-chemical properties of interstellar matter. In parallel with ISO, laboratory experiments have been specifically developed to simulate various aspects of interstellar physics and chemistry as well as to interpret ISO results. The goal of the school is to stimulate collaborations between scientists who are active in experimental astrochemistry and/or involved in ISO observing programs, and those who are working in the modelling of these data. The aims of this school are therefore to promote discussion and to open the field to young scientists and graduate students.

### Lectures and Speakers

- Theme 1 : General observations of Dust in the Diffuse and Dense Media. The ISO revelations.
  - Theme 2 : Carbon in Dust.
  - Theme 3 : The Cold Dust : Ices and Silicates.
  - Theme 4 : Dust Processing : Nucleation and Destruction Sites.
  - Theme 5 : Related and Follow-Up Observations.
  - "Table Ronde" Discussion : Future Developments in Astrochemistry.
- Two hour round table with short overviews (10 min.) followed by a general debate.

**The full program and a list of speakers can be found on the web site: [http://www.ias.fr/les\\_houches/a\\_hou.html](http://www.ias.fr/les_houches/a_hou.html).**

### Registration

**The deadline for registration is 1st January 1998.**

Due to limited places at the Center, the number of participants is restricted to about 70 including the speakers. **Individuals interested in attending the school must submit a brief letter detailing their research interest, by email to :**

**[ant@ias.fr](mailto:ant@ias.fr) or [joblin@cesr.fr](mailto:joblin@cesr.fr).**

Upon acceptance a registration form will be sent shortly after the deadline. We strongly encourage all participants to present a poster at this school. If you wish to do so, please submit a title and an abstract along with your letter detailing research interests. The total cost for complete session, including a copy of the proceedings, and full board accommodation is FF 2 600. A few grants are available, for PhD students, post-docs, and young researchers.

### Sponsors

The School is sponsored by the Centre National de la Recherche Scientifique (CNRS), Institut d'Astrophysique Spatiale (IAS), Centre d'Etude Spatiale des Rayonnements (CESR), the Ministère des Affaires Étrangères, the DGA, Aérospatiale and the Space Research Organisation of the Netherlands (SRON).

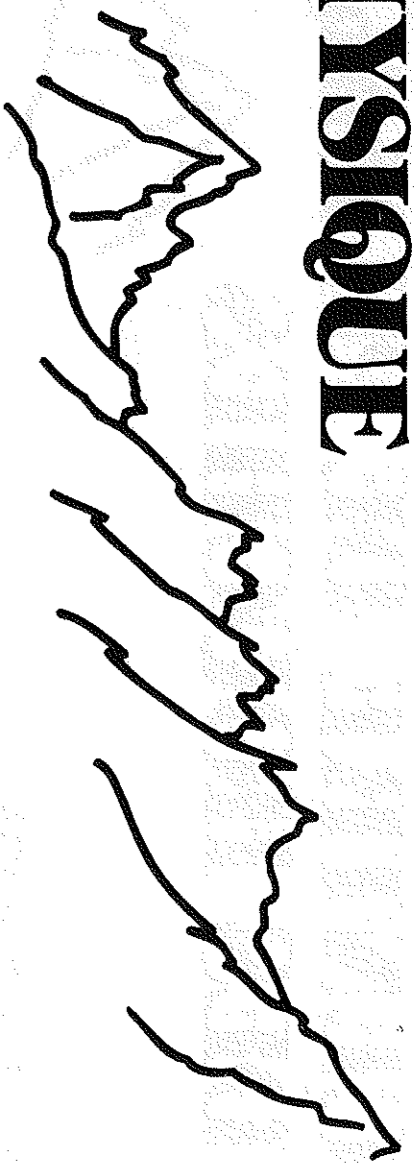
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*Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches.  
Director: Michèle LEDUC, Phone: (33) 1 44 32 20 23 or (33) 4 50 54 40 69*

*Fax: (33) 4 50 55 53 25*



# CENTRE DE PHYSIQUE DES HOUCHES



74310LES HOUCHES  
France

## ORDER, CHANCE AND RISK

**Aperiodic Phenomena : from Solid State to Finance**

**February 23 - March 6, 1998**

### Organizers

Françoise AXEL (Orsay), Jean-Pierre GAZEAU (Paris)

### Scientific Committee

Françoise AXEL (Orsay), Michel DEKKING (T.U. Delft), Jean-Pierre GAZEAU (Paris), Ted JANSSEN (Nijmegen), Peter KRAMER (Tübingen), Jiri PATERA (Montreal), Christian WALTER (Credit Lyonnais, Paris), Daniel ZAIDENWEBER (Nanterre).

Recent studies of aperiodic phenomena in Condensed Matter Physics have shown that certain mathematical structures come in naturally for the analysis and interpretation of experimental data. It so happens that these very same mathematical objects underlie in a very adequate fashion the most recent and efficient descriptions of various events in economics, finance and banking. This is why, around its mathematical kernel, this School has two facets, one in the physics of solid aperiodic media, the other in finance and economics.

The Condensed Matter Physics part presents studies on aperiodic solids having long range order -"Quasicrystals and beyond"- from the point of view of their relationships with glasses. This point of view organizes the presentation of theoretical as well as experimental courses.

The goal of the Economics and Finance part is to study the relevance of aperiodic phenomena to the description of the statistical modelling of prize variation and its practical consequences with the most recent and efficient techniques.

This School hopes to bring together several scientific communities, mathematicians, theoretical and condensed matter physicists, together with finance managers and market operators, with emphasis on realistic applications. Glossaries of specialized terminology will be available to the participants.

### Topics of the Courses

- Structure and electronic properties of aperiodic solids, experimental results and their analysis.
- Quasicrystals and glasses : structure, dynamics, transport, fractal and random tiling models, symmetries.
- Dynamical systems, deterministic chaos and their applications.
- Fractals, geometric measure theory, multifractals, wavelets and their applications.
- Probabilistic theory and stochastic processes: stable distributions, infinite memory and novel constructions.
- Risks in economics as relevant to insurance companies and financial markets, their evaluation and management: importance of rare events and long term dependance.
- Market microstructures.
- Market efficiency, market crisis and consequences for portfolio and option management.

### Invited speakers (Preliminary)

F. AXEL (Orsay), R. BALIAN (SPT, CEN-Saclay), C. BERGER (Grenoble), J.P. BOUCHAUD (Saclay), E. COCKAYNE (Yale), R. COIFMAN (Yale), E. COURTEENS (Montpellier), M. DACOROGNA (Olsen Associates, Zürich), M. DEKKING (Delft), F. DENOYER (Orsay), N. EL KAROUI (Palaiseau), C. EVERTSZ (CeVis, Bremen), F. FAMILY (Atlanta), J.P. GAZEAU (Paris), T. JANSSEN (Nijmegen), P. JONES (Yale), P. KRAMER (Tübingen), J.M. LASRY (Banque Paris-Bas, Paris), B.B. MANDELBROT (Yale), Y. MEYER (E.N.S. Cachan), R. MOODY (Edmonton), J. PATERA (Montreal), J. PEYRIERE (Orsay), N. RIVIER (Strasbourg), M. SHLESINGER (ONR, Arlington), C. WALTER (Credit Lyonnais, Paris), G. ZASLAVSKY (Courant Institute), D. ZAIDENWEBER (Nanterre)

The number of participants is limited to 70. The fee is 2600 FF per participant per week which includes food and lodging at the Centre and the volume of Proceedings. Applications including a brief C.V. should be sent before January 10, 1998 to Mrs Françoise KAKOU (Secretary of the Winter School), Laboratoire de Physique des Solides, Bâtiment 510, Université Paris-Sud, 91405 Orsay France (Fax 33-1 69 15 59 78, Phone 33-1 69 15 69 44).

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# CENTRE DE PHYSIQUE DES HOUCHES



74310LES-HOUCHES  
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## DIFFUSE WAVES IN COMPLEX MEDIA March 17-27, 1998

NATO Advanced Study Institute

Wave propagation in random media is being investigated in different fields such as applied mathematics, acoustics, optics, atomic physics, geophysics or medical sciences. New developments and concepts such as speckle correlations, weak and strong localization, time reversal, and near-field propagation are under active research. It has now become necessary to gather the different communities in a tutorial form. This School will be the first to bring together worldwide specialists who can illuminate various aspects of wave propagation in random media.

### Scientific Direction

Dir. **J.P. FOUQUE** (Palaiseau, France), **A. LAGENDIJK** (Amsterdam, The Netherlands),  
**R. MAYNARD** (Grenoble, France), **G. PAPANICOLAOU** (Stanford, USA).

### Local Organizing Committee

**J.P. MONTAGNER** (Paris, France), **C. PRADA** (Paris, France), **Ch. VANNESTE** (Nice, France),  
**B. VAN TIGELEN** (Grenoble, France)

Radiative transfer/Multiple scattering in seismology: **K. AKI** (Los Angeles, USA) / **M. CAMPILLO** (Grenoble, FR)  
Random matrix theory: **C. BEENAKKER** (Leiden, NL)  
Scattering from surfaces: **M. NIETO-VESPERINAS** (Madrid, SP)  
Time reversed acoustics: **M. FINK** (Paris, FR)  
Wave propagation in randomly layered media: **J.P. FOUQUE** (Palaiseau, FR)  
Radiative transfer in oceans and atmosphere: **J.W. HOVENIER** (Amsterdam, NL)  
Laser action in random media: **A. LAGENDIJK** (Amsterdam, NL)  
Polaritons in disordered atomic media: **R. LOUDON** (Colchester, UK)  
Microscopic theory of multiple scattering in random media: **R. MAYNARD** (Grenoble, FR)  
Statistical optics; speckle correlations: **G. MARET** (Konstanz, GER)  
Limit theorems for waves in random media: **G. PAPANICOLAOU** (Stanford, USA)  
Time-reversed imaging: chaotic behavior of waves and particles: **R.K. SNIEDER** (Utrecht, NL)  
Photonic band gaps: **C.M. SOUKOULIS** (Ames, USA)  
Optical imaging in scattering media: **A.G. YODH** (Philadelphia, USA).

A few additional seminars will be given by invited speakers: among them **R. KAISER** (Nice, FR), **J. LACROIX** (Paris, FR) and **B. VAN TIGELEN** (Grenoble, FR) will lecture on Cold atoms and multiple scattering, Localization, and Microscopic theory of multiple scattering in random media.

Registration forms can be obtained at:

or by contacting:

<http://www.poan.polytechnique.fr/Houches/houches.html>  
Lina Jegam, LOA, ESPCI, 10 rue Vauquelin, 75231 Paris cedex 05, France  
Tel: (33) 1 40 79 44 94 - Fax: (33) 1 40 79 44 68  
E-mail: [houches@loa.espci.fr](mailto:houches@loa.espci.fr)

Registration forms are due to arrive at this address before **November 15th, 1997**.

The number of participants is limited to 60. **Grants** will be attributed to selected participants. Most of travel expenses and local expenses (FF 4642 for 11 days) should be covered by these grants.

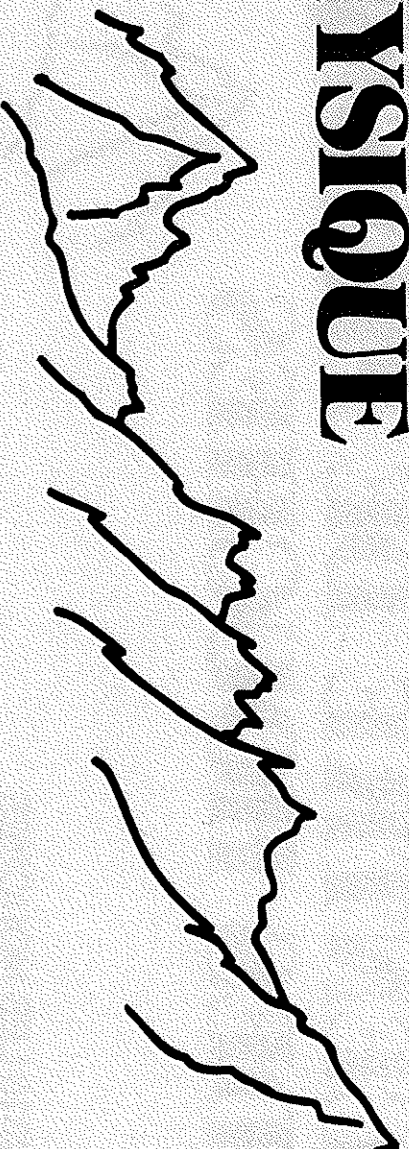
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Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches, France.  
Director: **Michèle LEDUC**, Tel.: (33) 4 50 54 40 69 - Fax: (33) 4 50 55 53 25

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# CENTRE DE PHYSIQUE DES HOUCHEES



74310 LEHOUCHES

France

## "NUCLEAR MATTER IN DIFFERENT PHASES AND TRANSITIONS"

**March 31 - April 10, 1998**

The aim of the workshop is to bring together theorists and experimentalists studying the properties of the hadronic matter produced in heavy-ion collisions in various energy regimes. The discussion will focus on the **experimental signals** which could reveal the expected phase changes of matter (e.g. liquid - gas transition, multifragmentation, quark - gluon plasma formation) as a function of density and excitation energy. We plan to include a discussion of phase transitions in other small quantum systems, such as metallic clusters, or atomic Bose-Einstein condensates.

### Organizing Committee

J.-P. BLAIZOT (Saclay), X. CAMPI (Orsay), et M. PLOSZAJCZAK (GANIL - Caen).

### Among the Contributors

J. AICHELIN, G. BAYM, F. BECATTINI, A. BIALAS, A. BONASERA, R. BOTET, P. BRAUN-MUNZINGER,  
E.B. CAMPBELL, Y. CASTIN, Ph. CHOMAZ, P. DANIELEWICZ, A. DREES, D. DURAND, H. FELDMEIER,  
C. GERSCHEL, N.K. GLENDENNING, D.H. GROSS, M. GUYLASSY, A. HÜLLER, R.C. HWA, F. KARSCH,  
U. LYNNEN, L.G. MORETTO, J.B. NATOWITZ, E. PLAGNOL, J. RANDRUP, V. RUUSKANEN, H. SATZ, P. SCHUCK,  
Y. SCHUTZ, E.V. SHURYAK, J. STACHEL, J. WAMBACH, K. WERNER.

### Inscriptions

Participation is by invitation. The number of participants is limited to 60.

Room and Board is provided by the Center (FF 4 642 for 11 days, FF 2 321 for CEA affiliates) for all participants. The School will provide a few grants, which may cover part of the living expenses and eventually travel expenses. Applications for grants must reach the admission committee before **February 15th, 1998**.

The final decisions (depending on the session funding) will be made at the beginning of the session.

For more information contact:

**M. PLOSZAJCZAK, Grand Accélérateur National d'Ions Lourds (GANIL), BP 5027, F-14076 Caen Cedex 5**  
Fax: (33) 2 31 45 46 65 - email: [houch98@ganil.fr](mailto:houch98@ganil.fr).

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Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches.

Director: Michele LEDUC, Tel.: (33) 4 50 54 40 69

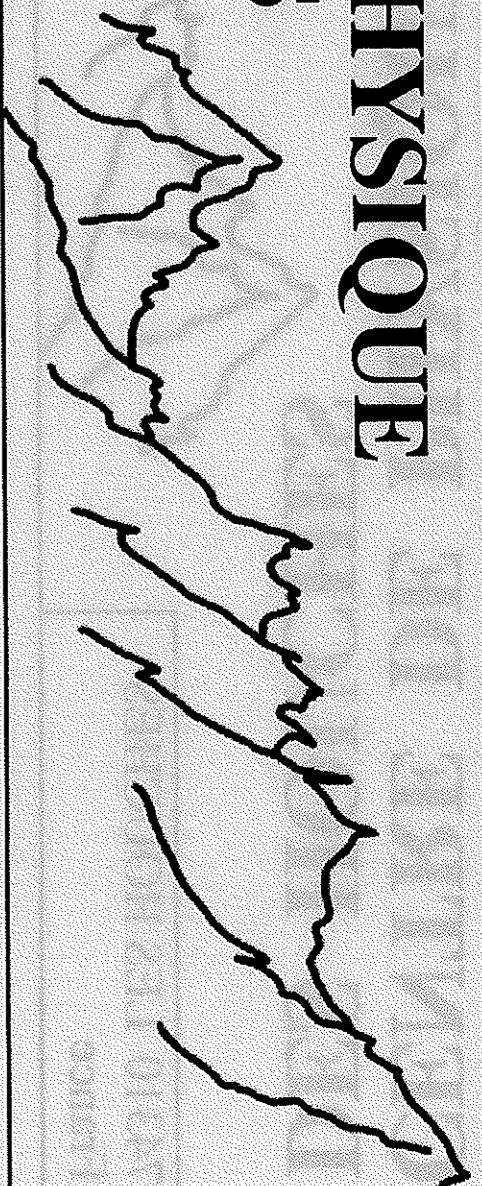
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# CENTRE DE PHYSIQUE DES HOUCHES

74310 LES HOUCHES  
France



## INNOVATIVE OPTIONS IN THE FIELD OF NUCLEAR FISSION ENERGY

April 27 - May 1<sup>st</sup>, 1998

The purpose of this school is to bring scientists from various background together in order to have an in-depth look at the use of accelerator driven sub-critical systems and thorium in the field of nuclear fission energy. Emphasis will be put on waste issues, and economic and socio-political aspects of such new options will be covered.

### Scientific Committee :

**Paul BONCHE**  
**Dominique FINON**  
**Jean-Paul SCHAPIRA**

**CEA-SPHT, Saclay**  
**CNRS-IEPE, Grenoble**  
**CNRS-IN2P3-IPN, Orsay**

### List of Speakers:

**Günter S. Bauer**  
**Frank Carré**  
**Paul Caseau**  
**Patrick Criqui**  
**Jean-Marie de Conto**  
**Sylvie Faucheu**  
**Dominique Finon**  
**Sylvie Leray**  
**Jacques Lochar**  
**Joseph Magill**  
**Thomas H. Pigford**  
**Carlo Rubbia**  
**Massimo Salvatores**  
**William Walker**

**Paul Scherrer Institut, Villigen**  
**CEA-DSE, Paris**  
**EDF-Direction Générale, Paris**  
**CNRS-IEPE, Grenoble**  
**CNRS-IN2P3-IPN, Grenoble**  
**Centre 3ED-Université de St Quentin en Yvelines**  
**CNRS-IEPE, Grenoble**  
**CEA-SPHN, Saclay**  
**CEPN, Fontenay aux Roses**  
**ITU, Joint Research Centre, Karlsruhe**  
**University of California, Berkeley**  
**CERN-EET, Genève**  
**CEA-DRN, Cadarache**  
**University of St Andrews, St Andrews**

**General information :** Françoise Samaran - IPN - F-91406 Orsay - France  
e-mail : samaran@ipno.in2p3.fr - Tel. : +33 1 69 15 77 49 - Fax : +33 1 69 15 64 70

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**Fees : 2 200 F**

**Specific grants : Commissariat à l'Énergie Atomique (CEA-DRN), Centre National de la Recherche Scientifique (CNRS-Formation Permanente, CNRS-IN2P3), Conseil Régional Rhône-Alpes, Électricité de France (EDF), the European Community**

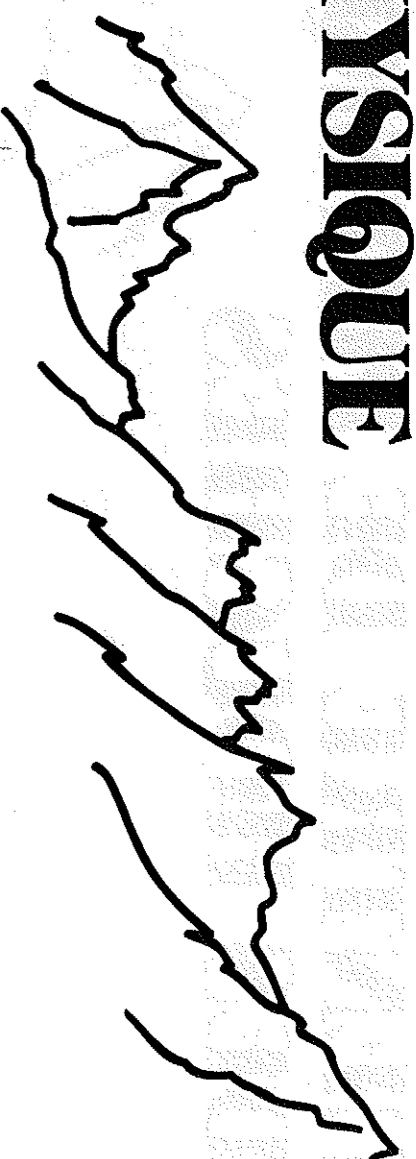
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Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches  
Directeur : Michèle Leduc

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# CENTRE DE PHYSIQUE DES HOUCHEES



74310LES HOUCHEES  
France

NATO ADVANCED STUDY INSTITUTE

CNRS, CEA, Formation Permanente du CNRS

## HYDRATION PROCESSES IN BIOLOGY : THEORETICAL AND EXPERIMENTAL APPROACHES

**May 5 - 15 1998**

### Organizer

M.-C. BELLISSENT-FUNEL (LLB, CEA/Saclay, France)

### Scientific Committee

M.-C. BELLISSENT-FUNEL (LLB, CEA/Saclay, France)

C.A. ANGELL (Arizona State University, Tempe, USA)

N.A. DENCHER (Institut für Biochemie, Darmstadt, RFA)

J. DURUP (Université Paul Sabatier and CNRS-Toulouse, France)

The interaction of water at organic surfaces or interfaces is of fundamental and technological interest and importance in chemistry, physics and biology. Progress towards an indepth, molecular interpretation of the structure and dynamics of interfacial water needs a range of novel experimental & simulations techniques. We are now reaching the stage at which we understand, at the molecular level, the mutual perturbation at a macromolecule/water interface. The aims of this Advanced Study Institute are to provide both new and established researchers from physics, chemistry and biology with a comprehensive background of the properties of bulk water at the microscopic level and with a substantial account of the theoretical and experimental contributions which have been done to understand the role of water in various systems from some model systems to the more complex ones such as the biological systems.

### Invited lecturers

C.A. ANGELL (USA), G. CARERI (Italy), S.H. CHEN (USA), N.A. DENCHER (RFA), W. DOSTER (RFA),

J. DURUP (France), J.L. FINNEY (GB), B. HALLE (Sweden), J. JANIN (France), M. KLEIN (USA), V. LOUNNAS (RFA),

H.E. STANLEY (USA), J. TEIXEIRA (France), S. WODAK (Belgium), K. WÜTHRICH (Switzerland).

Attendance will be limited to a maximum of 60 participants who will be selected on the basis of their qualification and their potential contribution to the meeting. Participants will be requested to pay a fee of 4 642 FF which includes boards, lodging at the Center during the School, and the proceedings. A limited number of grants will be available to subsidise participants who are unable to obtain full support from other sources. The scientific qualification of students requesting grants should be certified by the Head of the applicant's institution or by at least one well known scientist recognized by the Scientific Committee.

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To apply send a C.V. and description of research interest, before february 28, 1998 to

Dr. M.-C. BELLIS SENT-FUNEL, Laboratoire Léon Brillouin,

CEA-SACLAY, 91191 Gif-sur-Yvette Cedex, France

Fax : 33 1 69 33 14 87

E-Mail : mcbel@bail.saclay.cea.fr

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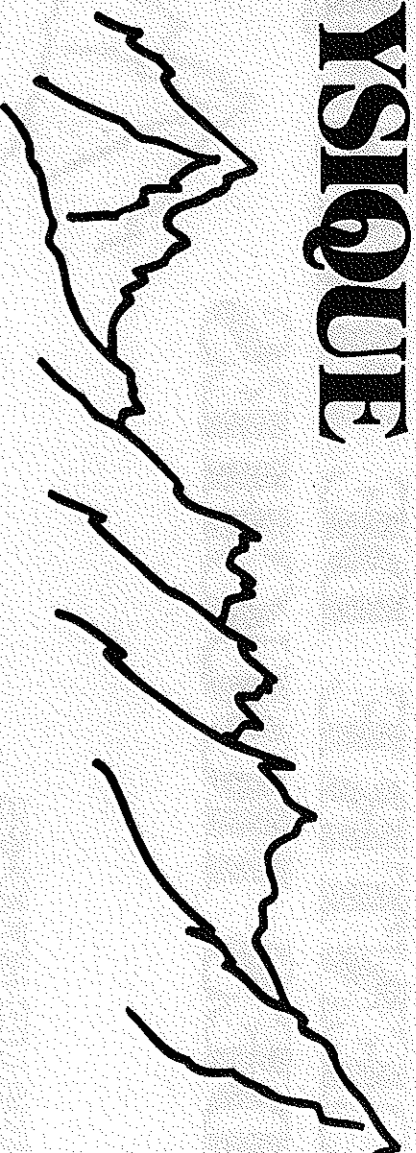
Centre de Physique des Houches, Côte de Chavants, F-74310 Les Houches.

Director : Michèle Leduc Tel. : (33) 1 44 32 20 23 or (33) 4 50 54 40 69

Fax : (33) 4 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHEs



74310 LES HOUCHEs  
France

## SELF-ORGANIZATION IN BIOLOGICAL SYSTEMS

**May 25-29, 1998**

Examples of *self-organization* occur everywhere in nature. Experimental observations show that systems exhibiting self-organizing behavior attain their structures or functions without any help from the "outside", and under certain conditions, their constituent and interacting subunits appear to work in cooperative or coherent fashion. Biological systems provide some of the most beautiful and most intriguing examples of self-organization, but, due to the complexity inherent in these systems, much remains to be understood. It has become apparent that an interdisciplinary approach, combining experimental and theoretical techniques with numerical simulation, is essential for studying the mechanism accompanying the emergence of self-organization in biological systems. The aim of the Les Houches School is to provide an overview of these phenomena in biological systems and the ways in which they are beginning to be explained.

### Themes

**Introduction to Self-Organizing Processes, Cytoskeleton and  
Extracellular Dynamics, Protein and Nucleic Acid Folding**

### Invited Speakers

J.L. DENEUBOURG (Brussels), W. EATON (Bethesda), H. HAKEN (Stuttgart), M. KARPLUS (Strasbourg),  
S. LEIBLER (Princeton), H. ORLAND (Saclay), K. SCHULTEN (Urbana), P.F. STADLER (Vienna),  
J. TABONY (Grenoble), R. THOM (Bures-sur-Yvette), M. VAN DER REST (Grenoble),  
D. WADE (Grenoble), P. WOLYNES (Urbana).

### Organizing Committee

D.J. BICOUT (IBS, Grenoble & NIH, Bethesda), M.J. FIELD (IBS, Grenoble), A. SZABO (NIH, Bethesda)

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The fee of 2200 FF includes board, lodging at the center during the workshop, and a copy of the proceedings. Attendance, including speakers, is limited to 65 participants.

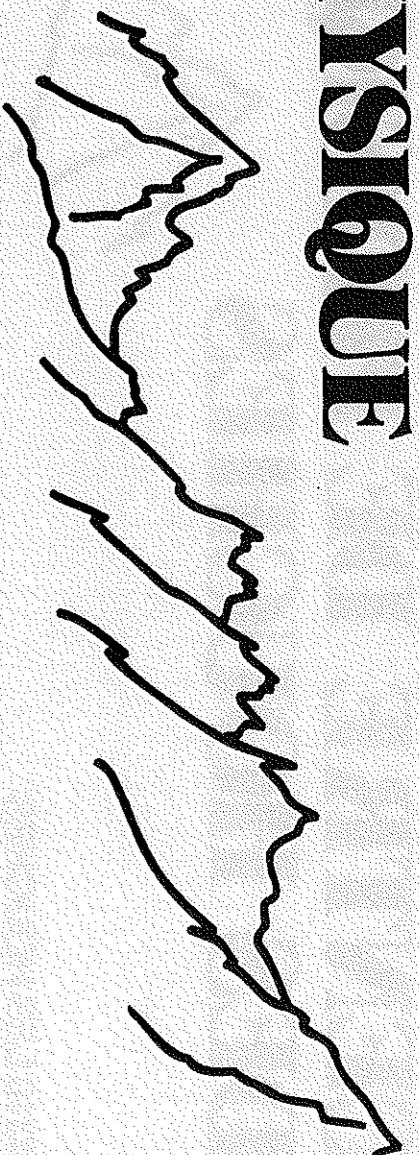
Applications, including a brief C.V. and recent publications, should be sent before May 1<sup>st</sup>, 1998 to:  
Mme E. LABOPIE, Institut de Biologie Structurale J.-P. Ebel, 41, avenue des Martyrs, F - 38027 Grenoble Cedex 1 - France.  
Tel. (33) 4 76 88 59 18 - Fax : (33) 4 76 88 51 22 - email : [elysne@iccp.ibs.fr](mailto:elysne@iccp.ibs.fr) or visit the site : <http://w3houches.ujf-grenoble.fr>

For information on the other meetings to be held in the Centre de Physique, please contact :  
the Director Michèle Leduc, Centre de Physique des Houches, Côte de Chavants, F-74310 Les Houches - France.  
Tel. : (33) 4 50 54 40 69 or (33) 1 44 32 20 23 - Fax : (33) 4 50 55 53 25.

*The Physics School in Les Houches is affiliated to Université Joseph Fourier and l'Institut National Polytechnique in Grenoble. It is subsidized by the MENESR, and CNRS and Commissariat à l'Énergie Atomique.*



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES  
France

NATO ADVANCED STUDY INSTITUTE

## QUANTUM FIELD THEORY PERSPECTIVE AND PROSPECTIVE

**16 Juin - 26 Juin 1998**

En remerciement à Roger BALIAN, Raymond STORA et Jean ZINN-JUSTIN,  
Directeurs de l'Ecole d'Eté des Houches (1972-1995)

### Organisateurs

Cécile DEWITT-MORETTE (Austin), Jean-Bernard ZUBER (Saclay)

Des progrès remarquables ont été effectués ces trois dernières années en physique théorique, mettant en évidence la convergence de thèmes différents dans le cadre de la théorie des champs: dualité électrique-magnétique, supergravité et ses symétries, aspects non perturbatifs des théories de jauge et théories de cordes. Par ailleurs la théorie quantique des champs continue d'irriguer en concepts et en méthodes d'autres domaines scientifiques, de la physique de la matière condensée aux mathématiques. Nous organisons pour un public de jeunes chercheurs une session interdisciplinaire en vue de présenter les idées neuves les plus intéressantes et les plus prometteuses.

### Programme Scientifique (Préliminaire)

- R. BALIAN (Saclay): Correlation functions through variational methods
  - A. CONNES (IHES and Collège de France): Non commutative geometry and Hopf algebras
  - L. DOLAN (Chapel Hill): Non perturbative symmetries in gauge and string theories
  - M. DUFF (Texas A&M): The world in eleven dimensions
  - L. FADDEEV (St Petersburg): Instructive history of the quantum scattering method
  - J. FRÖHLICH (Zurich): Strings and Gravitation
  - B. NIENHUIS (Amsterdam): Statistical lattice or lattice-like models
  - S. Y. PI (Boston): Dimensional reduction of the Chern-Simons term
  - K. STELLE (Imperial College): Super p-branes
  - R. STORA (LAPP Anecy): Differential algebras in field theory
  - A. ZEE (Santa Barbara): Random matrix theory
- Des conférences et séminaires supplémentaires seront donnés par T. BANKS, R. BOTT, E. BRÉZIN, C. CALLAN et J. ZINN-JUSTIN.

### Participants

Nous encourageons les étudiants en thèse, post-docs et jeunes chercheurs à participer à cette session. Le nombre de participants est limité à 70.

Les formulaires de candidature peuvent être demandés à C. DEWITT-MORETTE, Dept of Physics, U. of Texas, Austin TX 78712, USA (cdewitt@physics.utexas.edu, fax: 1 512 471 0890). Ils doivent lui être retournés avant le 1er Avril 1998; une réponse sera donnée vers le 20 Avril. Les candidats juniors doivent faire adresser deux lettres de recommandation à C. DEWITT-MORETTE avant le 1er Avril.

Les frais de séjour en pension complète pour la durée de la session s'élève à 4642 FF par participant. Quelques bourses de voyage pourraient être disponibles.

### Publication

Le texte des conférences sera publié dans un ouvrage de la série NATO/ASI.

La station du village des Houches (altitude 1150 m) se trouve au centre des Alpes, dans la vallée de Chammonix. Fondée en 1951, l'Ecole de Physique des Houches est située dans un groupe de chalets entourés de prairies et de bois. C'est un lieu idéal pour le travail intellectuel et les sports de montagne. Le Centre de Physique est affilié à l'Université Joseph Fourier et à l'Institut National Polytechnique de Grenoble. Il est subventionné par le MENERS, le CNRS et le Commissariat à l'Energie Atomique. La présente session bénéficie du soutien de l'OTAN et de la Formation Permanente du CNRS.

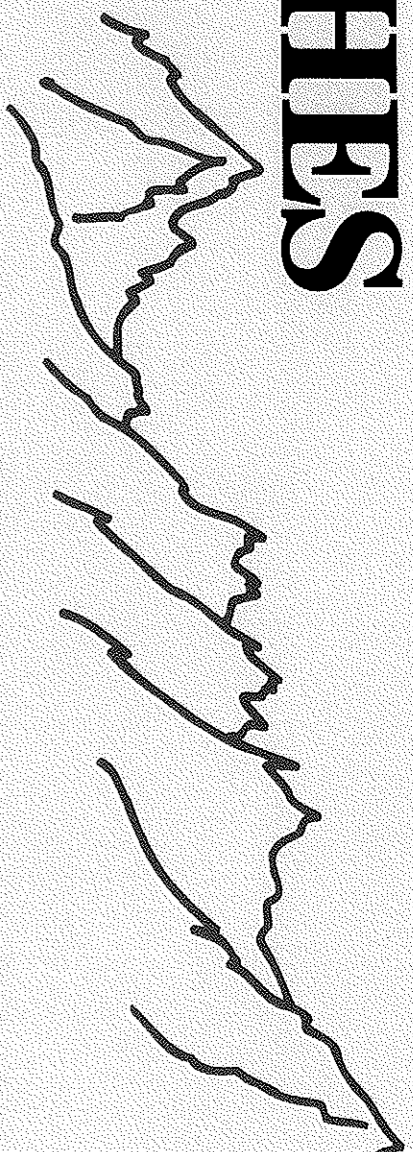
Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches.

Directeur: Michèle LEDUC, Tél.: (33) 01 44 32 20 23 ou (33) 04 50 54 40 69

Fax: (33) 04 50 55 53 25



# LES HOUCHEs



SESSION LXIX  
NATO ADVANCED STUDY INSTITUTE  
July 7 - 31, 1998

école d'été de physique théorique

## "TOPOLOGICAL ASPECTS OF LOW DIMENSIONAL SYSTEMS" "ASPECTS TOPOLOGIQUES DE LA PHYSIQUE DE BASSE DIMENSION"

Scientific Direction:

**Alain COMTET** (DPT-IPN, Orsay, France),  
**Thierry JOLICOEUR** (SPHT, CEA Saclay, France),  
**Stéphane OUVRY** (DPT-IPN, Orsay, France).

Introduction of Topological Numbers : **D.J. THOULESS** (U. Washington, Seattle, USA)  
The Quantum Hall Effect : **S.M. GIRVIN** (U. Bloomington, Bloomington, USA)  
Experimental Aspects of the Quantum Hall Effect and Related Phenomena : **M. SHAYEGAN** (U. Princeton, Princeton, USA)  
Edge States : **M.P.A. FISHER** (ITP, UCSB, Santa Barbara, USA)  
Exact Correlations and Transport Properties in Quantum Impurity : **H. SALEUR** (USC, Los Angeles, California, USA),  
Anyons : **J. MYRHEIM** (U. Trondheim, Trondheim, Norway),  
Intermediate Statistics in  $d=1$  : **A. POLYCHRONAKOS** (U. Uppsala, Uppsala, Sweden),  
Aspects of Chern-Simons Theory : **G. DUNNE** (U. Connecticut, Storrs, USA),  
Topological Statistical Mechanics of Polymers : **B. DUPLANTIER** (CEA-Saclay, France),  
Statistics of Knots and entangled Random Walks : **S. NECHAEV** (Landau Institute, Moscow, Russia).

A few additional lectures or seminars will be given, either by invited speakers or by school attendants.

The purpose of the school is to introduce young scientists to the study of quantum systems in low dimensions. In the past years, this field has been the subject of numerous theoretical and experimental works. Among the most notorious, let us mention, in condensed matter, the integer and fractional quantum Hall effects, quantum spin chains, polymers, mesoscopic systems in low dimensions. These topics require a wide range of modern theoretical methods, such as field theory, statistical mechanics, and topology. The quantum Hall effect will be a central topic; related subjects such as anyons, one dimensional statistics, statistical mechanics of polymers, etc... will also be discussed.

The school will be open to advanced graduate students and young researchers. Attendance is limited to 50 students.

*Les Houches is a resort village in the Chamonix valley of the french Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at an altitude of 1 150 m. It is above the village, facing the Mont-Blanc range. It is ideal for mountaineering, hiking or touring as well as for more intellectual work. Accommodation and meals are provided within the School for both participants and lecturers. A financial contribution of 4600 FF is required from each participant. It covers full lodging and meals at the School. The School will provide a few grants, which may cover part or all the living expenses and eventually travel expenses. Applications for grants must be sent in advance to the School. The final decisions (depending of course on the session funding) will be made at the beginning of the session. The participants will get a free Lecture Notes Book. Participants who intend to rent lodging should inquire directly at : Office du Tourisme, F-74310 Les Houches (tel. +33-4-50 55 50 62). The School is affiliated to the University Joseph Fourier and Institut National Polytechnique de Grenoble. It is subsidized by the MENESR, CNRS and the Commissariat à l'Energie Atomique.*

Admission forms and additional information are available from:

**ECOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE - F - 74310 LES HOUCHEs**  
**PHONE: +33-4-50 54 40 69 - FAX: +33-4-50 55 53 25**  
**E-MAIL: secretariat.houches@ujf-grenoble.fr W3:http://w3houches.ujf-grenoble.fr**

Please if you asked for admission forms by e-mail, mention your mailing address or fax number.

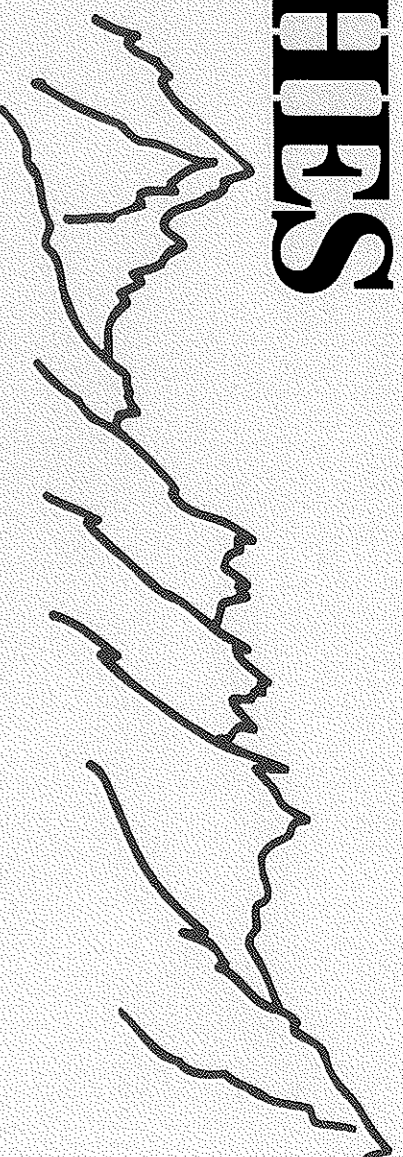
Complete files (admission forms and letters of recommendation) must have reached this address before **March 1, 1998**.

Do not send application forms by e-mail ! In case of emergency, use fax. A selection committee (Scientific Directors of the session and Direction of the School) will select the candidates.

The second 1998 session will be entitled "Infrared Space Astronomy, Today and Tomorrow".  
Two sessions will be held in 1999, one on "The Primordial Universe", and one on "Atomic Matter waves, Coherence and Decoherence".



# LES HOUCHEs



école d'été de physique théorique

**SESSION LXX**  
**NATO ADVANCED STUDY INSTITUTE**  
**August 4 - 28, 1998**

## **"INFRARED SPACE ASTRONOMY, TODAY AND TOMORROW" "ASTRONOMIE SPATIALE INFRAROUGE, AUJOURD'HUI ET DEMAIN"**

Scientific Direction: **Fabienne CASOLI** (Observatoire de Paris, France),  
**James LEQUEUX** (Observatoire de Paris, France).

General presentation of infrared astronomy : **M. HARWIT** (USA)  
The Infrared Space Observatory (ISO) : **M. KESSLER** (ASE, Spain) and **J.L. STARCK** (CEA, France)  
Solar system : **T. ENCRENAZ** (Observatoire de Paris, France)  
Stars and galactic structure : **H. HABING** (Leiden Observatory, The Netherlands)  
Interstellar matter and star formation : **F. BOULANGER** and **P. COX** (IAS, France), **A. NATTA** (Arcetri Observatory, Italy)  
Normal galaxies : **G. HELOU** (IPAC, Cal Tech, USA)  
Active galaxies : **R. GENZEL** (MPE, Germany)  
Cosmology : **J.L. PUGET** (IAS, France)

In addition to these general courses, time will be reserved for practical work on actual data from the Infrared Space Observatory (ISO), using workstations and appropriate softwares. A number of more specific lectures will be given, either by invited speakers or school attendees. In particular, future facilities for infrared and submillimeter astronomy will be presented.

All celestial bodies emit in the infrared, and half of the radiation of galaxies lies in this wavelength range. This domain is crucial for studies of the solar system, of stars at the beginning and the end of their lives, of interstellar matter, of nearby as well as very distant galaxies. Recent developments of observational techniques have been tremendous; one airborne observatory and two satellites, IRAS and ISO, have been dedicated to this domain, and many more are to come.

The purpose of this school is to attract a new community of scientists, from graduate students to senior researchers, to this field of research. They will learn the bases of infrared astronomy, and how to use the archival data of ISO. This will help to prepare themselves for the many future infrared and submillimeter space facilities: ODIN (launched in 1998), SWAS (1998), WIRE (1998), MAP (2000), SOFIA (2001), SIRTf (2001), IRIS (2002), PLANCK/FIRST (2005) etc.

The School will be open to graduate students and researchers. Attendance is limited to 50 students.

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**PHONE: +33-4-50 54 40 69 - FAX: +33-4-50 55 53 25**  
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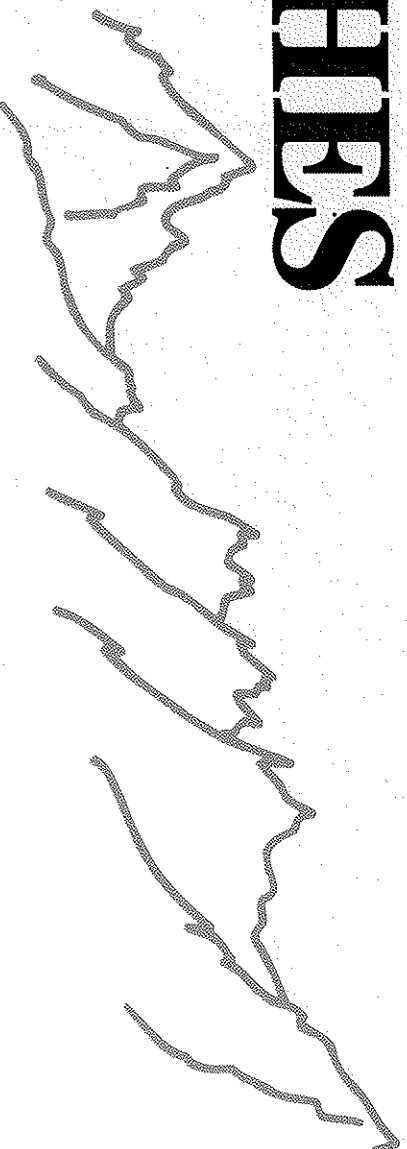
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Do not send application forms by e-mail ! In case of emergency, use fax. A selection committee (Scientific Directors of the session and Direction of the School) will select the candidates.

The first session of 1998 will be entitled "Topological Aspects of Low Dimensional Systems".  
Two sessions will be held in 1999, one on "The Primordial Universe", and one on "Atomic Matter waves, Coherence and Decoherence".



# LES HOUCHES



SESSION XI

31 août - 11 septembre 1998

école pré-doctorale de physique

FÉDÉRATION FRANÇAISE DES MAGISTÈRES DE PHYSIQUE

## LASERS ET OPTIQUE QUANTIQUE: DÉVELOPPEMENTS RÉCENTS

**Lasers et microcavités à semi-conducteurs:** E. ROSENCHER (Corbeville) / J.L. OUDAR (Bagnex)

**Dynamique des lasers:** P. GLORIEUX (Lille)

**Lasers femtoseconde et applications:** A. MIGUS (Palaiseau)

**Refroidissement d'atomes par laser et applications:** C. SALOMON / J. DALIBARD (Paris)

**Fluctuations quantiques et mesures quantiques non destructives en optique:** P. GRANGIER (Orsay)

**Electrodynamique quantique en cavité:** M. BRUNE (Paris)

L'objectif de cette session est de présenter une introduction pédagogique à un certain nombre de domaines de l'optique des lasers, choisis parmi ceux qui ont connu un développement spectaculaire ces dernières années, aussi bien à cause de leurs applications potentielles que de leur intérêt fondamental. Les cours des Écoles pré-doctorales sont approfondis mais de caractère suffisamment général. Ils sont destinés principalement aux jeunes chercheurs venant de terminer un DEA ou un Magistère, à ceux qui sont en cours de Thèse et, plus généralement, aux jeunes chercheurs étrangers dans une situation d'études analogue. Ils doivent permettre de compléter la formation des participants à la fois dans leur domaine de recherche et dans d'autres disciplines à un niveau plus accessible et moins spécialisé que celui des autres Écoles. Un effort pédagogique y est effectué tant pour les cours eux-mêmes que par les échanges entre étudiants et enseignants et par les interactions entre étudiants. En dehors des cours et séminaires effectués par les enseignants, chacun des participants fera un court exposé sur son sujet de recherche ou de stage (DEA, Magistère).

## Candidatures et financement

Cette École est ouverte aux étudiants de toute nationalité. Les candidats doivent envoyer un dossier qui sera examiné par un Comité de Sélection. Ce dossier doit comprendre un curriculum vitae détaillé, une lettre de recommandation et éventuellement une demande de bourse.

Le Comité de Sélection attribuera des bourses couvrant totalité ou partie des frais d'inscription et de séjour lesquels s'établissent à 2 600 FF.

Le dossier d'inscription doit parvenir:

**avant le 14 juin 1998**

à Claude FABRE

Laboratoire Kastler Brossel, Université Pierre et Marie Curie, Case 74, 75252 Paris Cedex 05

Tél.: 01 44 27 73 27 - Fax: 01 44 27 38 45 - Email: fabre@spectro.jussieu.fr

## Comité d'organisation

C. FABRE (Directeur Scientifique de la Session, Paris), C. DELALANDE (Paris)

L'École pré-doctorale des Houches est organisée par la Fédération Française des Magistères de Physique qui regroupe les Magistères de l'Université Joseph Fourier (Grenoble I), de Paris-Sud (Orsay), de l'Université Paris 7, de l'Université Claude Bernard et de l'ENS de Lyon, de l'Université de Rennes, le Magistère Interuniversitaire de Physique (Paris, 6, 7, 11 et 13 et ENS) et le Magistère "Matériaux" (Strasbourg I et Mulhouse).

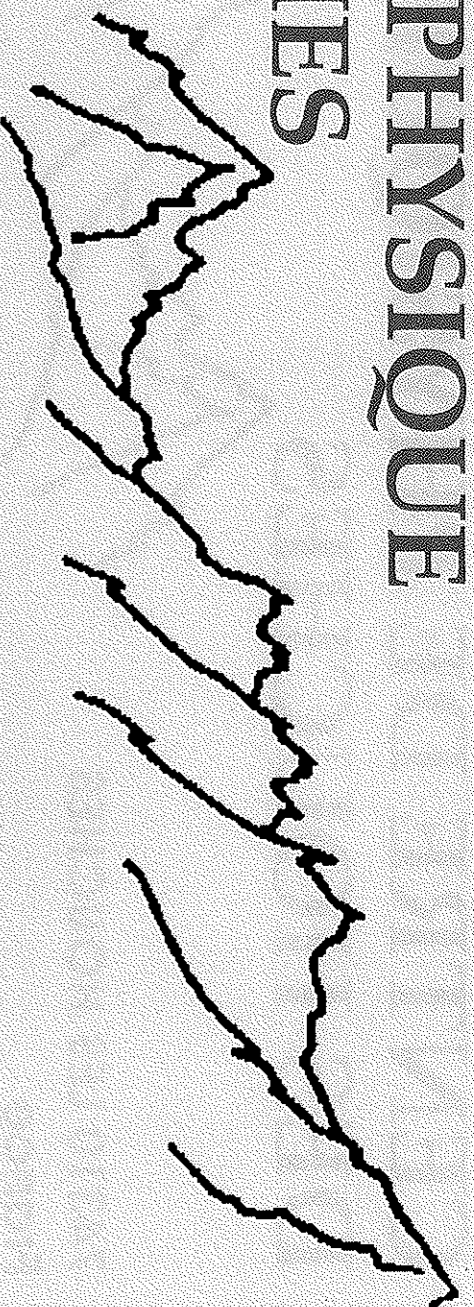
*Les Houches est un village de la vallée de Chamoni, dans les Alpes françaises. L'École a lieu dans un groupe de chalets montagnards entourés de prairies et de bois. Il est situé à une altitude de 1150 m. L'hébergement et les repas sont assurés pour tous les participants. Les étudiants bénéficieront en permanence de salles de réunion et d'une bibliothèque.*

Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches. Tél.: (33) 4 50 54 40 69 - Fax: (33) 4 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHEs

74310 LES HOUCHEs  
France



## SOFT CONDENSED MATTER: WHAT'S NEW AFTER 30 YEARS ?

*International Workshop in honour of Pierre-Gilles De Gennes (Prof. College de France, Dir. ESPCI, Nobel Laureate),  
on the occasion of his 65th birthday.*

**14-18 September 1998**

Our knowledge of soft matter has improved considerably over the last thirty years: polymers, liquid crystals, colloids, lyotropic systems, emulsions etc..., have been very actively investigated, and the time is about right for summarizing the essential messages which emerge from this activity, and discuss the new avenues in which the community could engage. Soft condensed matter is original in that weak external perturbations can induce large observable effects. Most of the time the energy scales involved are of the order of thermal energy, and subtle entropic effects play a very important role. In some cases, such as for granular materials, the energies involved are much larger than the thermal energy, but the noise generated by the external perturbation itself is of the order of this perturbation. The case of biological systems is intermediate. The aim of this workshop is to review the main advances and to set the grounds for expanded activity, by bringing together experts in the field of soft condensed matter.

### Scientific Committee

*J. Prost (Paris), J.F. Joanny (Strasbourg), Ph. Pincus (Santa Barbara)*

### List of Invited speakers

*M. Adam (Saclay), Ph. Auroy (Paris), L. Auvray (Saclay), J.Ph. Bouchaud (Saclay), F. Brochard (Paris),  
R. Bruinsma (Los Angeles), M. Doi (Nagoya), Sir S. Edwards (Cambridge), A. Gent (Akron),  
J. Klein (Rehovot), L. Leibler (Levallois-Perret), L. Léger (Paris), T. Lubensky (Philadelphia),  
Ph. Pincus (Santa Barbara), D. Quere (Paris), E. Raphael (Paris), T. Witten (Chicago), C. Williams (Paris)*

**Organized by :** Centre National de la Recherche Scientifique, Institut Curie, University of California  
Santa Barbara

**Also supported by :** Rhône Poulenc, LVMH, Commissariat à l'Energie Atomique...

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*Grenoble and is supported by MENESR, CNRS and Atomic Energy Commission.*

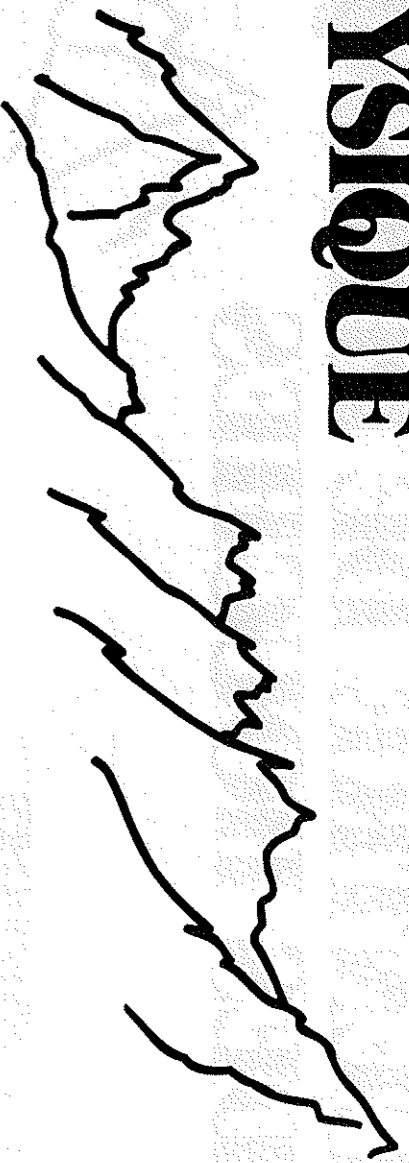
*Centre de Physique des Houches, Côte des Chanants F - 74310 Les Houches. Director : Michèle Leduc*

*Phone +33 4 50 54 40 69 - Fax +33 4 50 55 53 25*

*Applications should be sent to Jean-François Joanny, Institut Charles Sadron, 6 rue Boussingault,  
F-67083 Strasbourg cedex (Fax +33 3 88 41 40 20, Email pgg@ics.u-strasbg.fr) before June 15th, 1998.  
Internet site : <http://www-ics.u-strasbg.fr>  
The fees (2 200 FF) includes board and lodging at the center during the workshop*



# CENTRE DE PHYSIQUE DES HOUCHES



74310LESHOUCHES  
France

## OPTICAL SOLITONS : THEORETICAL CHALLENGES AND INDUSTRIAL PERSPECTIVES 28 September - 2 October 1998

The objective of the School is to convene researchers actively working in different domains of optical soliton physics, ranging from its physical and mathematical foundations to its potential industrial and future telecommunication network applications. We intend to stimulate a cross-fertilization between recent developments in the theory of integrable nonlinear evolution equations and a wide spectrum of present-day experiments involving both novel optical materials and rapidly evolving lightwave systems. Indeed, at the present time fiber and telecom technology has reached the stage of maturity for the practical implementation of soliton transmissions : industrial demonstrations progress today at an ever-increasing rate, which often exceeds theoretical understanding. Optical solitons also hold an immense potential for all-optical signal processing and storage, at rates far superior to the capabilities of electronics, and for optical interconnects and networking. Once again, material technology has evolved to the level of permitting the observation of novel solitons, e.g., in semiconductor waveguides and in quadratic or photorefractive nonlinear crystals. We expect that the lecturers and researchers participating to the School will represent a synthesis of basic and applicative expertise in nonlinear optical phenomena.

### Organizers

Stefan WABNITZ (Université de Bourgogne, Dijon),  
Vladimir E. ZAKHAROV (Landau Institute, Moscow).

### Scientific Committee

Jean-Pierre HAMAIDE (Alcatel, Paris), Yuji KODAMA (Osaka U.), Evgenii KUZNETSOV (Landau I., Moscow),  
Alexander MIKHAILOV (Leeds U.), Guy MILLOT (UB-Dijon), George I. STEGEMAN (CREOL, Orlando).

### Among the Invited Speakers

F. ABDULLAEV, S. AITCHISON, N. DORAN, I. GABITOV, T. GEORGES, M. HAELTERMAN, A. HASEGAWA,  
H.A. HAUS, F. LEDERER, J. LEON, B. LUTHER-DAVIES, A.I. MAIMISTOV, L. MOLLENAUER, C. MONTES,  
A.C. NEWELL, M. SEGEV, W. TORRUELLAS, S. TRILLO, S. TURITSYN.

The School is intended for Ph. D. students and postdoc-level researchers (under 35 years of age). We strongly encourage a relatively large participation of young researchers from less favourite european countries, from industry and woman researchers. The total number of students is limited to about 40. Room and board is provided by the Center (the cost is FF 2110 TTC). Student grants (covering living and/or travel expenses) are available. Application forms are available on the internet at :  
<http://www.u-bourgogne.fr/LPUB/SolitonSchool98>.

The deadline for application is July 15, 1998.

The Physics School in Les Houches is affiliated to the University Joseph Fourier and the National Polytechnical Institute in Grenoble. It is subsidized by the MENESR, CNRS and the Atomic Energy Commission. This session is supported by Alcatel Alsthom Recherche, CNET-France Télécom, the CNRS, the GDR-POAN, the European Community (TMR Programme), and the Ministry of Foreign Affairs.

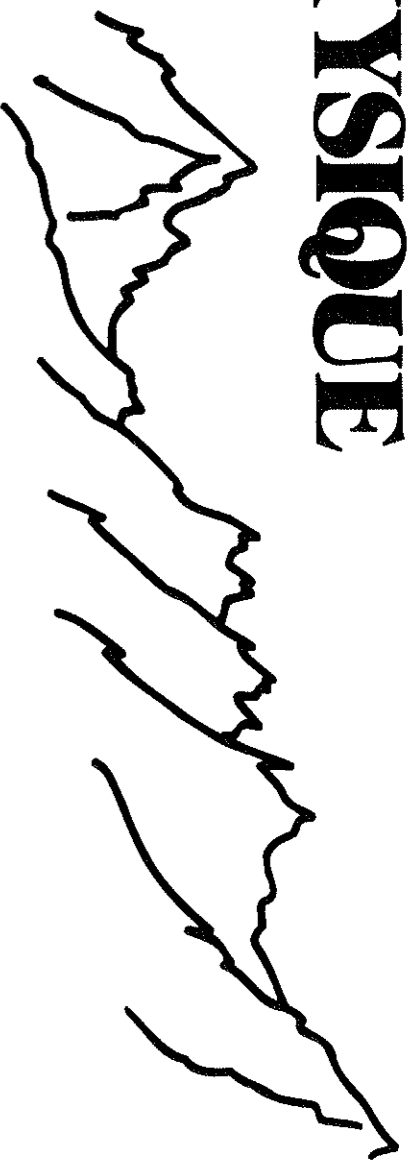
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Send your applications to : Stefan WABNITZ. E-mail: [swabniz@u-bourgogne.fr](mailto:swabniz@u-bourgogne.fr)  
Fax : (33) 3 80 39 59 71

Centre de Physique des Houches, Côte de Chavants, F-74310 Les Houches.  
Directeur: Michèle LEDUC, Tel.: (33) 1 44 32 20 23 ou (33) 4 50 54 40 69  
Fax: (33) 4 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES  
France

## NEUROPHYSICS AND PHYSIOLOGY OF THE MOTOR SYSTEM

**February, 8-12 1999**

This winter school will bring together physiologists and physicists, who will discuss recent experimental and theoretical advances on the structure, dynamics and functions of the motor system. It will provide an unique opportunity for young scientists and students to become familiar with many important issues related to the elaboration, the execution and the control of movement in the central nervous system. It will also bring to light how Neurophysics can contribute to understanding the motor system. Among the topics discussed will be : emerging functional properties, the role of the nonlinearities of neural dynamics, the synchrony of neural activity. These questions will be introduced in the framework of the different nervous structures involved (cortex, basal ganglia, spinal cord...), and further discussed in the wider context of the integrated physiology of the motor system.

### Organizers

**D. HANSEL** and **C. MEUNIER**, EP 1848 CNRS, Université René Descartes, 75006 Paris France.  
**D. GOLOMB**, Dept. of Physiology, Faculty of Health Sciences, Ben Gurion University of the Negev, Beersheva, 84105, Israël.

### Scientific committee

**H. BERGMAN** (Jerusalem), **P. COLLET** (Paris), **C. MASSON** (Dijon), **A. SCHMIED** (Marseille), **I. SEGGEV** (Jerusalem).

### Speakers

**M. ABELLES** (Jerusalem) - **H. BERGMAN** (Jerusalem) - **E. FETZ** (Seattle) - **C. FEUERSTEIN** (Grenoble) - **D. GOLOMB** (Beersheva) - **D. HANSEL** (Paris) - **L. JAMI** (Paris) - **R. LEMON** (London) - **Y. MANOR** (Beersheva) - **C. MEUNIER** (Paris) - **P. MOUCHET** (Grenoble) - **A. RIEHLE** (Marseille) - **T. RUIGROK** (Rotterdam) - **A. SCHMIED** (Marseille) - **I. SEGGEV** (Jerusalem) - **H. SOMPOLINSKY** (Jerusalem) - **E. VAADIA** (Jerusalem) - **C. VAN VREESWIJK** (London) - **J. YELNIK** (Paris) - **D. ZYTNIKI** (Paris).

Les Houches is a village in the Chamornix valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at an altitude of 1150 m. It is above the village, facing the Mont-Blanc range.

Registration fees are 2200 FF including accommodation and meals during the whole session. Number of participants is limited to 40, speakers included. The participation of students and young scientists is encouraged, and they may benefit from reduced fees (limited number). Registration demands (short curriculum vitae and publications list) should be sent before January 15, 1999 to Mrs Martine Escoute, EP 1848, UFR biomédicale, 45, rue des Saints-Pères, 75270 Paris cedex 06 - Telephone 33 1 42 86 21 38 - Fax 33 1 49 27 90 62 - e-mail : Martine.Escoute@biomedicale.univ-paris5.fr.

*Les Houches Physics school is affiliated to Joseph Fourier University (Grenoble) and Institut National Polytechnique de Grenoble. It is subsidized by MENESR, CNRS and CEA.*

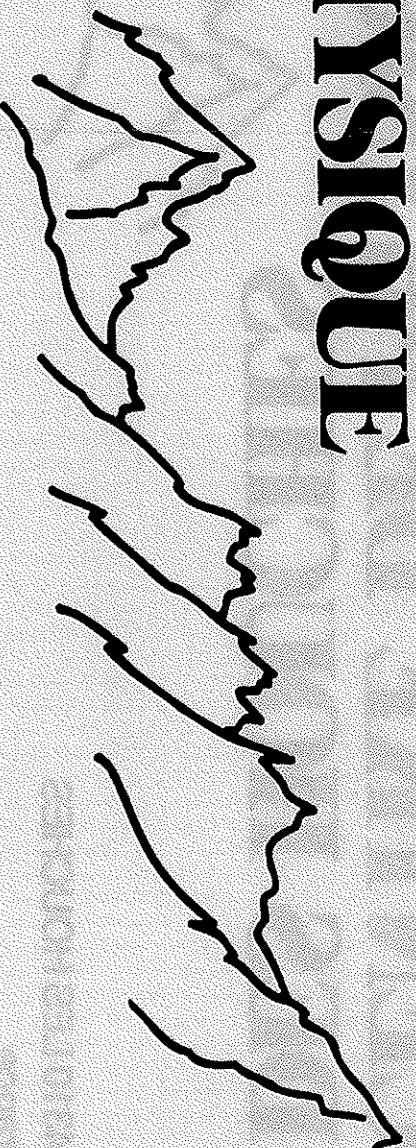
*Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches.*

*Director: M. Martial DUCLOY, Tel.: 33 1 49 40 39 00 or 33 4 50 54 40 69 - Fax : 33 4 50 55 53 25*

*ducloy@jpl.univ-paris13.fr*



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES  
France

## Topological Defects and the Non-Equilibrium Dynamics of Symmetry Breaking Phase Transitions.

February 16 - 26, 1999

### Organisers:

Yuriy Bunkov and Henri Godfrin (CRTBT - CNRS, Grenoble, France)

### Scientific Committee:

A. Achúcarro (Bilbao), Yu. Bunkov (Grenoble), R. Durrer (Geneva), A. Gill (Geneva),  
H. Godfrin (Grenoble), T.W.B. Kibble (London), M. Krusius (Helsinki),  
A. Schakel (Berlin), G. Vitiello (Salerno), W. Zurek (Los Alamos).

In many different fields of physics topological defects formed at symmetry-breaking phase transitions play an important role. Topological defects appear in many condensed-matter systems at low temperature; examples include vortices in superfluid helium-4, a rich variety of defects in helium-3, quantised magnetic flux tubes in type-II superconductors, and disclination lines and other defects in liquid crystals. In cosmology, unified gauge theories of particle interactions suggest a sequence of phase transitions in the very early universe some of which may lead to defect formation. In astrophysics, defects play an important role in the dynamics of neutron stars. The main aim of this school is to bring together experimental and theoretical physicists and students from these different disciplines to exchange ideas about how to tackle these challenging problems.

### Invited Speakers (preliminary):

Ana Achúcarro (Bilbao), Daniel Boyanovsky (Pittsburgh), Yuriy Bunkov (Grenoble), Henri Godfrin (Grenoble),  
Tom Kibble (London), Matti Krusius (Helsinki), Anthony Leggett (Urbana), Douglas Osheroff (Stanford),  
George Pickett (Lancaster), Diek Rainer (Bayreuth), James Sauts (Evanston), Adriaan Schakel (Berlin),  
Tammy Vashaspati (Cleveland), Grigoriy Volovik (Moscow and Helsinki), Wojciech Zurek (Los Alamos).

The winter school will be open to approximately 60 participants. The full cost of accommodation and food is FF 4642; this amount is due on arrival in Les Houches. A modest registration fee will also be requested. Pre-registration at [topdef199@labs.polycnrs-gre.fr](mailto:topdef199@labs.polycnrs-gre.fr) before 15 December 1998 will allow us to send participants personalised information about available financial support. Instructions for payment will be sent with the acceptance. The School is supported by the European Science Foundation, the Centre National de la Recherche Scientifique, the Université J. Fourier and other institutions.

**Information:** <http://www-crtbt.polycnrs-gre.fr/ul/LesHouches99/LesHouches99.html>

Mail should be sent to: Topological Defects School / Les Houches 99, c/o Yu. M. Bunkov, CNRS-CRTBT, BP 166, 38042  
Grenoble Cedex 09, France. Fax: (33) 4 76 87 50 60 Phone: (33) 4 76 88 12 52 or (33) 4 76 88 90 63.

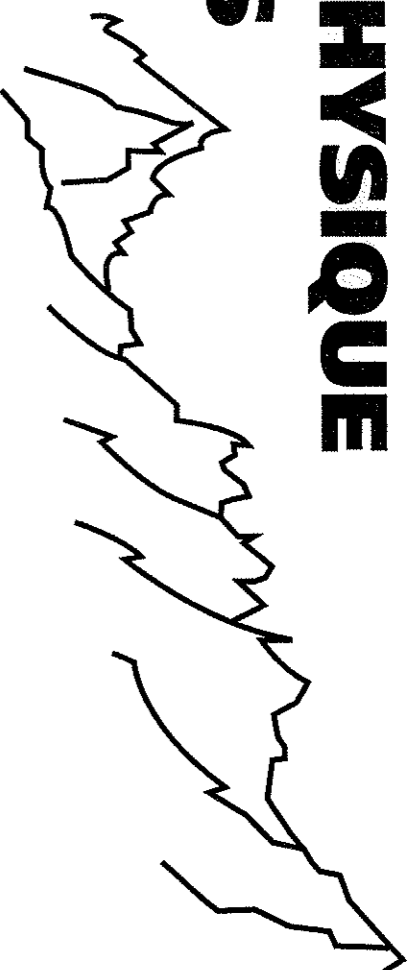
*Les Houches is a resort village in the Chamoniix valley of the French Alps. The Physics School in Les Houches, established in 1951, is located in a group of mountain chalets surrounded by meadows and woods at 1150 m elevation. It is ideally located for intellectual pursuits as well as for mountain sports. The Physics School in Les Houches is affiliated to the University Joseph Fourier and the National Polytechnical Institute in Grenoble. It is subsidised by the MENESR, CNRS and Atomic Energy Commission.*

Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches  
Director: Martial DUCLOY, Phone (33) 1 49 40 39 00 or (33) 4 50 54 40 69  
Fax (33) 4 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHEs

74310 LES HOUCHEs  
FRANCE



## Intense laser fields, X-ray Generation and Applications

March 8 - March 12, 1999

### Organizers

- A. Mysyrowicz, LOA, ENSTA, École Polytechnique, Palaiseau, France
- S. Svanberg, Lund Laser Center, LUND University, Sweden

### Scientific Committee

- P. Agostini, CEA, DRECAM, Saclay, France
- H. Hutchinson, Rutherford Appleton Laboratories, Chilton, Great-Britain
- A. Mysyrowicz, LOA, ENSTA, École Polytechnique, Palaiseau, France
- B. Prade, LOA, ENSTA, École Polytechnique, Palaiseau, France
- S. Svanberg, Lund Laser Center, LUND University, Sweden

Based on new concepts in laser technology, ultrashort and superintense light pulses with intensities approaching  $10^{20}$  W/cm<sup>2</sup> are now available in several European Facilities. This conference shall offer a forum for users of such installations.

The meeting will cover the generation of ultrashort optical pulses from the infrared to the X-ray domain and their applications to physics, biophysics and medicine. Nonlinear propagation of ultra-intense optical pulses through dielectric and ionized media will also be discussed.

Presentations will consist of oral contributions and posters.

*Preliminary list of invited speakers :*

- |                                |                                 |                                    |
|--------------------------------|---------------------------------|------------------------------------|
| <b>P. Audebert</b> (Palaiseau) | <b>J.-L. Martin</b> (Palaiseau) | <b>M. Schmidt</b> (Saclay)         |
| <b>P. Balcou</b> (Palaiseau)   | <b>J.-T. Mendonça</b> (Lisbon)  | <b>S. de Silvestri</b> (Milan)     |
| <b>T. Elsaesser</b> (Berlin)   | <b>P. Monot</b> (Saclay)        | <b>J. Tisch</b> (London)           |
| <b>E. Förster</b> (Jena)       | <b>P. Mora</b> (Palaiseau)      | <b>R. Trebino</b> (Sandia)         |
| <b>D. Giulietti</b> (Pisa)     | <b>P. Nickles</b> (Berlin)      | <b>D. Umstadter</b> (Michigan)     |
| <b>F. Krausz</b> (Vienna)      | <b>C. Rischel</b> (Copenhagen)  | <b>D. von der Linde</b> (Essen)    |
| <b>J. Larsson</b> (Lund)       | <b>A. Rousse</b> (Palaiseau)    | <b>C.-G. Wahlstroem</b> (Lund)     |
| <b>C. Leblanc</b> (Palaiseau)  | <b>P. Salières</b> (Saclay)     | <b>A. Walmsley</b> (Rochester)     |
| <b>K. Ledingham</b> (Glasgow)  | <b>R. Sauerbrey</b> (Jena)      | <b>B. Wellegehausen</b> (Hannover) |

The number of participants is limited to 60. Applications forms are available from R. Muller, « Les Houches » conference, LOA, ENSTA, Palaiseau, France, FAX ; 331 69 31 99 96 ; E-MAIL : [muller@enstayaensta.fr](mailto:muller@enstayaensta.fr) and should be returned complete before November 30th, 1998.

Les Houches is a resort village in the ChamoniX Valley of the french Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at 1150 m elevation. It is ideally located for mountaineering, skiing or touring as well as for intellectual pursuits.

The Physics School in Les Houches is affiliated to Université Joseph Fourier and l'Institut National Polytechnique in Grenoble. It is subsidized by the MENESR and CNRS and Commissariat à l'Energie Atomique.

*Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches.*

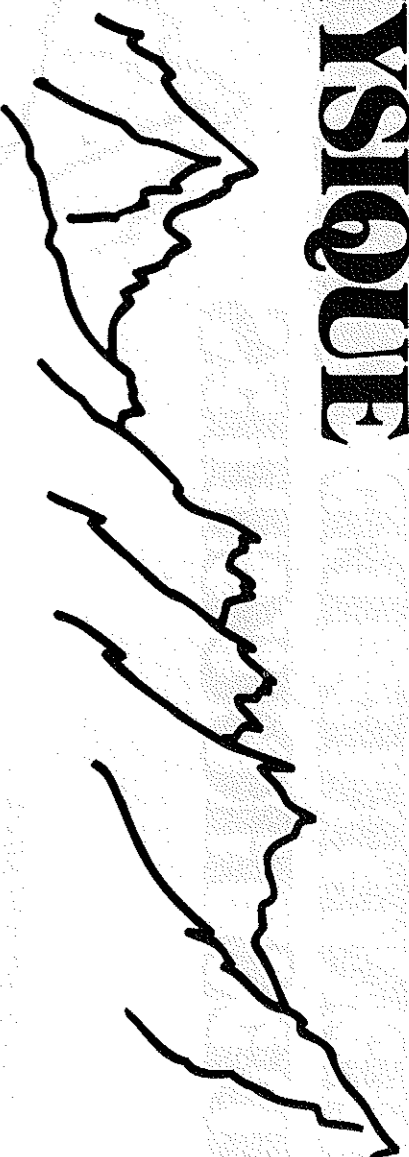
*Director : Martial Ducloy*

*Tel. : (33) 4 50 54 40 69 or (33) 1 49 40 39 00*

*Fax : (33) 4 50 55 53 25*



# CENTRE DE PHYSIQUE DES HOUCHEES



74310LES HOUCHEES  
France

## LOW-DIMENSIONAL (<2D) ELECTRON SYSTEMS IN NATURAL AND ARTIFICIAL STRUCTURES

**March 30 - April 9 1999**

### Organizers

Bernard ETIENNE (Bagnaux) - Claude BERTHIER (Grenoble) - Bernard JUSSEMAND (Bagnaux)

### Scientific committee

G. GRUNER (UCLA) - J.P. KOTTHAUS (Muenchen) - E. MOLINARI (Modena) - F. ZAWADOWSKI (Budapest)

"Recent progresses in the fabrication of artificial nanostructures made of semiconductors lead to new properties resulting from lower dimensionality (in laterally modulated 2D heterostructures, quantum wires,...). This makes a link with other classes of materials, the natural 1D systems (organic and inorganic materials, metals and superconductors, and the more recent C nanotubes...). The purpose of this school is to put together, in a balanced way, scientists from the different communities studying these systems, in order to discuss new issues concerning recent theoretical ideas and experimental results, with an emphasis on the effects related to the electron-electron interaction."

### List of confirmed speakers

G. Bastard (ENS) - C. Berthier (Grenoble) - C. Bourbonnais (Sherbrooke) - De Giorgi(Zürich) - B. Etienne (L2M) - T. Giamarchi (Orsay)  
A. Gold (Toulouse) - M. Gironi (EPFL) - G. Gruner (UCLA) - D. Heitman (Hamburg) - J. Hvam (Lyngby) - D. Jérôme (Orsay)  
B. Jusserand (CNET) - E. Kapon (EPFL) - J.P. Kotthaus (Muenchen) - F. Laruelle (L2M) - F. Milla (Toulouse) - E. Molinari (Modena)  
F. Peeters (Antwerpen) - D. Poilblanc (Toulouse) - T. M. Rice (Zürich) - J. Voit (Bayreuth) - L. Wendler (Jena)

Poster sessions will be organized for the participants.

Information on the school and application form are available at :

<http://spectro.ujf-grenoble.fr/MODES99>

or from

Bernard Jusserand, Laboratoire de Bagnaux, CNET, France Telecom,  
B.P. 107, 196 av. H. Ravera, 92225 Bagnaux Cedex, France,

Fax : +33-1-42-53-49-30,

E-mail: [bernard.jusserand@cnet.francetelecom.fr](mailto:bernard.jusserand@cnet.francetelecom.fr).

**The number of participants is limited to 65**

**The application must be received before February 15. 1999**

This school is supported by the European Union (TMR program) and the CNRS.

*Les Houches is a resort village in the Chamonix valley of the French Alps. Established in 1951, the School of Physics is located in a group of chalets surrounded by meadows and woods, at an altitude of 1150 m facing the Mont-Blanc range -a very favorable environment for intellectual activity in ideal surrounding for hiking, mountaineering and sightseeing. The Center is affiliated with the Université Joseph Fourier and the Institut National Polytechnique de Grenoble and is subsidized by the MENRS, the CNRS, and the CEA.*

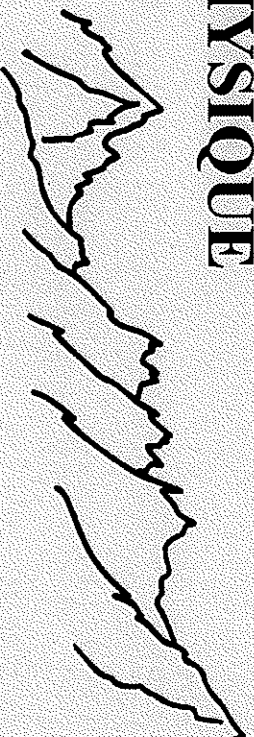
Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches.

Director: Martial DUCLOY, Phone: (33) 1 49 40 39 00

[ducloy@jpl.univ-paris13.fr](mailto:ducloy@jpl.univ-paris13.fr)



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES  
France

## ÉCOULEMENTS TURBULENTS COMPLEXES: MODELLISATION, CONTRÔLE ET ACOUSTIQUE

4 - 7 mai 1999

Dans ce séminaire Recherche-Industrie sur la Mécanique des Fluides Turbulents, on fera un bilan des divers efforts de recherche faits en France en modélisation et expérimentation de la turbulence, dans la perspective des besoins industriels du futur. On couvrira les avancées récentes en physique, modélisation, contrôle et acoustique. On cherchera aussi à définir des projets de recherche pluridisciplinaires dans ces domaines. Un effort particulier sera fait pour une confrontation avec les besoins émergents de l'industrie, avec le souci de se situer par rapport aux projets nationaux, européens et internationaux. On essaiera de mieux cerner les axes scientifiques prometteurs à développer en France, et les échanges futurs visant à des avancées utilisables dans l'industrie. Le séminaire fera alterner des exposés et des discussions permettant aux participants de présenter leur vision de l'avenir dans la discipline.

*Directeurs de Session:* P. PERRIER (Dassault)- M. LESIEUR (LEGI-Grenoble et IUF)

Le programme est articulé autour de quatre thèmes:

**Progrès dans la physique des écoulements turbulents**

**Modélisation et simulation numériques, validations expérimentales**

**Acoustique et pollution**

**Contrôle actif en aérodynamique et combustion**

*Participants pressentis:*

B. AUPOIX (ONERA), C. BAILLY (Lyon), J. BIUM (Grenoble), X. BOHNEUST (PSA), S. CANDEL (Paris), P. COMTE (Grenoble), G. COMTE-BELLOT (Lyon), G.H. COTTELET (Grenoble), J.C. COURTY (Dassault), J. COUSTEIX (ONERA), J. DELVILLE (Poitiers), J.P. DUSSAUGE (Marseille), P. GILIERON (Renault), D. GRAND (CEA), J.L. KUENY (Grenoble), E. LAMBALLAIS (Poitiers), D. LAURENCE (EDF), F. MASBERNAT (ALSTOM), P. MESTAYER (Nantes), O. METAIS (Grenoble), H. PERRHOSSAINI (Nantes), O. PIRONNEAU (Paris), P. SAGAULT (ONERA), L. STANISLAS (Lille), G. SUNYACH (Lyon), J. VERRON (Grenoble)...

La participation est sur invitation. Le nombre des participants est limité à 60. Les frais d'inscription (HT), par participant, sont de 1600 F par personne (montant forfaitaire incluant les repas et le logement au Centre durant la session).

Les industriels qui désirent subventionner le programme peuvent payer une inscription **Mécénat** de 5800 F. Quelques possibilités de bourses pour les séjours de chercheurs existent, compte-tenu des aides (Mécénat et autres) obtenues. Les candidatures, accompagnées d'un bref C.V. et, le cas échéant, d'une demande motivée d'aide financière, sont à envoyer à **Marcel LESIEUR - LEGI/IMG, BP 53, 38041 Grenoble Cedex 9, ou à MAILLO: Akia.Rachedi@img.inpg.fr.**

L'École de Physique des Houches est affiliée à l'Université Joseph Fourier et à l'Institut National Polytechnique de Grenoble. Elle est subventionnée par le Ministère de l'Enseignement Supérieur, de la Recherche et la Technologie, le CNRS et le Commissariat à l'Énergie Atomique.

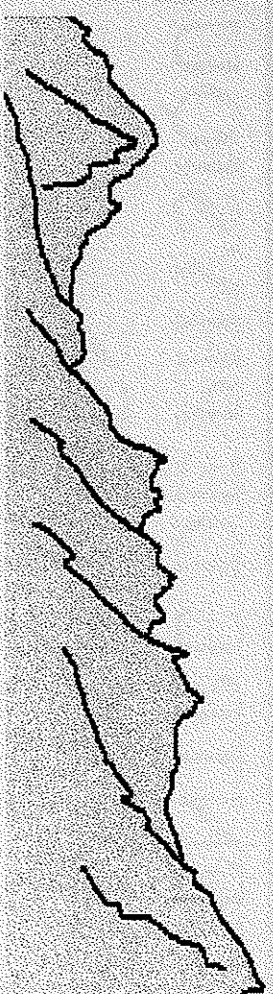
*La station du village des Houches (altitude 1150 m) se trouve au centre des Alpes, dans la vallée de Chamoni. Fondée en 1951, l'École est située dans un groupe de chalets de montagne entouré de prairies et de bois. C'est un lieu idéal pour le travail intellectuel et les sports de montagne.*

Centre de Physique des Houches, Côte des Chavauns, F-74310 Les Houches. Directeur: Martial Ducloy

Tél: (33) 04 50 54 40 69 - Fax 04 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHEs



école de physique

74310 LES HOUCHEs  
France

## ATOM OPTICS APPLICATIONS 23<sup>rd</sup> - 28<sup>th</sup> May 1999

### Organizers

Jacques VIGUE (Toulouse) - John WEINER (Toulouse) - Dieter MESCHÉDE (Bonn)  
Secretary : Philippe MIROUX (Toulouse)

### Scientific committee

Alain ASPECT (Institut d'Optique Théorique et Appliquée)  
Christian BORDÉ (Laboratoire de Gravitation et Cosmologie Relativistes)  
Dieter MESCHÉDE (Institut für Angewandte Physik)  
Jacques VIGUÉ (Laboratoire Collisions - Agrégats - Réactivité)  
John WEINER (Laboratoire Collisions - Agrégats - Réactivité)

Atom optics deals with the interaction of light and matter, but the roles usually played by these two elements are reversed. Light fields can create forces with quite complex spatial structure which then act on atom beams as masks, lenses, or mirrors so as to project on a substrate a material image on a nanometer scale. Furthermore the wave properties of the atoms can be used to develop an atomic interferometry at the scale of the deBroglie wavelength. Such an atomic interferometry can lead to a new class of instrumentation (gyros, gravitational meters, etc.) with sensitivity and precision enhanced by several orders of magnitude. Application of laser cooling techniques to atom beams has improved their intensity, spatial definition, and narrowed their velocity dispersion. Such beams have already found application, and their use as atom sources for atom optical studies is very promising.

### Among the invited speakers

Christian BORDÉ (CNRS-Universités de Paris 6 et Paris 13), Gerhard GROSS (Sematech), Edward HINDS (University of Sussex), Siu Au LEE (Colorado State University), Dieter MESCHÉDE (Universität Bonn), Jabez McCLELLAND (NIST), Mara PRENTISS (Harvard University), Dave PRITCHARD (MIT), Jörg SCHMIEDMAYER (Universität Innsbruck), Karl Heinz RIEDER (FU Berlin), John WEINER (CNRS-Université Paul Sabatier), Eii YABLONOVITCH (UCLA).

### General informations

The Physics Schools in Les Houches is affiliated to the University Joseph Fourier and the National Polytechnical Institute in Grenoble. It is subsidized by the MENESR, CNRS and the Atomic Energy Commission. This session is supported by CNRS, Ministry of Foreign Affairs, DSP/DGA and EOARD.

Information about the school and application form are available at :

<http://irsamc1.ups-tlse.fr/irsamc/colloques/les-houches99/p1leshouches99.html>

The number of participants is limited to 70

The application must be received before the 5<sup>th</sup> April 1999

We strongly encourage a relatively large participation of young researchers. Room and board are provided by the Center (cost FF 2110 TTC). Student grants (covering partly living expenses) are available.

Located in the French Alps, next to Chamonix, the Centre de Physique des Houches is ideally suited for scientific meetings. Established in 1951, the center occupies a group of mountain chalets surrounded by meadows and woods at an elevation of 1150 meters. It is well adapted for intellectual pursuits, with a library containing the main scientific journals and some reference books, a few computers and internet connection.

Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches  
Director : Martial DUCLOY, Phone (33) 1 49 40 39 00  
[ducloy@jpl.univ-paris13.fr](mailto:ducloy@jpl.univ-paris13.fr)



# CENTRE DE PHYSIQUE DES HOUCCHES



74310 LES HOUCCHES  
France

## Workshop: Physics at TeV Colliders Les Houches, France 8-18 June 1999

### Local Organising Committee:

Patrick Aurenche, LAPTH, Annecy-le-Vieux  
Geneviève Bélanger, LAPTH, Annecy-le-Vieux  
Fawzi Boudjema, LAPTH, Annecy-le-Vieux  
Jean-Philippe Guillet, LAPTH, Annecy-le-Vieux  
Eric Pilon, LAPTH, Annecy-le-Vieux  
Gilles Sauvage, LAPP, Annecy-le-Vieux  
Robert Zitoun, LAPP, Annecy-le-Vieux

### International Organising Committee:

J. Bagger, Johns Hopkins Univ., USA  
D. Denegri, CERN, CH & Saclay, France  
A. Djouadi, LPM, Montpellier, France  
M. Fontannaz, LPTHE, Orsay, France  
D. Froidevaux, CERN, Genève, CH  
J. Huston, Michigan State Univ., USA  
M. Mangano, CERN, Genève, CH  
F. Richard, LAL, Orsay, France  
Y. Shimizu, KEK, Tsukuba, Japan  
P. Zerwas, DESY, Hamburg, Germany

### **Aim of the Workshop**

The aim of the Workshop is to bring together theorists and experimentalists working on the phenomenology of the upcoming colliders (Large Hadron Collider and Linear Collider). Topics to be covered in the Workshop are related to the issue of electroweak symmetry breaking notably Higgs physics and supersymmetry, with an emphasis on the strong interplay between the signals from the New Physics and their respective backgrounds. The Workshop will consist of a few lectures and review talks followed by working groups activities. The activity of the working groups is starting in February 1999.

### **Working Groups and their Conveners**

#### Higgs : SUSY and SM

A. Djouadi (Theory)  
R. Kinnunen, H.U. Martyn,  
E. Richter-Was (Experiment)

#### SUSY

M. Drees, H. Dreiner (Theory)  
S. Abdullin, H.U. Martyn,  
G. Polesello (Experiment)

#### QCD and SM Processes

S. Catani, D. Soper (Theory)  
M. Dittmar, J. Huston,  
S. Tapprogge (Experiment)

### **Registration**

Attendance is limited to about 60 participants. The total fee amounts to FF 5000. It covers full lodging and meals for the whole duration of the meeting in Les Houches. Very limited financial support may be available. Registration should be made **before 15 March 1999** at the WEB site

<http://lappc-th8.in2p3.fr/Houches99/intro.html>

where more information is available.

*Les Houches is a resort village in the Chamoni valley of the French Alps. The Physics Centre in Les Houches, established in 1951, is located in a group of mountain chalets surrounded by meadows and woods at 1150 m elevation facing the Mont-Blanc. It provides a very favourable environment for intellectual activity in ideal surroundings for hiking and sight-seeing. The Physics Centre is affiliated with the University Joseph Fourier and the Institut National Polytechnique de Grenoble and is supported by MENRT, CNRS and CEA. This session is supported by CNRS (Formation Permanente), IESA (Grenoble Pole Européen) and Université de Savoie.*

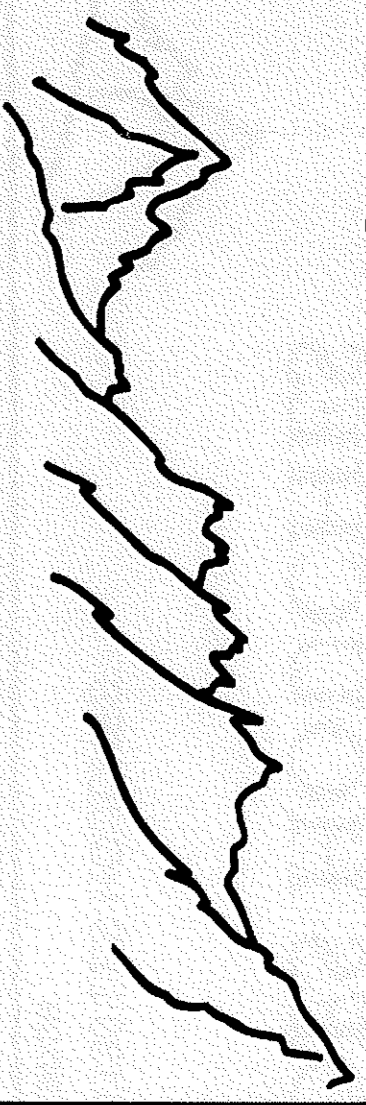
Centre de Physique des Houches,  
Director: Martial DUCLOY

Côte des Chavants, F-74310 les Houches.  
Tel. (33) 1 49 40 39 00 or (33) 4 50 54 40 69  
Fax (33) 1 49 40 32 00 or (33) 4 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCCHES

74130 LES HOUCCHES  
France



## HYPERPOLARIZED GASES IN MAGNETIC RESONANCE : BIOMEDICAL INVESTIGATIONS AND CLINICAL APPLICATIONS

June 21 - 25, 1999

Originating from basic physics, hyperpolarized gases are now widely used for biomedical investigations in magnetic resonance (MR) imaging. Clinical applications in ventilation and perfusion imaging are emerging. The meeting is intended to bring together experts from different specialties: radiology, biomedical engineering, physics, biochemistry, respiratory medicine, critical care medicine, thoracic surgery and physiology.

Tutorial lectures will give comprehensive state-of-the-art reviews of hyperpolarization of noble gases, specific MR physics and sequences, requirements for ventilation and perfusion imaging with different MR techniques, and clinical approval. The preliminary investigations conducted in lungs of patients and animal models will be analyzed. The potential performances of this novel tool will be assessed and compared to existing references modalities. Scientific contributions will present the most recent results from the opening fields of research. Panel discussions with participation of the whole audience will debate prospects and future directions.

### Management and scientific organization

Geneviève TASTEVIN (Paris) - Hans-Ulrich KAUCZOR (Mainz)  
tastevin@physique.ens.fr kauczor@radiologie.klinik.uni-mainz.de

### List of confirmed speakers

L. Darrasse (Orsay), J.P. Mugler (Charlottesville), W. Happer (Princeton), R. Surkau (Mainz),  
P. Grenier (Paris), E. Durand (Kremlin-Bicêtre), T. Higebottom (Sheffield), B. Eberle (Mainz),  
G. Hedenstierna (Uppsala), M. Leach (London), A. Bifone (London), T. Grey-Morgan (Amersham),  
J. Brookeman (Charlottesville), H. Iida (Akita)

The number of participants is limited to 70. All information on the session and application form is available from the organizers or at the following address :

<http://www.uni-mainz.de/FB/Medizin/Radiologie/leshouches/Welcome.htm>

*Les Houches is a resort village in the Chamoniix Valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at 1150 m elevation. It is ideally located for mountaineering, skiing or touring as well as for intellectual pursuits.*

The session is supported by the Centre National de la Recherche Scientifique (France), the Délégation Générale à l'Armement (France), the Ministry of Foreign Affairs (France) and the following companies : Nycomed-Amersham Plc., Siemens A.G. Medizintechnik, Isonics Corp., OptoPower Corp., OptoCom Innovation.

*The Physics School in Les Houches is affiliated to Université Joseph Fourier and the Institut National Polytechnique in Grenoble. It is subsidized by the MENRT, the CNRS and the Commissariat à l'Energie Atomique.*

Centre de Physique des Houches, Côte des Chavants, F 74310 Les Houches

Fax : (33) 4 50 55 53 25

Director : Martial Ducloy, [ducloy@lpl.univ-paris13.fr](mailto:ducloy@lpl.univ-paris13.fr)

Phone : (33) 4 50 54 40 69 or (33) 1 49 40 39 00



# LES HOUCHEES



SESSION LXXI

école d'été de physique théorique

## THE PRIMORDIAL UNIVERSE L'UNIVERS PRIMORDIAL

June 28 - July 23, 1999

### Scientific Direction:

**Pierre Binétruy** (Orsay U., France)

**Richard Schaeffer** (Saclay, France)

**Joseph Silk** (Berkeley U., CA, USA)

Introduction to Supersymmetry, Astrophysical and Phenomenological Constraints, **K. OLIVE** (U. of Minnesota Minneapolis, USA)  
Large Scale Structure of the Universe, **A. STEBBINS** (Fermilab, Batavia, USA)  
The Universe at High Redshift \*, **S. LILLY** (U. of Toronto, Canada)  
The Early Universe: Baryogenesis, Defects, and Initial Conditions, **N. TUROK** (Cambridge U., Grande Bretagne)  
Quantum Gravity, Superstrings and M-Theory, **T. BANKS** (Rutgers U., USA)  
The CMB fluctuations, **J.-L. PUGET** (Orsay U., France)  
Inflation and Primordial Fluctuations, **A. LINDE** (Stanford U., USA)  
Dark Matter: Direct Detection, **G. CHARDIN** (Saclay, France)  
Superstring Cosmology: the Pre-Big Bang Scenario, **G. VENEZIANO** (CERN, Switzerland)

In addition to the lectures, time will be reserved for seminars on recent development in the fields covered by this school.

In the last 20 years the ties between Particle Physics and Astrophysics have become much closer. Our modern concepts of the physics of fundamental interactions turn out to have important cosmological consequences. This school will review what has been learned from these connections, and introduce the most recent topics in the field. The interface between Particle Physics and Astrophysics is getting a new boost from ideas about the description of the elementary interactions in connection with inflation and quantum gravity. On the observational side, the limits on the cosmological parameters have noticeably tightened. The bounds on a possible population of dark compact objects in our Galaxy will soon be quantified. Also, sensitive experiments of direct and indirect detection of dark matter in the form of weakly interacting elementary particles are underway. This school will focus on the Universe before Nucleosynthesis. It is specially addressed to the community at the interface between astrophysics and particle physics and is aimed typically at advanced doctoral or postdoctoral students. The courses, however, are organized so that astrophysicists as well as physicists from neighboring fields can step in and benefit.

The School will be open to graduate students and researchers. Attendance is limited to 50 students. A financial contribution of 5600 FF (853.71 €) is required from each participant. It covers full lodging and meals at the School, and includes the published lecture notes. The School may provide a few grants, to cover part or all the living expenses and eventually travel expenses. Applications for grants must be sent in advance to the School. Except for some specific cases, the grant allocations (depending of course on the session funding) will be made at the beginning of the session. Application forms and additional information are available from:

ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE - 74310 LES HOUCHEES, FRANCE

Phone: +33 - 4 50 54 40 69 - Fax: +33 - 4 50 55 53 25

E-mail: [secretariat.houches@ujf-grenoble.fr](mailto:secretariat.houches@ujf-grenoble.fr) WS: <http://w3houches.ujf-grenoble.fr/>

The required documents (application form + 2 recommendation letters) must be sent by ordinary mail to the School before **March 1, 1999** (please if you ask for application form by e-mail, mention your mailing address or fax number). The selection committee (Scientific Directors of the session and Direction of the School) will select the candidates.

*Les Houches is a resort village in the Chamoniix valley in the French Alps. Established in 1951, the Physics School is located in a group of chalets surrounded by meadows and woods, at an altitude of 1150 m facing the Mont-Blanc range - a very favorable environment of intellectual activity in ideal surroundings for hiking, mountaineering and sight-seeing. Participants who would prefer to rent lodging in the village should enquire directly to Office du Tourisme, 74310 Les Houches, France (Tel. +33 - 4-50 55 50 62, Fax +33 - 4 50 55 53 16, E-mail: [ot.les.houches@wanadoo.fr](mailto:ot.les.houches@wanadoo.fr)).*

The Les Houches Physics School is affiliated to the Université Joseph Fourier and to the INPG in Grenoble, and is supported by MENRT, CNRS and CEA. This session is supported by CNRS, CEA, PNC, NSF & NASA.

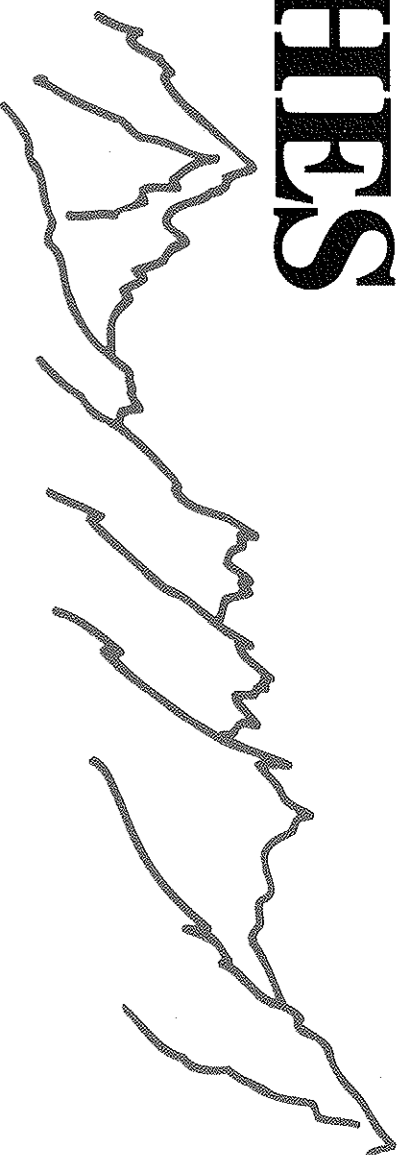
The August 1999 Summer School Session is entitled "Coherent Atomic Matter Waves". Two sessions are scheduled for 2000, one on "Clusters and Nanoparticles", the other on "Turbulence".

*Ecole de Physique des Houches, Côte des Chavants, F-74310 Les Houches.*

*Director: François DAVID*



# LES HOUCHEs



SESSION LXXII  
NATO ADVANCED STUDY INSTITUTE

école d'été de physique théorique

## COHERENT ATOMIC MATTER WAVES ONDES DE MATIÈRE COHÉRENTES

### July 27 - August 27, 1999

**Scientific Direction:**

Robin Kaiser (Institut Non Linéaire de Nice, France)  
Christoph Westbrook (Institut d'Optique, Orsay, France)

Bose condensed atomic gases: simple theoretical results: **Y. Castin** (LKB-ENS, France)  
Nonequilibrium phenomena in trapped atomic gases: **H. Stoof** (U. Utrecht, Netherlands)  
Techniques and results of experimental Bose-Einstein Condensation: **E. Cornell** (JILA, Boulder, USA)  
Experimental studies of Bose-Einstein condensates: **W. Ketterle** (MIT, Cambridge, USA)  
Decoherence, the quantum-classical transition, and the physics of information: **J. Paz** (Buenos Aires, Argentina) & **W. Zurek** (Los Alamos, USA)  
Cavity QED Experiments, entanglement and quantum measurement: **M. Brune** (LKB-ENS, France)  
Atom interferometry: **S. Chu** (U. Stanford, USA)  
Quantum and nonlinear optics in a photonic band gap: **S. John** (U. Toronto, Canada)  
Applications of multiple scattering concepts in atomic physics: **B. van Tiggelen** (IJF, Grenoble, France)  
Quantum chaos and atomic physics: **D. Delande** (LKB-ENS, France)

In addition to the lectures, time will be reserved for seminars on recent development in the fields covered by this school.

Rapid progress is being made in the study of quantum effects in atomic systems. Due largely to the development of laser cooling during the years 1980-1990 the 1990's have witnessed several breakthroughs: Bose Einstein condensation, the production of "Schrödinger cat states", and the beginning of the study of the propagation of atomic de Broglie waves in complex media which exhibit chaos, localization etc. This school is intended to bring together several leading researchers in these areas to give a series of lecture courses aimed at advanced doctoral and post-doctoral students in order to familiarize them with the frontiers of this research.

The School will be open to graduate students and researchers. Attendance is limited to 50 students.

A financial contribution of **5900 FF** is required from each participant. It covers full lodging and meals at the School, and the published lecture notes. The School will provide a few grants, which may cover part or all the living expenses and possibly travel expenses. Applications for grants must be sent in advance to the School. The final decisions (depending of course on the session funding) will be made at the beginning of the session.

Application forms and additional information are available from:

ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE - 74310 LES HOUCHEs, FRANCE  
Phone: +33 - 4 50 54 40 69 - Fax: +33 - 4 50 55 53 25  
E-mail: [secretariat.houches@ujf-grenoble.fr](mailto:secretariat.houches@ujf-grenoble.fr) W3: <http://w3houches.ujf-grenoble.fr/>

The required documents (application form + 2 recommendation letters) must be sent by ordinary mail to the School **before March 1, 1999** (please if you asked for application form by e-mail, mention your mailing address or fax number). The selection committee (Scientific Directors of the session and Direction of the School) will select the candidates.

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The Les Houches Physics School is affiliated to the Université Joseph Fourier of Grenoble and to the Institut National Polytechnique de Grenoble, and is supported by the Ministère de l'Éducation Nationale, de la Recherche et de la Technologie (MENESR), the Centre National de la Recherche Scientifique (CNRS) and the Direction des Sciences de la Matière of the Commissariat à l'Énergie Atomique (CEA). This session is supported by the NATO ASI program.

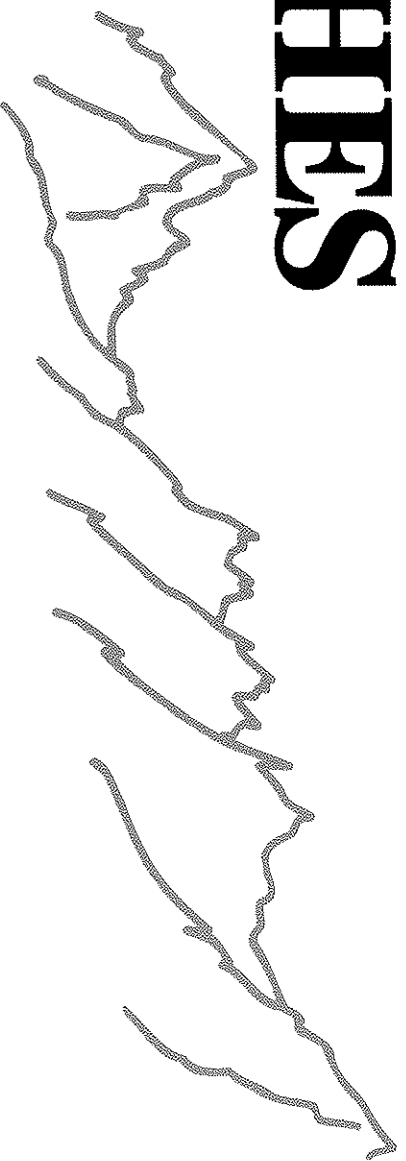
The July 1999 Summer School session will be entitled "The Primordial Universe". Two sessions are scheduled for 2000, one on "Clusters and Nanoparticles", the other on "Turbulence".

*Ecole de Physique des Houches, Côte des Chavants, F-74310 Les Houches.*

*Director: François DAVID*



# LES HOUCHES



SESSION XII

30 Août - 10 Septembre 1999

école pré-doctorale de physique

Fédération Française des magistères de physique

## INTRODUCTION AUX PROBLÈMES DE LA BIOLOGIE

### 30 Août - 10 Septembre 1999

Transport intracellulaire et rôle du cytosquelette: **E. Coudrier** (Paris)

Mort cellulaire: **P. Golstein** (Marseille)

Structure et fonction des protéines: **E. Pebay-Peroula** (Grenoble)

Cytosquelette et mécanique cellulaire: **O. Thoumine** (Lausanne)

Imagerie et activation cellulaire: **A. Trautmann** (Paris)

Intérêt des modèles en biologie: **F. Amblard** (Paris)

Génomés, du déchiffrage à la biologie: **B. Jordan** (Marseille)

Interaction leucocyte-endothélium et inflammation: **G. Kaplanski** (Marseille)

Le système immunitaire: **B. Malissen** (Marseille)

Développement du système nerveux: **A. Prochiantz** (Paris)

L'objectif de cette session est d'aider de jeunes physiciens à s'engager dans des thèmes de recherche de nature biologique. Les sujets traités ont été choisis soit en raison de leur importance actuelle, soit parce qu'ils paraissent particulièrement susceptibles de bénéficier d'une approche physique. Les intervenants ont accepté de consentir un effort pédagogique particulier afin que leurs conférences soient accessibles à une audience déjà familiarisée avec la réalité de la recherche, mais ne possédant pas nécessairement une culture biologique approfondie.

Cet enseignement est destiné essentiellement à des étudiants français venant de terminer un DEA ou doctorants, ainsi qu'à des étrangers de niveau équivalent. Il est également prévu d'accueillir quelques chercheurs post-doctorants. Le nombre des participants sera limité afin de favoriser au maximum les interactions entre les étudiants et les enseignants.

### Candidatures et Financement

Cette école est ouverte aux étudiants ou aux jeunes chercheurs de toutes nationalités. Les candidats doivent envoyer un dossier qui sera examiné par un comité de sélection et devra comprendre un curriculum vitae détaillé, une lettre de recommandation et éventuellement une demande de bourse.

Le comité de sélection attribuera des bourses couvrant la totalité ou une partie des frais d'inscription et de séjour, dont le montant est de 2 600 F.

Le dossier d'inscription doit parvenir

**Avant le 14 Mai 1999**

à Pierre BONGRAND

Laboratoire d'immunologie, unité INSERM 387, Hôpital de Sainte-Marguerite, BP 29, 13274 Marseille cedex 09.

Tél.: 04 91 75 39 06 - Fax: 04 91 75 73 28 - Email: bongrand@marseille.inserm.fr

### Comité d'Organisation

**Bruno Berge - Pierre Bongrand - Claude Delalande**

L'École prédoctorale des Houches est organisée en collaboration avec la Fédération Française des magistères de physique, avec le soutien de l'INSERM.

Les Houches est un village de la vallée de Charmonix, dans les Alpes françaises. L'École a lieu dans un groupe de chalets montagnards entourés de prairies et de bois. Il est situé à une altitude de 1 150 m. L'hébergement et les repas sont assurés pour tous les participants. Les étudiants bénéficieront en permanence de salles de réunion et d'une bibliothèque.

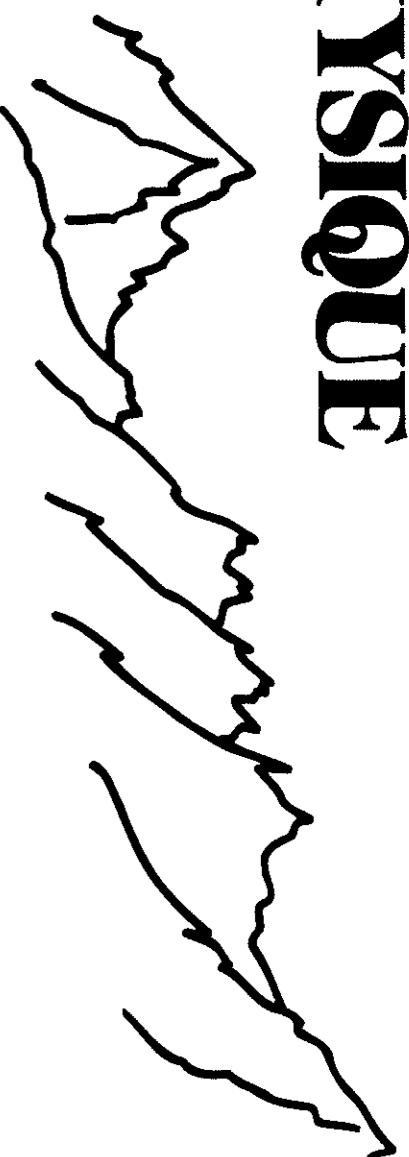
*Ecole de Physique des Houches, Côte des Chavants, F-74310 Les Houches.*

Tél.: (33) 4 50 54 40 69

Fax: (33) 4 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHES



74310LES HOUCHES  
France

Sponsored by the NATO Science Program

Advanced Study Institute (ASI)

## STRUCTURE AND DYNAMICS OF POLYMER AND COLLOIDAL SYSTEMS

**September 14 - 24, 1999**

An Advanced Study Institute (ASI) is a high-level teaching activity where a carefully defined subject, systematically presented, is treated in depth by lecturers of international standing, and new advances in a subject, not taught elsewhere, are reported in tutorial form. ASIs, as short courses, contribute to the dissemination of knowledge and the formation of international scientific contact. Although the teaching in an ASI is aimed at scientists at the postdoctoral level with an appropriate scientific background, scientists at all levels of experience are encouraged to participate.

The purpose of this ASI is to bring together colloid and polymer scientists, especially those beginning their careers, to discuss recent developments on the structure and dynamics of macromolecular systems (including polymer mixtures, co-polymers, polyelectrolytes) and colloids (spherical, non-spherical, polymer-colloid mixtures). The polymer and colloid fields overlap strongly and share many experimental (e.g., light, neutron and x-ray scattering) and theoretical techniques. In many cases, the concepts from one area are ready to be adapted and extended to the other. For instance, the theory of spherical colloids is very highly refined and many of the concepts developed for these systems can be extended to systems with non-spherical morphology, such as solutions of rigid rod polymers.

### Organizers

**R. Pecora** (Stanford, USA), Director; **R. Borsali** (Grenoble, France) Co-Director

### Scientific Committee

**R. Pecora** (Stanford, USA); **R. Borsali** (Grenoble, France);  
**M. Antonietti** (Berlin, Germany); **A. Gast** (Stanford, USA);  
**C. Williams** (Paris, France)

### Invited Lecturers

**M. Antonietti** (Teltow, Germany); **M. Ballauff** (Karlsruhe, Germany); **R. Borsali** (Grenoble, France);  
**P.G. de Gennes** (Paris, France); **A. Gast** (Stanford, USA); **R. Klein** (Konstanz, Germany); **J.F. Joanny** (Strasbourg, France);  
**D. Langevin** (Paris, France); **T.P. Lodge** (Minneapolis, USA); **J.ewis** (Louvain, Belgium); **R. Ottewill** (Bristol, UK);  
**R. Pecora** (Stanford, USA); **P. Pusey** (Edinburgh, UK); **C. Williams** (Paris, France); **H. Winter** (Amherst, USA)

*Financial support is available for a limited number of participants (50). Interactive poster sessions will be scheduled in the evenings.*

Applications and more information available at the **WEB site:**

[http://www.cermav.cnrs.fr/polymer\\_colloid\\_99/](http://www.cermav.cnrs.fr/polymer_colloid_99/)

**Deadline for applications: April 30, 1999**

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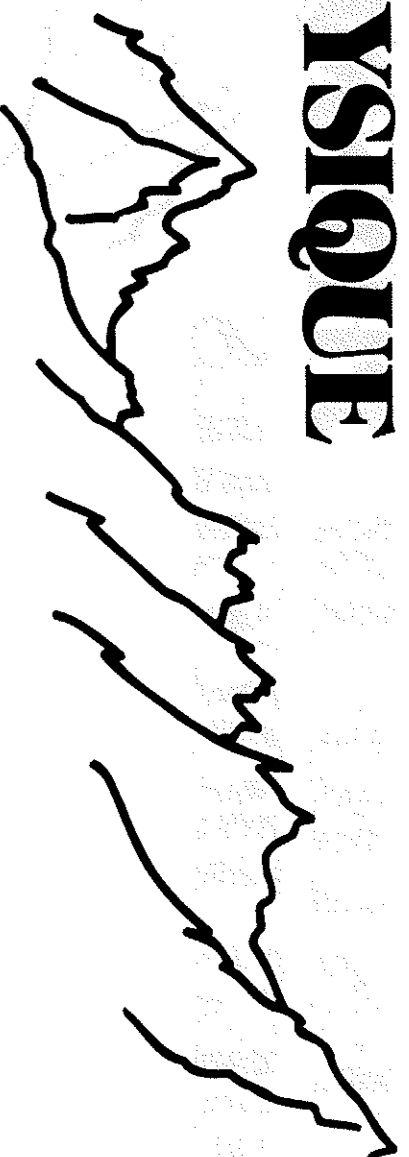
Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches.

Director: Martial DUCLLOY, Phone: (33) 1 49 40 39 00

Fax: (33) 1 49 40 32 00



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES

France

## DISORDERED POROUS MATERIALS

**October 4 - 8, 1999**

### Organizers

Jean-Pierre KORB (PMC, Ecole Polytechnique, Palaiseau), Pierre LEVITZ (CRMD-CNRS, Orléans).

### Scientific Committee

J.-P. HULIN (Université Paris Sud, Orsay), J. TEIXEIRA (LLB-CNRS, Saclay),  
P. TOULHOAT (CEA, Saclay), H. VAN DAMME (CRMD-CNRS, Orléans).

Disordered porous materials are largely present in our common environment (rocks, wood, paper, soil, cement, bones). These materials play an important role in various industrial applications (oil recovery, heterogeneous catalysis, environmental sciences, nuclear waste storage, biomedical applications). They are highly disordered and have a large interface whose the spatial organisation might extend over several orders of magnitude, usually from the nanometer range up to the millimeter or even larger. The physical and chemical properties of these materials are specifically related to the geometrical confinement, the reactivity of complex interfaces and to the multi-scales transport mechanisms. In the last years, statistical physics concepts of disordered media have been used successfully. Important experimental progresses (NMR and X-ray tomography) have been made on the multi-scale characterization and on the perception of fundamental processes at the interfaces of such materials. The first objective is to address a comprehensive view of the fundamentals and recent breakthroughs to researchers and engineers interested by the physical properties and applications of these real materials. Our second objective is to transfer recent knowledges and discoveries to the young researchers working in this active and growing field.

### List of confirmed speakers

P. ADLER (INPG, Paris), J. BARUCHEL (ESRF, Grenoble), J.-P. BOILOT (E. Polytechnique, Palaiseau),  
R. BRYANT (U. of Virginia), M. FLEURY (IFP, Rueil), G. GUILLOT (U. Paris Sud), J.-P. HULIN (U. Paris Sud),  
R. JULLIEN (U. Montpellier), J. KLAFTER (U. Tel Aviv), J.-P. KORB (E. Polytechnique, Palaiseau), P. LEVITZ (CNRS, Orléans),  
J. LIVAGE (U. Paris 6), P. MEAKIN (U. Oslo), D. QUÉNARD (CSTB, Grenoble), J. ROUQUEROL (CNRS, Marseille),  
B. SAPOVAL (E. Polytechnique, Palaiseau), J. TEIXEIRA (LLB, Saclay), S. TORQUATO (U. Princeton),  
P. TOULHOAT (CEA, Saclay), H. VAN DAMME (CRMD, Orléans), C. VERNET (Bouygues, Coignières).

**The number of participants is limited to 70. The application must be received before August 1, 1999**

Information on the school and application form are available at :

<http://www.cnrs.fr/Actualites/Colloques/colloque.html> ou <http://pmc.polytechnique.fr/houches-poreux>

Jean-Pierre KORB, Laboratoire PMC, École Polytechnique, 91128 Palaiseau  
Tel.: 33 1 69 33 47 39 - Fax : 33 1 69 33 30 04 - e-mail : jean-pierre.korb@polytechnique.fr  
Pierre LEVITZ, CRMD-CNRS, 1b rue de la Fêrolierie, 45071 Orléans cedex 2  
Tel.: 33 2 38 25 53 65 - Fax : 33 2 38 63 37 96 - e-mail : levitz@cnrs-orleans.fr

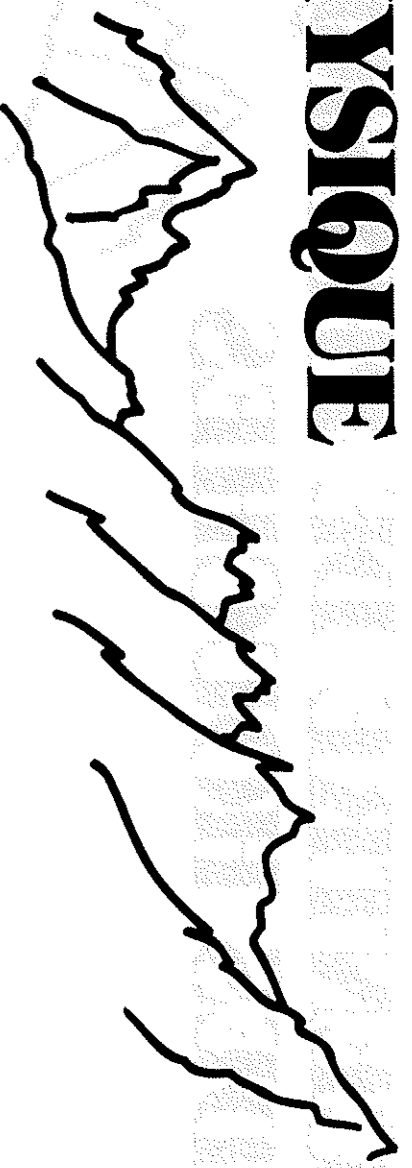
The registration fees for scholars, 2500 FF (about 380 Euros), will be paid upon final registration. A special fee is required for the non scholars. The registration fees cover the living expenses in Les Houches (housing).

*Les Houches is a resort village in the Chamornix valley of the French Alps (altitude 1150 m). The Center is affiliated with the Université Joseph Fourier and the Institut National Polytechnique de Grenoble and is subsidized by the MENRT, the CNRS and the CEA.*

Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches, France. Tel.: 33 4 50 54 40 69 - Fax : 33 4 50 55 53 25  
Director : Martial DUCLOY Phone : 33 1 49 40 39 00 - Fax : 33 1 49 40 32 00  
[ducloy@lpl.univ-paris13.fr](mailto:ducloy@lpl.univ-paris13.fr)



# CENTRE DE PHYSIQUE DES HOUCHEES



74310LES HOUCHEES

France

## DYNAMICS AND MORPHOGENESIS OF BRANCHING STRUCTURES FROM CELLS TO RIVER NETWORKS

**October 11th-15th, 1999**

### Organizing Committee

Vincent FLEURY, Jean-François GUYET (PMC, Ecole Polytechnique)  
et Marc LEONETTI (LPS, Université de Paris Sud-Orsay).

### Scientific Committee

Herman CUMMINS (City College of CUNY, New York, USA), Albert LIBCHABER (Rockefeller University, New York, USA),  
James D. MURRAY (University of Washington, Seattle, USA), Yves POMEAU, Alain PROCHANTZ (Ecole Normale, Paris),  
Harry STRUJKER-BOUDIER (U. Maastricht), Ewald WEIBEL (University of Berne, Switzerland).

While the study of morphogenesis has a long and fascinating history, pattern formation of complex structures has received a deeper attention in the last twenty years. In many fields, including developmental biology, out-of-equilibrium physics and differential geometry, concepts and models have been put forward that pave the way to a description of the mechanisms of morphogenesis, especially of branching structures.

It is expected that specialized courses, on neurons, vascular systems, gland growth, dendritic growth, mathematical and physical models, geology etc. will be given at a high scientific level but with a special attention towards different communities, which are not expert in these fields.

### Scientific Program

The dynamics of branching in growth patterns. **Yves Couder** (Ecole Normale, Paris)  
Instabilities in dendritic growth, and beyond: continuum models. **Alain Karma** (Northeastern U., Boston)  
Reaction-diffusion, chemotaxis and aggregation: from spirals and spots to vasculature and bacterial growth. **Eshel Ben Jacob** (U. of Tel Aviv)  
Branching in dewetting and in soft matter. **Chaouqi Misbah**, (U. Grenoble)  
Transduction of hemodynamic forces, biomechanics of vascular cells. **Bernard Lévy** (Hôp. Lariboisière, Inserm, Paris)  
Vasculogenesis. **Ferdinand Le Noble** (U. of Maastricht)  
Branching morphogenesis in gland and lung growth. **Saverio Bellusci** (Institut Curie, Paris)  
Branching in geology: river networks and other systems. **Paul Meakin** (U. of Oslo)  
Neuron branching. (to be announced)  
Biological basis of growth and branching in plant cells. **Darryl Kropf** (U. of Utah, Salt Lake City)  
Branching in botany, meristem morphogenesis. (to be announced)  
Evolutionary aspects of branching: fossil record and biomechanics of early plants. **Brigitte Meyer-Berthaud**  
and **Nicolas Rowe** (U. of Montpellier)  
Exchange across convoluted interfaces: of lungs and gills. **Bernard Sapoval** (Ecole Polytechnique).

More information and registration form at: <http://pmc.polytechnique.fr>

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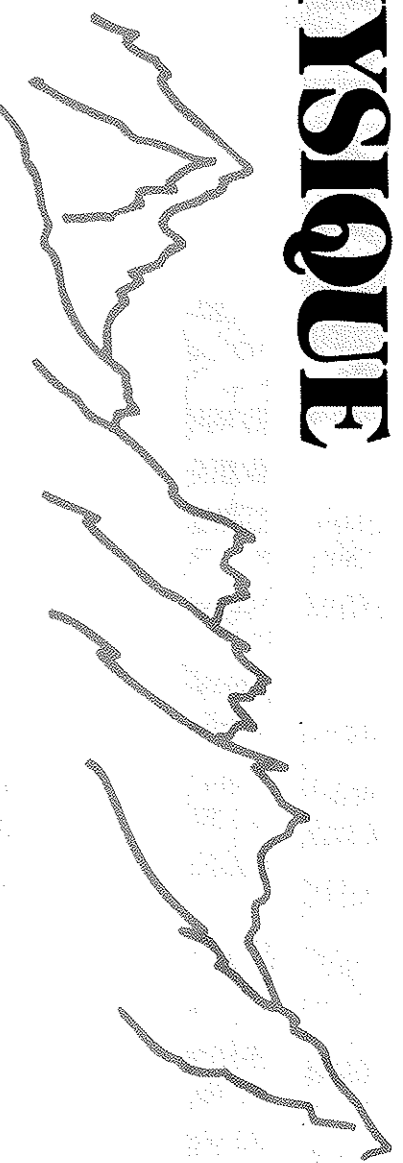
Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches.

Tel.: 33 4 50 54 40 69 - Fax : 33 4 50 55 53 25

Director : Martial DUCLOY Tel.: 33 1 49 40 39 00



# CENTRE DE PHYSIQUE DES HOUCHEES



74310 LES HOUCHEES  
France

CNRS, CEA

## RECENT DEVELOPMENTS IN NEUTRON SCATTERING 2 - 12 May 2000

### Organisers

A. Menelle and J. Teixeira (LLB, CEA/Saclay, France)

### Scientific Committee

K. Clausen (Risø, Denmark), J. Finney (London, Grande-Bretagne), P. Fratzl (Leoben, Autriche),  
A. Furrer (Villigen, Suisse), G. Heger (Aachen, Allemagne), G. Lander (Grenoble, France), F. Leclercq (Lille, France),  
A. Menelle (Saclay, France), J. Teixeira (Saclay, France), C. Vettier (Grenoble, France)

Neutron scattering is a technique used by thousands of users in essentially all fields of condensed matter: solid state, disordered media, soft matter, biology, materials science. Many developments have been achieved both in instrumentation and in data analysis. However, because the main centres for research are relatively independent and dispersed in several countries, the cross information is not as large as it should be. This has been the main motivation for organising a series of lectures at Les Houches.

The invited speakers come from the main research centres in Europe and will present the more recent progresses in their field. A large part of the time will be available in order to allow the active participation of all the people attending the school, either by some oral communications or in a special poster session. In principle, there will be no proceedings, but we ask all the invited speakers to provide all participants with an informal text or a copy of their presentation material.

The participation implies a minimum background in neutron scattering.

### Invited speakers

Ian Anderson (ILL, Grenoble), Nick Bernhoft (DRFMC, Grenoble), Philippe Bourges (LLB, Saclay),  
Stefan Egelhaaf (Dept. of Physics and Astronomy, Edinburgh), François Fillaux (LASIR, Triais),  
Albert Furrer (ETHZ & PSI, Zürich), Roland Gähler (TU-München, Garching), Hans U. Güdel (Dept. of Chemistry, Bern),  
Stefan Klotz (PMC, Paris), Peter Lindner (ILL, Grenoble), Renato Magli (Dipt. del Energetica, Firenze),  
Robert Papoular (LLB, Saclay), Jan Skov Pedersen (Risø, Roskilde), T.G. Perring (ISIS, Didcot),  
Eric Ressouche (DRFMC, Grenoble), Randal W. Richards (IRC Polymer Science, Durham),  
Dieter Richter (Inst. für Festkörperforschung, Jülich), Juan Rodriguez-Carvajal (LLB, Saclay),  
Helmuth Schöber (ILL, Grenoble), Jens-Boie Suck (Inst. of Physics, Chemnitz), Francis Tasset (ILL, Grenoble),  
George Webster (Imperial College, London), Hartmut Zabel (Ruhr-Univ., Bochum), Joseph Zaccai (IBS, Grenoble)

Attendance will be limited to a maximum of 60 participants who will be selected on the basis of their qualification and their potential contribution to the meeting. Participants will be requested to pay a fee of 4642 FF which includes boards and lodging at the Centre during the School.

Les Houches is a resort village in the Chamoniix valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at 1150 m elevation. It is ideally located for mountaineering, skiing or touring as well as for intellectual work.

To apply send a C.V. and description of research interest, before March 31, 2000 to

A. Menelle or J. Teixeira, Laboratoire Léon Brillouin,  
CEA/Saclay, 91191 Gif-sur-Yvette Cedex, France  
Fax : 33 1 69 33 14 84 - emails : menl@llb.saclay.cea.fr  
teix@llb.saclay.cea.fr

Additional information can be obtained on our Web site: <http://www-llb.cea.fr/houches>

The Physics School in Les Houches is affiliated to Université Joseph Fourier and l'Institut National Polytechnique in Grenoble. It is subsidized by the MENERT, and CNRS, and CEA.

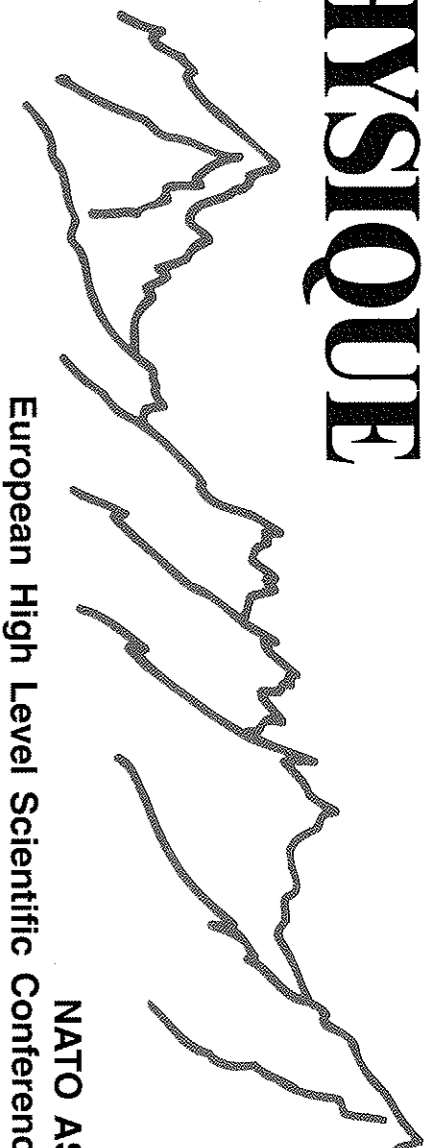
Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches

Director : Martial Ducloy Tel : (33) 4 50 54 40 69  
(33) 1 49 40 39 00  
Fax : (33) 4 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHEES

74310 LES HOUCHEES  
France



NATO ASI  
European High Level Scientific Conference

## TRAPPED PARTICLES AND FUNDAMENTAL PHYSICS

**23rd May - 2nd June, 2000**

**Scientific Direction:** **S. ATUTOV** (IAE - Novosibirsk, Russia)  
**R. CALABRESE** (Univ. Ferrara, Italy)  
**L. MOI** (Univ. Siena, Italy)

### List of confirmed Lecturers:

**A. Aspect** (Institut d'Optique, Paris, France); **M. Brune** (LKB-ENS, Paris, France); **J. Dalibard** (LKB-ENS, Paris, France); **A. Di Giacomo** (Univ. Pisa, Italy); **M. Ducloy** (Univ. Paris Nord, France); **R. Grimm** (MPI-Heidelberg, Germany); **S. Haroche** (LKB-ENS, Paris, France); **R. Hulet** (Rice Univ., USA); **D. Kleppner** (MIT, Cambridge, USA); **J. Kluge** (GSI-Darmstadt, Germany); **I. Khriplovich** (BINP-Novosibirsk, Russia); **M. Inguscio** (LENS-Univ. Firenze, Italy); **P. Jacquier** (LKB-ENS, Paris, France); **V. Letokhov** (Institute of Spectroscopy, Moscow, Russia); **L. Orozco** (Stony Brook Univ., USA); **D. Vieira** (Los Alamos National Laboratory, USA)

Fundamental physics with trapped particles (ions, atoms, molecules or photons) represents one of the most challenging and promising fields of investigation. Contemporary application of particle trapping and laser cooling techniques, together with traditional techniques of atomic physics, represents a real revolution in investigation for a wide range of fields. The application of these techniques opens new perspectives to fields which were the absolute domain of other branches of physics (namely nuclear and high energy physics). Experiments spanning very high resolution spectroscopy to Bose-Einstein condensation, tests of the Standard Model of electroweak interactions to precise mass measurements, detailed analysis of  $\beta$  decay to QED tests have become possible. It seems therefore timely, opportune and very fruitful to train young researchers in these techniques by organizing a School devoted to the investigation of these subjects. The School will offer them the unique opportunity to study problems usually spread about different fields and to interact with leading scientists, usually attending other conferences or meetings. The main goal of the School is therefore to present a series of lecture courses directed towards advanced doctoral and post-doctoral students in order to familiarize them with these new expanding frontiers of physics.

In addition to the lectures time will be reserved for seminars on recent developments in the fields covered by this School. Poster sessions will be organized during the School.

The School will be open to graduate students and researchers. The participation of students from Eastern Europe is strongly encouraged. Attendance is limited to 65 students.

A financial contribution of 5000 FF is required from each participant. It covers full lodging and meals at the School, and the published lecture notes. The School will provide several grants, in particular for students from Eastern Europe and developing countries, which may cover part or all the living expenses and possibly travel expenses. Application for grants must be sent in advance to the School. The final decision (depending of course on the session funding) will be made before March 15, 2000 and communicated to the applicants.

This session has received the financial support from the NATO Advanced Study Institute (ASI) Program and from the European Commission High-Level Scientific Conferences (HLSC) Program.

Application forms and additional information are available from:

ÉCOLE DE PHYSIQUE - 74310 LES HOUCHEES, FRANCE  
Phone: +33 450544069 - Fax: + 33 450555325  
E-mail: [secretariat.houches@ujf-grenoble.fr](mailto:secretariat.houches@ujf-grenoble.fr) <http://www.unisi.it/fisica/leshouches/index.htm>

The application form must be sent by web before February 20, 2000. The selection committee (Scientific directors of the session and Direction of the School) will select the candidates.

### General Information

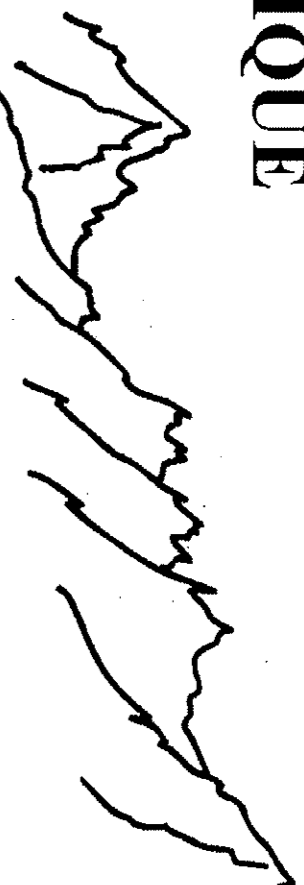
Les Houches is a resort village in the Chammonix Valley of the French Alps. Established in 1951, the school is located in a group of mountain chalets surrounded by meadows and woods at 1150 m elevation.

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Centre de Physique des Houches, Cote des Chavants, F-74310 Les Houches Tel: 33 4 50544069 - Fax: 33 4 50555325  
Director: Martial Ducloy Tel: 33 1 49403900



# CENTRE DE PHYSIQUE DES HOUCCHES



74310 LES HOUCCHES

## Les lasers : applications aux technologies de l'information et au traitement des matériaux

**SFO**

**DU 5 JUIN AU 9 JUIN 2000**

École organisée par la Société Française d'Optique (S.F.O.)  
avec la collaboration de la Formation Permanente du CNRS - Ile de France Sud  
et du Centre de Physique des Houches

### COMITÉ D'ORGANISATION :

**Jean-Paul POCHOLLE** (Thomson CSF-LCR, Domaine de Corbeville, Orsay)

**Claude FABRE** (Lab. Kastler-Brossel, Univ. P. et M. Curie, Paris)

**Pierre CHAVEL** (Lab. Charles Fabry de l'IO)

**Jean-Claude SAGET** (Lab. Charles Fabry de l'IO)

### PROGRAMME ET CONFÉRENCIERS :

- Diodes laser : nouveaux concepts et leurs applications : **Philippe Brosson** (Alcatel, Marcoussis)
- Lasers solides : **Patrick Georges** (LCF/IO, Orsay)
- Sources cohérentes et transmissions sécurisées : **Philippe Grangier** (LCF/IO, Orsay)
- Imagerie en milieu très diffusant : **Claude Boccara** (ESPCL, Paris)
- Lasers et amplificateurs à fibres : **Marc Douay** (USTL, Lille)
- Les lasers et le traitement des matériaux : **Rémy Fabbro** (CLFALALP, Arcueil)
- Mesures par laser des paramètres physiques d'environnement : **Jean-Pierre Wolf** (Univ. de Lyon 1)
- Imagerie par résonance de l'He3 polarisé : **Michèle Leduc** (LKB, Paris)

**Frais d'inscription :** 3700 F incluant la pension complète,

1850 F pour les étudiants, 2645 F pour les agents du CEA,  
réduction de 150 F pour les membres de la SFO.

*L'École a été reconnue comme École Thématique du CNRS. Agents CNRS : nous contacter.*

**Date limite d'inscription : 29 avril 2000**

Renseignements : J.C. SAGET, Institut d'Optique, BP 147, 91403 ORSAY cedex

Tél. : 01 69 35 87 43 - télécopie : 01 69 35 87 00 - Mel : jean-claude.saget@iota.u-psud.fr

*La station du village des Houches (altitude 1150 m) se trouve au centre des Alpes, dans la vallée de ChamoniX. Fondée en 1951 l'École est située dans un groupe de chalets de montagne entouré de prairies et de bois. C'est un lieu idéal pour le travail et les sports de montagne.*

L'École de Physique des Houches est affiliée à l'Université Joseph Fourier et à l'Institut National Polytechnique de Grenoble. Elle est subventionnée par le MENRT, le CNRS et le Commissariat à l'Énergie Atomique.

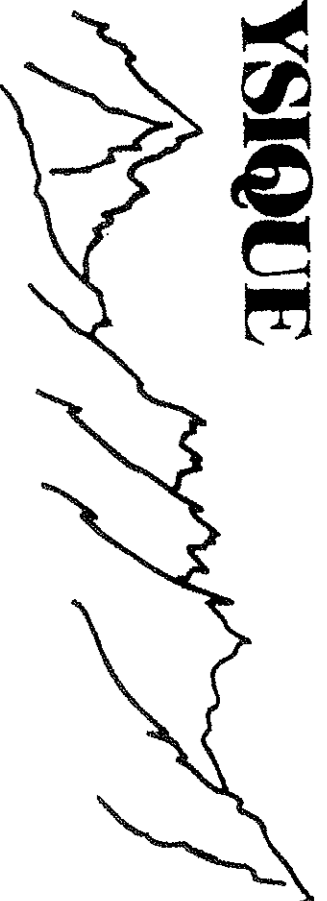
*Ecole de Physique des Houches, Côte des Chavants, 74310 Les Houches* Tél. : 04 50 54 40 69

Fax : 04 50 55 53 25

Directeur : Martial Ducloy Tél. : 01 49 40 39 00



# CENTRE DE PHYSIQUE DES HOUCHEs



74310 LES HOUCHEs  
France

## NANOPHYSIQUE et NANOÉLECTRONIQUE 25-30 Juin, 2000

**Contexte scientifique:** La réduction continue de la dimension des composants électroniques, l'accroissement de la complexité des circuits et la recherche de performances accrues marquent l'évolution de la microélectronique. Les composants électroniques sont ainsi amenés près des limites physiques estimées de leur fonctionnement. Pour relever ce défi, non seulement les méthodes de fabrication doivent encore progresser, mais de nouveaux concepts de composants doivent être imaginés et la physique qui les sous-tend doit être approfondie. La conception des systèmes intégrant ces composants devra également faire appel à des principes nouveaux susceptibles d'associer un grand nombre de composants tout en maintenant les performances à un niveau élevé. L'objectif de cette session sera de rassembler les communautés concernées par ce thème et de favoriser les échanges entre ces différentes composantes. Les sujets suivants seront abordés :

**Lithographie et gravure:** lithographie électronique, nanoimpression, manipulation d'atomes, extrême UV, champ proche. **Nanobjets:** croissance auto-organisée de métaux et semiconducteurs, nanotubes. **Nanophysique:** Transport et blocage de Coulomb dans les plots, bruit, cohérence, quantification et recombinaison, électronique de spin. **Composants:** MOSFET ultime (conception et technologie), Transistor à un électron, Composants pour l'électronique de spin. **Circuits et systèmes:** Architecture des circuits et interconnexions, réseaux de neurones, calcul quantique

**Conférenciers:** M.G. Bawendi (MIT, Cambridge, USA); A. Bietsch (IBM, Zürich, Switzerland); S. Cristoloveanu (LPCS, Grenoble France); S. Deleonibus (LETI, Grenoble, France); C. Delerue (IEMN, Lille, France); B. Diény (DRFMC, Grenoble, France); P. Dolfus (IEF, Orsay, France); G. Dujardin (Univ. Orsay, France); Z. Durrani (Hitachi, Cambridge, UK); A. Fert (Univ. Orsay and Thomson, France); M. Forshaw (Univ. College, London, UK); S. Galdin (IEF, Orsay, France); C. Gamrat (LETI, Saclay, France); M. Gordon (DRFMC, Grenoble, France); F. Hekking (LPM2C, Grenoble, France); H. Jaouen (ST Microelectronics, Crolles, France); O. Joubert (LTM, Grenoble, France); K. Kern (MPI, Stuttgart, Germany); P. Lavallard (GPS, Univ. Paris, France); K.K. Likharev (State Univ., Sony Brook, USA); D. Loss (Univ. Basel, Switzerland); A. Loiseau (ONERA, Chatillon, France); V. Safarov (GPEC, Univ. Marseille, France); M. Sanquer (DRFMC, Grenoble, France); A. Van Dijsseldonk (ASM Litho, Veldhoven, Pays-Bas); C. Vieu (LAAS, Toulouse, France); Z. Yao (Technical Univ., Delft, Pays-Bas).

**Comité scientifique:** A. Fert (Thomson et Univ. Orsay, France); C. Glatti (CEA, Saclay, France); P. Hadley (Techn. Univ. Delft, The Netherlands); C. Joachim (CEMES, Toulouse, France); D. Maillly (L2M, Bagnaux, France); M. Van Rossum (IMEC, Leuven, Belgique).

**Comité d'organisation:** J. Gautier (LETI, Grenoble); P. Hesto (IEF, Orsay); N. Magnea (DRFMC, Grenoble); B. Pannetier (CRTBT, Grenoble); J.L. Pautrat (DRFMC, Grenoble).

**Contact :** J.L. Pautrat: DRFMC/SP2M; CEA-Grenoble - 17 rue des Martyrs. 38054 Grenoble cedex 9  
phone: 0476884021; Fax: 0476885197; email : [jpautrat@cea.fr](mailto:jpautrat@cea.fr)  
Web site <http://www-drfmc.cea.fr/Congres/>

Les demandes d'inscription doivent être envoyées avant le 1<sup>er</sup> Mai 2000. Le nombre de participants étant limité il est demandé de fournir une lettre de recommandation du directeur du laboratoire. Les droits d'inscription (3500 FF) couvrent la totalité des frais de séjour et de repas, le livre des compte-rendus. Un tarif d'inscription réduit (1500 FF) peut être consenti aux étudiants sur la demande de leur directeur de laboratoire. La notification de l'acceptation des inscriptions sera faite le 15 mai 2000.

La possibilité sera donnée aux participants de présenter leurs travaux en cours sur un poster.

La station du village des Houches (altitude 1150 m.) se trouve au centre des Alpes, dans la vallée de Chamonix. Fondée en 1951, l'école est située dans un groupe de chalets de montagne entouré de prairies et de bois. C'est un lieu idéal pour le travail intellectuel et les sports de montagne. L'École de Physique des Houches est affiliée à l'Université Joseph Fourier et à l'Institut National Polytechnique de Grenoble. Elle est subventionnée par le Ministère de l'Éducation Nationale, de la Recherche et de la Technologie (MENRT), le Centre National de la Recherche Scientifique (CNRS), et la Direction des Sciences de la Matière du Commissariat à l'Énergie Atomique (CEA).

Cette session a reçu le soutien financier de : CEA-LETI, CEA-DSM, CNRS, Ministère de la Défense-DGA, Région Rhône-Alpes

Centre de Physique des Houches. Côte des Chavants, 74310 - Les Houches (France)

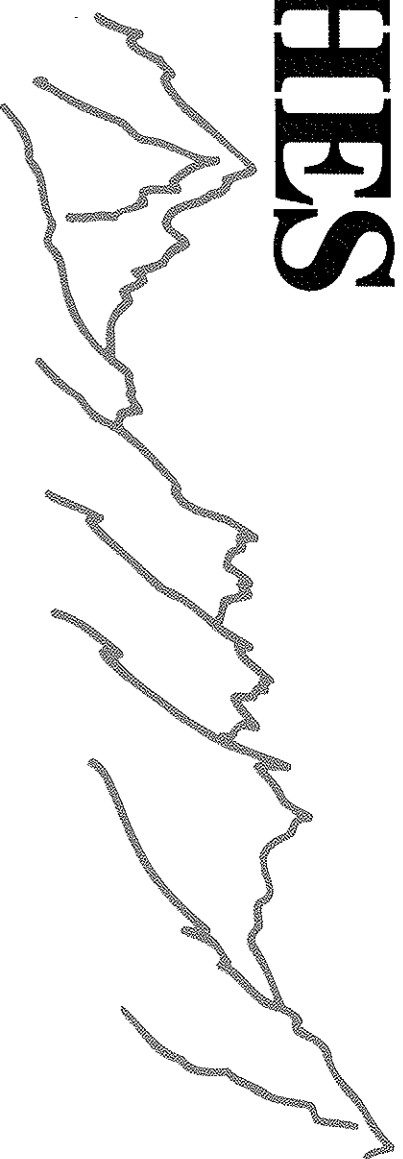
Phone: 33-4 50 54 40 69 Fax: 33 - 4 50 55 53 25 Email : [secretariat.houches@ujf-grenoble.fr](mailto:secretariat.houches@ujf-grenoble.fr)

Web site: <http://www.ujf-grenoble.fr/HOUCHES/>

Directeur: Martial DUCLOY



# LES HOUCHES



SESSION LXXIII  
NATO ASI  
European High Level Scientific Conference

École d'été de physique théorique

## ATOMIC CLUSTERS AND NANOPARTICLES AGRÉGATS ATOMIQUES ET NANOPARTICULES July 3 - July 28, 2000

**Scientific Direction:**

**Claude Guet** (CEA Grenoble, France)  
**Pavel Hobza** (J. Heyrovsky Institute of Physical Chemistry, Prague, Czech Republic)

**Lecturers:**

Electronic properties of clusters: **G. Bertsch** (U. Seattle, USA)  
Semiclassical approaches to mesoscopic systems: **M. Brack** (U. Regensburg, Germany)  
Confinement techniques for simulating finite many-body systems: **S. Chekmarev** (Inst. Thermophysics, Novosibirsk, Russia)  
Pairing correlations in finite systems: atomic nuclei and metallic clusters: **H. Flocard** (U. Orsay, France)  
Experimental investigations of thermodynamical properties of metallic clusters: **H. Haberland** (U. Freiburg, Germany)  
Physical and chemical processes in nano and mesoscale systems and their size evolution: **U. Landman** (U. Atlanta, USA)  
Condensed matter physics approach to nanosystems: **M. Manninen** (U. Jyväskylä, Finland)  
Experimental studies of atomic clusters: **T. P. Martin** (MPI Stuttgart, Germany)  
Magnetism of Clusters: **G. Pastor** (U. Paul Sabatier, Toulouse, France)  
Cooperativity effects in quantum chemistry: **L. Piela** (U. Warsaw, Poland)  
Density functional theory for small systems: **D. Salahub** (U. Montreal, Canada)  
Electron scattering on clusters: **A. Soloviev** (Ioffe Institute, St Petersburg, Russia)  
Complex energy surfaces and thermodynamics of clusters: **D. Wales** (U. Cambridge, England)

**Scientific Context:**

Since about 20 years interest has grown very fast in the study of atomic and molecular clusters as well as nanoparticles such as quantum dots. The small size and the finite number of constituents lead to novel structural and thermodynamic properties with no equivalent in the bulk. The physics and chemistry of clusters remains a largely interdisciplinary subject. The present school will take advantage of this interdisciplinarity with outstanding lecturers having their background in atomic and molecular physics, condensed matter physics, nuclear physics, chemistry and physical chemistry, and last but not least computational physics.

The school aims at providing advanced doctoral and post-doctoral researchers with the state of the art of theoretical concepts and methods. In addition to the already confirmed lectures there will be additional lectures and seminars on recent developments in the fields covered by this school. There will be plenty of time for personal work, discussions, organizing small working groups and to get to know each other.

**Scientific Committee:** **Claude Guet** (Grenoble, France), **Pavel Hobza** (Prague, Czech Republic), **Steve Berry** (Chicago, USA), **Joshua Jortner** (Tel Aviv, Israel), **Fernand Spiegelmann** (Toulouse, France)

**Inscriptions:**

Applications must be send to the School **before March 1, 2000**. A selection committee will select the participants. A financial contribution is requested from each participant (FF 4500 - € 686). It covers accommodation and meals, which are provided within the School for both participants and lecturers. Possibilities of grants exist, in particular for students from Eastern Europe and developing countries. Application forms and additional information are available from:

ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE - 74310 LES HOUCHES, FRANCE  
Phone: +33 - 4 50 54 40 69 - Fax: +33 - 4 50 55 53 25  
E-mail: [secretariat.houches@ujf-grenoble.fr](mailto:secretariat.houches@ujf-grenoble.fr) W3: <http://w3houches.ujf-grenoble.fr/>

*Les Houches is a resort village in the Chamornix valley in the French Alps. Established in 1951, the Physics School is located in a group of chalets surrounded by meadows and woods, at an altitude of 1150 m facing the Mont-Blanc range - a very favorable environment of intellectual activity in ideal surroundings for hiking, mountaineering and sight-seeing.*

The Physics School is affiliated to the Université Joseph Fourier of Grenoble and to the Institut National Polytechnique de Grenoble, and is supported by the Ministère de l'Éducation Nationale, de la Recherche et de la Technologie (MENRT), the Centre National de la Recherche Scientifique (CNRS) and the Direction des Sciences de la Matière of the Commissariat à l'Énergie Atomique (CEA).

This session has received the financial support from the **NATO Advanced Study Institute (ASI) Program** and from the **European Commission High-Level Scientific Conferences (HLSC) Program**

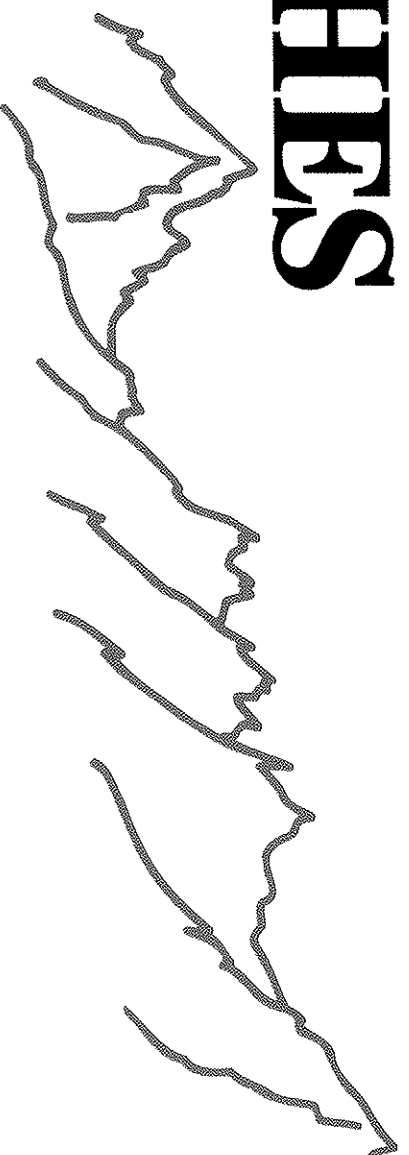
Two sessions are scheduled for 2001, one on "Physics of Biomolecules and Cells", the other on "Gravity, Gauge Theory and Strings"

*Ecole de Physique des Houches, Côte des Chavants, F-74310 les Houches*

*Director: François David*



# LES HOUCHEES



SESSION LXXIV  
NATO ASI  
European High Level Scientific Conference

École d'été de physique théorique

## NEW TRENDS IN TURBULENCE TURBULENCE: NOUVEAUX ASPECTS July 31 - September 1, 2000

**Scientific Direction:** Marcel LESIEUR (LEGI-Grenoble, France)  
Akiva YAGLOM (Institute of Atmospheric Physics, Moscow, and MIT)

**Lecturers:**

A century of turbulence theory - the main achievements and unsolved problems: **A. YAGLOM** (Institute of Atmospheric Physics, Moscow, Russia/MIT)  
Large-eddy simulations: **O. METAIS** (LEGI, Grenoble, France)  
Scaling laws and scale invariance: **G. FALKOVICH** (Weizmann Institute, Israel)  
Burgers turbulence in one and several dimensions: **U. FRISCH** (Cote d'Azur Observatory, Nice, France)  
Industrial modelling of turbulence: **M. LESCHZINER** (Queen Mary College, London, U.K.)  
Computational aeroustics: **R. MANKBADI** (University of Cairo, Egypt/NASA-Lewis, Cleveland, USA)  
Helicity in neutral and MHD turbulence: **K. MOFFATT** (DAMTP, Cambridge, U.K.)  
Two-dimensional turbulence: **J. SOMMERIA** (LEGI, Grenoble, France)  
Wavelet techniques: **M. FARGE** (LMD, Paris, France)  
Scaling laws from experiments: **K. SREENIVASAN** (Yale, USA)  
Instability and vortices in rotating flows: **E. WEISFREID** (ESPCI, Paris, France)  
Dislocations and phase turbulence: **P. COULLET** (INLN, Nice, France)

**Scientific Context:**

This Summer School has several objectives. The first one is to present the spectacular progresses made these last ten years in the domain of turbulence coherent-vortex self-organization, thanks in particular to new large-eddy simulation methods. We intend also to describe the modern tools developed for the analysis of fluid turbulence in three and two dimensions: normal and anomalous scaling laws, turbulent mixing and Lagrangian dynamics, maximum-entropy states, wavelet techniques, nonlinear amplitude equations. From a more practical viewpoint, one will study the influence on turbulence of boundaries, compressibility, curvature and rotation, helicity, magnetic fields. Finally, various applications of turbulence modelling and control to certain industrial or environmental situations will be considered. Specialized seminars by leading European specialists will also be given, on fundamental or more industrial topics related to the programme. It is intended mainly for PhD students and young researchers in fluid mechanics, condensed-matter physics, applied mathematics and environmental sciences. The participation of students from Eastern Europe is strongly encouraged. A computing centre connected to the international network will be also set up, for practical works on simulation, modelling or signal processing.

**Scientific Committee:** G. FALKOVICH, M. FARGE, M. LESIEUR, K. MOFFATT, A. YAGLOM

**Inscriptions:**

Applications must be send to the School **before March 1, 2000**. A selection committee will select the participants. A financial contribution is requested from each participant (FF 4500 - € 686 - for Academic, FF 8000 - € 1220 - for Industrial). It covers accommodation and meals, which are provided within the School for both participants and lecturers. Possibilities of grants exist, in particular for students from Eastern Europe and developing countries. Application forms and additional information are available from:

ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE - 74310 LES HOUCHEES, FRANCE  
Phone: +33 - 4 50 54 40 69 - Fax: +33 - 4 50 55 53 25  
E-mail: secretariat.houches@ujf-grenoble.fr W3: <http://w3houches.ujf-grenoble.fr/>

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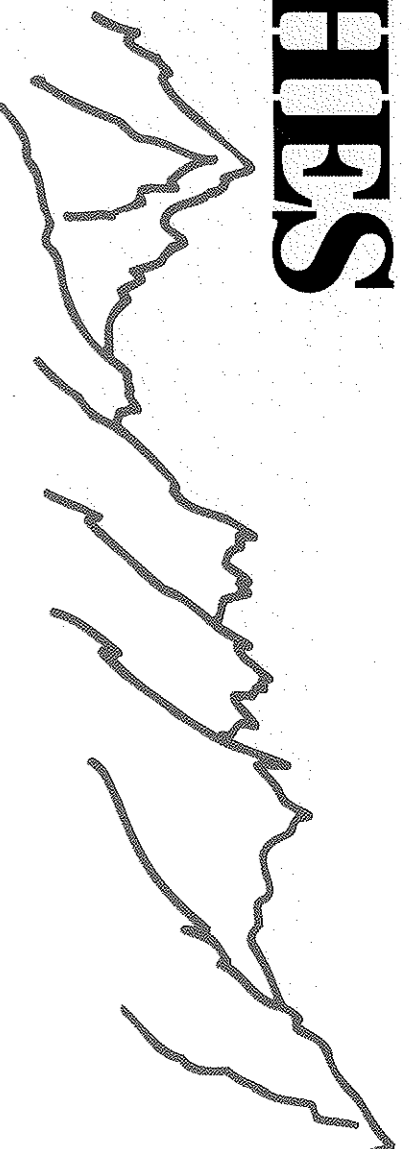
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*Ecole de Physique des Houches, Côte des Chavants, F-74310 Les Houches.*

*Director: François DAVID*



# LES HOUCHES



SESSION XIII

École pré-doctorale de physique

## MICROSCOPIES À CHAMP PROCHE 3 - 15 septembre 2000

### Microscopie à effet tunnel:

- Principes de base, interprétation des images: Ph. SAUTET (Lyon)
- Aspects expérimentaux, applications aux nanotechnologies: P. ZEPPEFELD (Linz)

### Microscopies à force atomique:

- Forces entre une pointe et une surface: C. NOGUERA(Orsay)
- Aspects expérimentaux et applications: C. FRETIGNY (Paris)

### Microscopie et spectroscopie à champ proche optique: A. DEREUX (Dijon)

L'objectif de cette session est de présenter une introduction pédagogique aux microscopies à champ proche qui se sont développées dans les 20 dernières années et qui constituent maintenant un ensemble de techniques expérimentales incontournables dans de nombreux domaines (physique, chimie, biologie...). Les fondements théoriques de ces nouvelles microscopies et leurs applications seront décrits à l'occasion des cours magistraux cités ci-dessus et de séminaires spécialisés. Les cours des Ecoles pré-doctorales sont approfondis mais de caractère suffisamment général. Ils sont destinés principalement aux jeunes chercheurs venant de terminer un DEA ou une Maîtrise; à ceux qui sont en cours de Thèse et, plus généralement, aux jeunes chercheurs étrangers dans une situation d'études analogue. Ils doivent permettre de compléter la formation des participants à la fois dans leur domaine de recherche et dans d'autres disciplines à un niveau plus accessible et moins spécialisé que celui des autres Ecoles. Un effort pédagogique y est effectué tant pour les cours eux-mêmes que par les échanges entre étudiants et enseignants et par les interactions entre étudiants. En dehors des cours et séminaires effectués par les enseignants, chacun des participants fera un court exposé sur son sujet de recherche ou de stage (DEA, Magistère).

### Candidatures et financement

Cette Ecole est ouverte aux étudiants de toute nationalité. Les candidats doivent envoyer un dossier qui sera examiné par un Comité de Sélection. Ce dossier doit comprendre un curriculum vitae détaillé, une lettre de recommandation et éventuellement une demande de bourse.

Le Comité de Sélection attribuera des bourses couvrant totalité ou partie des frais d'inscription et de séjour lesquels s'établissent à 2600 FF.

Le dossier d'inscription doit parvenir:

**avant le 16 Juin 2000**

à Jean-Marc BERRROIR et Sylvie ROUSSET  
Groupe de Physique des Solides, Universités Paris 6 et 7, CNRS UMR 75-88,  
Tour 23, 2 Place Jussieu, 75251 Paris Cedex 05  
Tél.: 01 44 27 46 73 - Fax: 01 43 54 28 78 - Email: berroir@gps.jussieu.fr  
Informations disponibles sur le site: [www.gps.jussieu.fr](http://www.gps.jussieu.fr)

### Comité d'organisation

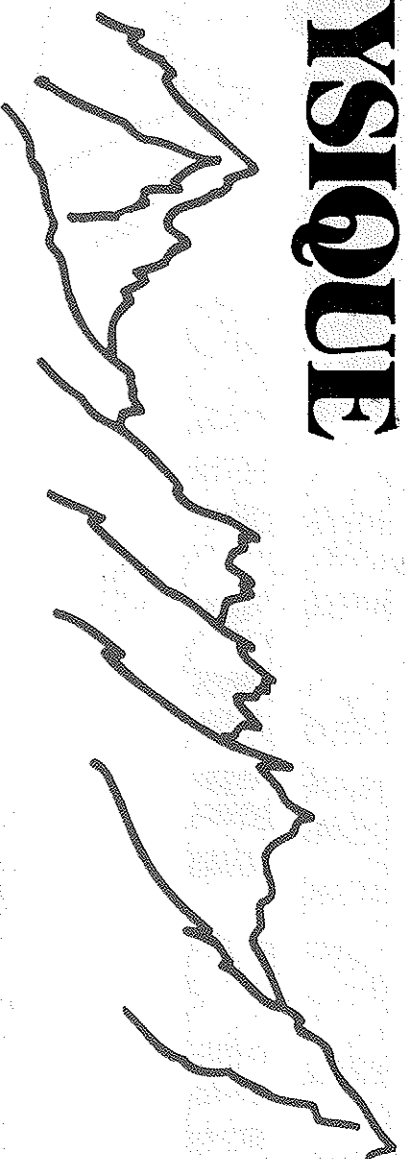
**J-M. BERRROIR et S. ROUSSET** (Directeurs Scientifiques de la session, Paris),  
**C. DELALANDE** (Paris)

*Les Houches est un village de la vallée de ChamoniX, dans les Alpes françaises. L'Ecole a lieu dans un groupe de chalets montagnards entourés de prairies et de bois. Il est situé à une altitude de 1150m. L'hébergement et les repas sont assurés pour tous les participants. Les étudiants bénéficieront en permanence de salles de réunions et d'une bibliothèque.*

*Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches. Tél.: (33) 4 50 54 40 69 - Fax: (33) 4 50 55 53 25*



# CENTRE DE PHYSIQUE DES HOUCHEES



74310-LES HOUCHEES  
France

## **Nato ASI and Euro Summer School ELECTROSTATIC EFFECTS IN SOFT MATTER AND BIOPHYSICS October 1 - 13, 2000 in Les Houches - France**

### **ORGANIZED BY**

Christian HOLM, MPI for Polymer Research, Mainz  
Rudi PODGORNIK, Univ. of Ljubljana, and NIH, Bethesda  
Patrick KÉKICHEFF, CNRS Strasbourg

An interdisciplinary school on advanced theoretical and experimental methods used in the study of the biological, chemical and physical behavior of electrolytes, macroions and polyelectrolytes in the fields of soft condensed matter and biophysics.

### **CONFIRMED SPEAKERS**

<b>D. ANDELMAN</b> , Tel-Aviv	<b>P. KÉKICHEFF</b> , Strasbourg	<b>R. PODGORNIK</b> , Ljubljana et Bethesda
<b>M. CAFFREY</b> , Columbus (Ohio)	<b>A. KHOKLOV</b> , Moscou	<b>J. RÄDLER</b> , Munich
<b>W. GELBART</b> , Los Angeles	<b>R. KJELLANDER</b> , Göteborg	<b>M. RAWISO</b> , Strasbourg
<b>D. GRIER</b> , Chicago	<b>K. KREMER</b> , Mayence	<b>C. WILLIAMS</b> , Paris
<b>J.-F. JOANNY</b> , Strasbourg	<b>R. NETZ</b> , Potsdam-Golm	
<b>B. JÖNSSON</b> , Lund	<b>V.A. PARSEGIAN</b> , Bethesda	

Les Houches is a resort village in the Chamamonix Valley of the french Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at 1150 m elevation. It is ideally located for mountaineering, skiing or touring as well as for intellectual pursuits.

The school is open to about 55 participants. Costs are 900 Euro, including full board and lodging, with a limited number of grants available. Preference is given to Women researchers, researchers aged 35 years or under, qualified applicants from Greece, Portugal and Turkey, and researchers whose place of work is in a less-favoured region of the EU. Application information can be found at [http://www-theory.mpi-mainz.mpg.de/~pep/les\\_houches/](http://www-theory.mpi-mainz.mpg.de/~pep/les_houches/) or email to [karttune@mpip-mainz.mpg.de](mailto:karttune@mpip-mainz.mpg.de)

This school is financially supported by NATO grant ASI.976196 and the European Commission Research, DG, Human Potential Programm, High-Level Scientific Conferences, contract HPCF-CT-1999-00130.

The Physics School in Les Houches is affiliated to Université Joseph Fourier and l'Institut National Polytechnique in Grenoble. It is subsidized by the MENERT and CNRS and Commissariat à l'Energie Atomique.

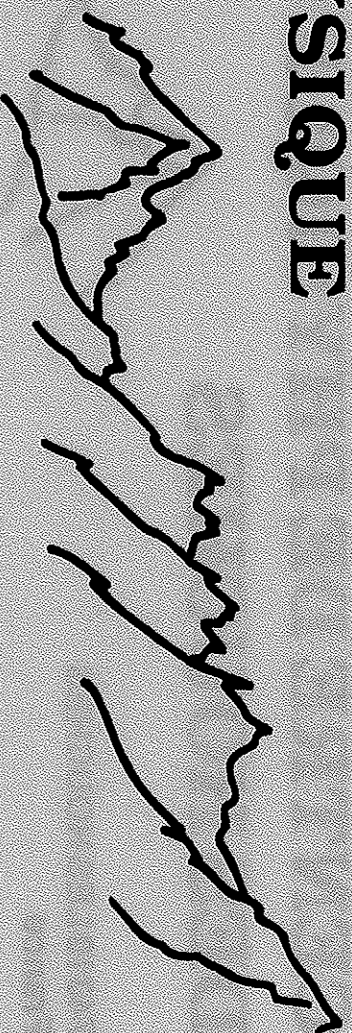
Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches.

Director : Martial DUCLOY Tel. : (33) 1 49 40 39 00 - (33) 4 50 54 40 69 - Fax : (33) 4 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHES

74310 LES HOUCHES  
France



## BIOMEDICAL APPLICATIONS OF NUCLEAR MAGNETIC RESONANCE USING HYPERPOLARIZED GASES

October 16-27, 2000

### SCIENTIFIC PRESENTATION

Biomedical applications of hyperpolarized noble gas in Nuclear Magnetic Resonance (NMR) represent new research fields of medical diagnostics and biophysical investigations. These new multidisciplinary research topics cover scientific areas such as laser physics, materials science, and medicine.

The Euro Summer School is designed to offer training in multidisciplinary applications of hyperpolarized gases to graduate or undergraduate students as well as to other research scientists. The Euro Summer School is based on lectures by leading world scientists involved in the use or production of hyperpolarized noble gases. The program of the Euro Summer School includes (i) tutorial lectures on Nuclear Magnetic Resonance, Magnetic Resonance Imaging, laser physics, and atomic spectroscopy, (ii) in-depth presentation of state-of-the-art biomedical applications of hyperpolarized noble gases in neurology, lung studies, biochemistry, surface science and (iii) cutting-edge perspectives of the method.

### ORGANIZERS

Winnie Svendsen, Elizabeth Shabanova, Henrik Gesmar, Yannick Crémillieux.

### SCIENTIFIC COMMITTEE

Michèle Leduc, Niils O. Andersen, Werner Heil, Jann Mortensen, Freddy Stahlerberg, Ron Walsworth

### LECTURERS

M. Albert, A. Bifone, L. Darrasse, A. Dirksen, B. Driehuis, W. Happer, K-U. Kauczor,  
K-F. Kreimer, H. Larsson, M. Leduc, T. Meersmann, J.P. Mugler, G. Navon, B. Quistorff,  
C. Segebarth, S. Swanson, E. Van Beek, R. Walsworth, N. Weller

The Euro School will be open to approximately 60 participants.

Participation costs:           Accommodation:       5064 FFR

Registration fees:           2500 FFR

The Euro School may provide grants for EU participants to cover accommodation and travel expenses.  
For application and additional information :

<http://ntserv.fys.ku.dk/hypolgas/>  
Email : [winnie@fys.ku.dk](mailto:winnie@fys.ku.dk)

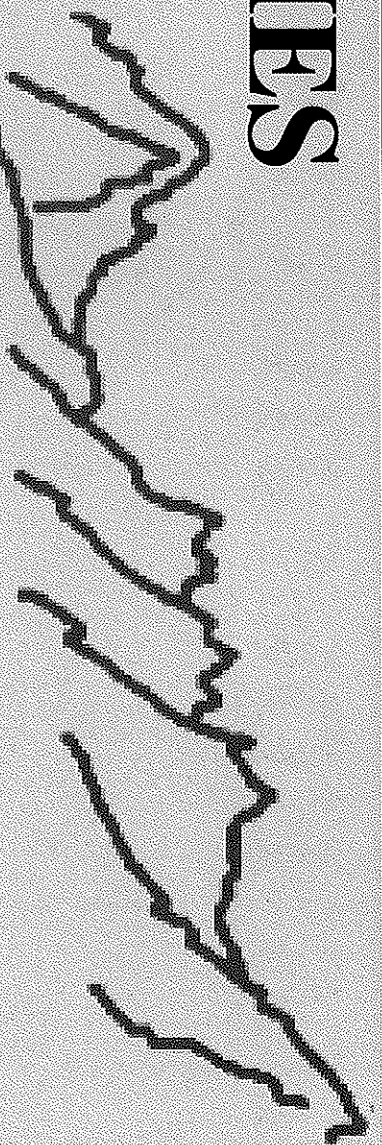
This session acknowledges grants from the European Community, the Danish Research Academy's Graduate School of Biophysics, the Centre National de la Recherche Scientifique (France), the Ministère de l'Education Nationale, de la Recherche et de la Technologie (France) and from Coherent Corp.

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The Physics School in Les Houches is affiliated to Université Joseph Fourier and Institut National Polytechnique in Grenoble. It is subsidized by the MENRT, and CNRS and Commissariat à l'Energie Atomique.  
Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches.  
Director : Martial Ducloy - Tel. : (33) 4 50 54 40 69 or (33) 1 49 40 39 00 - Fax. : (33) 4 50 55 53 25



# LES HOUCHEES



CENTRE DE PHYSIQUE

## FUTURE APPLICATIONS OF SCIENCE WITH SYNCHROTRON RADIATION AND FREE ELECTRON LASERS IN EUROPE

March 12-15 2001

### SCIENTIFIC COMMITTEE

Prof. G. Le Lay, Université de Provence, Marseille and Dr P. Lindley, ESRF, Grenoble, co-Chairs  
Dr. M.C. Asensio, CSIC, Madrid  
Dr. C. Cambillau, AFMB-CNRS, Marseille  
Dr. J.-M. Filhol, ESRF, Grenoble  
Prof. U.O. Karlsson, Royal Institute of Technology, Stockholm  
Prof. J.M. Layer, Université de Provence, Marseille

Dr P. Perfetti, ISM-CNR, Roma  
Prof. J. Schneider, HASYLAB at DESY, Hamburg  
Prof. P. Soukiasian, Université Paris-Sud, Orsay and CEA, Saclay  
Dr A. Tadjeddine, LURE, Orsay

### SCIENTIFIC PROGRAM and OBJECTIVE

Synchrotron radiation plays a crucial role for the understanding of many phenomena in natural sciences and living systems. Modern facilities used by a continually growing community of users play a pivotal role in innovative science across a wide range of disciplines. A brilliance greater than  $10^{20}$  ph/(s mm<sup>2</sup>.mmrad<sup>2</sup>.0.1% bandpass) can be achieved at present third generation sources such as the ESRF and will also be available over a certain energy range at new facilities like the SLS, DIAMOND and SOLEIL. At the same time, novel accelerator techniques could open the way to new light sources with very interesting time structures and potential peak brilliance several orders of magnitude above conventional synchrotrons. Such projects include the Self-Amplified Spontaneous Emission (SASE) Free Electron Laser under investigation at DESY in Hamburg.

This winter school is intended for doctoral and postdoctoral researchers, engineers and senior scientists interested in the fields of synchrotron radiation production and its applications to scientific research. In-depth lectures will cover basic aspects of synchrotron radiation production and introductions to several relevant applications in the natural and life sciences. Shorter lectures and seminars will present latest developments and trends. There will also be time for **poster presentations** and discussions.

### TOPICS and SPEAKERS (Lectures and Seminars)

**SYNCHROTRON RADIATION** (accelerator physics, synchrotron radiation production and instrumentation, storage rings, Free Electron Lasers, new projects)

J. Schneider (Hamburg), A. Roper (Grenoble), T. Möller (Hamburg), G. Datoli (Frascati), P. Perfetti (Roma), G. Le Lay (Marseille), P. Lindley (Grenoble)

**LASER PHYSICS and APPLICATIONS** (IR-FELs, new developments in ultra short pulses and soft x-ray lasers, pump/probe experiments and dynamical studies)

A. Tadjeddine (Orsay), J.M. Ortega (Orsay), C. Hirtlmann (Strasbourg), U.O. Karlsson (Stockholm)

**HARD X-RAYS** (diffraction, protein crystallography, medical and biotechnological applications, environmental applications)

G. Margaritondo (Lausanne), J. Lopez Carrascosa (Madrid), R. Fourme (Orsay), C. Cambillau (Marseille), G. Renaud (Grenoble), A. Manceau (Grenoble)

**SOFT X-RAYS and UV LIGHT** (photoelectron diffraction and holography, x-ray emission, applications in materials science)

M.C. Asensio (Madrid), J. Nordgren (Uppsala), P. Soukiasian (Orsay)

### REGISTRATION

Applications must have reached the organizers (contact : Prof. G. Le Lay) before **February 15, 2001**, in order to be considered by the selection committee. A financial contribution of **2300 FF – 350 Euros** is requested from each participant (it covers housing and meals at the school). Grants may be available. To get the application forms and additional **information**, click on : <http://www.crmc2.univ-mrs.fr/Ecole/>

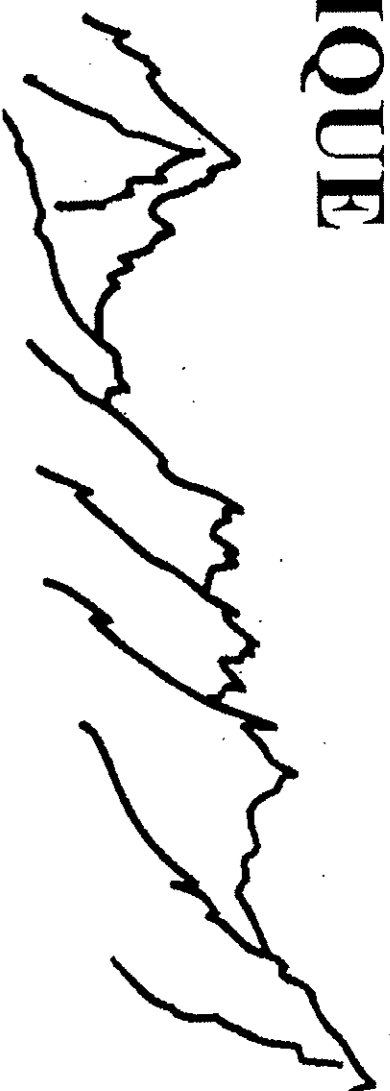
This session is supported by the European Round Table on Synchrotron Radiation and Free Electron Lasers, the Commissariat à l'Energie Atomique and the Centre National de la Recherche Scientifique

Les Houches is a resort village in the Chamoniix valley in the French Alps. Established in 1951, the Physics School is located in a group of chalets surrounded by meadows and woods, at an altitude of 1150 m facing the Mont-Blanc range - a very favorable environment for intellectual activity in ideal surroundings for skiing, hiking, mountaineering and sight-seeing.



# CENTRE DE PHYSIQUE DES HOUCCHES

74310 LES HOUCCHES



## Élaboration et caractérisation des cristaux massifs et en couches minces pour l'optique

**DU 23 AVRIL AU 27 AVRIL 2001**

École organisée par la Société Française d'Optique (S.F.O.)  
avec la collaboration de la Formation Permanente du CNRS - Ile-de-France Sud  
et du Centre de Physique des Houches

### COMITÉ D'ORGANISATION :

**Benoît BOULANGER** (Lab. de Spectrométrie Physique, Univ. J. Fourier, St Martin d'Hères)  
**Pierre CHAVEL** (Lab. Charles Fabry de l'I.O.)  
**Jean-Claude SAGET** (Lab. Charles Fabry de l'I.O.)

### PROGRAMME ET CONFÉRENCIERS :

- Élaboration des cristaux massifs pour l'optique : **Bernard Ferrand** (CEA/LETT, Grenoble), **Jean-Paul Garandet** (CEA/MLSP, Grenoble).
- Élaboration des couches minces monocristallines pour l'optique : **Bernard Agius** (LCF/IO).
- Caractérisation de la qualité cristalline : **Bernard Capelle** (LMC, Paris), **Camille Cohen** (GPS, Paris), **Didier Gourier** (LCAES/ENSCP, Paris).
- Caractérisations des cristaux massifs pour l'optique : **Benoît Boulanger** (LSP, St Martin d'Hères), **Jacques Mangin** (LPUB, Dijon), **Richard Moncorgé** (CIRIL-MIL, Caen), **Gérald Roosen** (LCF/IO, Orsay).
- Caractérisations des couches minces optiques : **Pierre Boher** (SOPRA, Bois-Colombes), **François Abel** (GPS, Paris), **Jacques Lafait** (L. Opt. Sol., Paris).
- Propriétés d'interfaces des couches minces optiques : **Claude Amra** (Institut Fresnel, Marseille).

**Frais d'inscription :** 5000 F incluant la pension complète,

2645 F pour les agents du CEA, 3700 F pour les participants des autres établissements publics,

1850 F pour les étudiants,

réduction de 150 F pour les membres de la SFO.

*L'École a été reconnue comme École Thématique du CNRS. Agents CNRS : nous contacter.*

**Date limite d'inscription : 23 mars 2001**

Renseignements : **J.C. SAGET**, Institut d'Optique, BP 147, 91403 ORSAY cedex

Tél. : 01 69 35 87 43 - télécopie : 01 69 35 87 00 - Courriel : [jean-claude.saget@iota.u-psud.fr](mailto:jean-claude.saget@iota.u-psud.fr)

*La station du village des Houches (altitude 1150 m) se trouve au centre des Alpes, dans la vallée de Chamoniix. Fondée en 1951 l'École est située dans un groupe de chalets de montagne entouré de prairies et de bois. C'est un lieu idéal pour le travail et les sports de montagne. L'École de Physique des Houches est affiliée à l'Université Joseph Fourier et à l'Institut National Polytechnique de Grenoble. Elle est subventionnée par les ministères de l'Éducation Nationale et de la Recherche, le CNRS et le Commissariat à l'Énergie Atomique.*

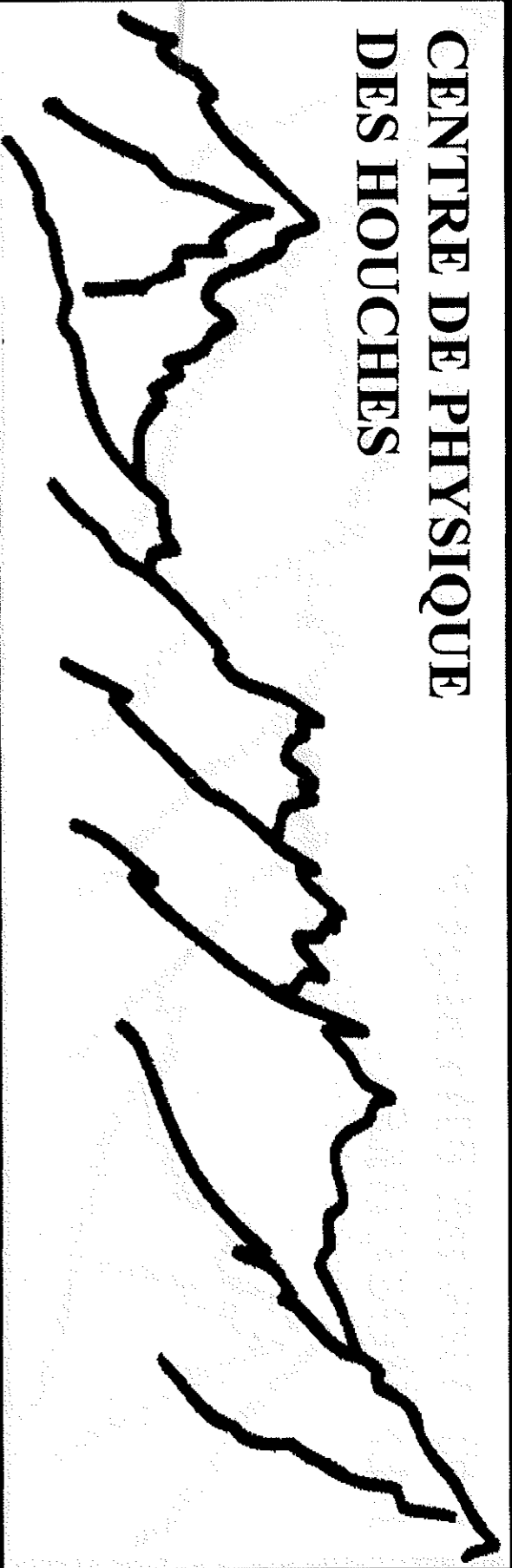
*École de Physique des Houches, Côte des Chavants, 74310 Les Houches*

Tél. : 04 50 54 40 69  
Fax : 04 50 55 53 25

Directeur : **Marthal Ducloy** Tél. : 01 49 40 39 00



# CENTRE DE PHYSIQUE DES HOUCHES



## SPRING SCHOOL

# OPTICAL SPECTROSCOPY AND MICROSCOPY OF SINGLE OBJECTS

Sunday 6 - Friday 11 May 2001

Les Houches - France

Organizers : M. Orrit, Ph. Tamarat, A. Maali (Bordeaux)

Scientific Committee : Th. Basché, M. Orrit, Th. Schmidt, C. Seidel, N. van Hulst, S. Weiss, X. S. Xie.

It is now possible to detect, image, and study single nano-objects by purely optical methods. This new microscopy removes ensemble averaging completely, so that the heterogeneity of populations as well as the dynamical fluctuations of individuals come to light. Though such nano-objects as semiconductor nanocrystals, metal particles, color centers, polymer molecules, etc. can be detected individually, the School will focus mainly, but not exclusively, on single small molecules. Topics will include the photophysical and photochemical properties of single molecules and their use as probes for various environments at nanometer scales. Biophysical applications will be given special attention.

The School is primarily aimed at beginners in the microscopy of single objects: students, post-docs, young researchers, or experienced scientists from other disciplinary horizons. It should provide them with a firm background in the experimental methods and the state-of-the-art, as well as with precious personal relations with prominent contributors to the field. The program combines courses of detailed lectures on well established subjects and shorter contributions on promising new developments.

### Main Lectures by :

<b>Thomas Basché</b> (Mainz)	<i>Molecular spectroscopy, intramolecular processes, spectral jumping of single molecules</i>
<b>Claus Seidel</b> (Göttingen)	<i>Photochemistry and physical chemistry with single molecules</i>
<b>Thomas Schmidt</b> (Leiden)	<i>Diffusion of single molecules in lipid membranes and in living cells</i>
<b>Niek van Hulst</b> (Twente)	<i>Single molecule studies with near-field optics</i>
<b>Shimon Weiss</b> (Berkeley)	<i>Single quantum dots, FRET studies of single biomolecules</i>
<b>X. Sunney Xie</b> (Harvard)	<i>Nonlinear optics with single molecules, apertureless near-field microscopy</i>

A total participation fee of 3500 FF (535 Euro) will cover registration, full board accommodation, and one issue of the proceedings. The number of participants is limited to 55, selected on a first-come-first-served basis. Application forms should be received no later than March 1<sup>st</sup> 2001. Payment will be made in Les Houches at the beginning of the School. Each participant will have the possibility to present a poster.

Application forms should be sent to: Ph. Tamarat, CPMOH, Université Bordeaux I, 351 cours de la Libération, F-33405 Talence

E-mail: [sing-mol@ftbdx11.cribx1.u-bordeaux.fr](mailto:sing-mol@ftbdx11.cribx1.u-bordeaux.fr)

Web: <http://www.cpmoh.u-bordeaux.fr/PagesEquipes/orrit/equipe-orrit-ang.html>

See also <http://W3houches.ujf-grenoble.fr>

This School is supported by the CNRS, the DGA, and the Ministère des Affaires Étrangères.

Les Houches is a resort village in the valley of Chamomix in the French Alps. The School is distributed over a group of chalets surrounded by meadows and woods, at an elevation of 1150 m, facing the Mont-Blanc. Its quiet location is ideally suited for mountaineering and skiing as well as for intellectual activities.

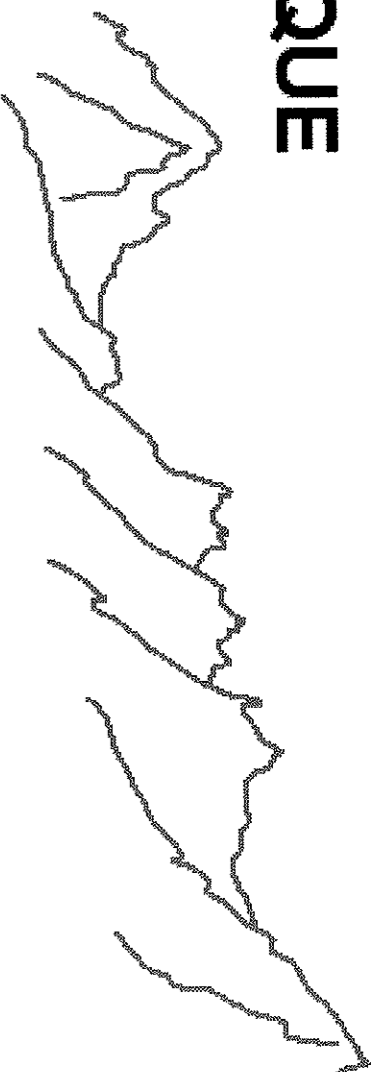
The Physics School in Les Houches is affiliated to Université Joseph Fourier and l'Institut National Polytechnique in Grenoble. It is subsidized by the MENERT, and CNRS and Commissariat à l'Énergie Atomique.

*Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches (France). Director: Martial Ducloy. Tel.: (33) (0)4 50 54 40 69, Fax: (33) (0)4 50 55 53 25.*

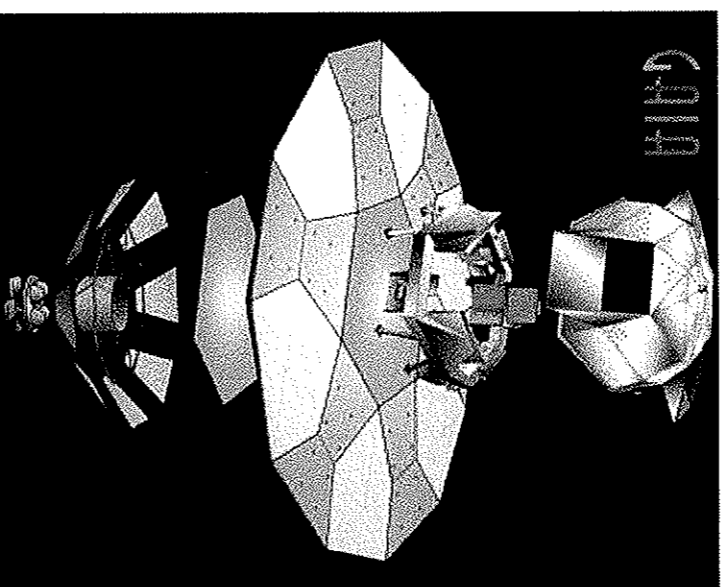


# CENTRE DE PHYSIQUE DES HOUCHES

74310 Les Houches  
France



## GAIA, A EUROPEAN SPACE PROJECT



14 – 18 May 2001

Les Houches  
France

SCIENTIFIC  
ORGANISING  
COMMITTEE



**O. BIENAYMÉ**, Strasbourg, **C. TURON**, Paris, **M.A.C. PERRYMAN**, Noordwijk  
**A. BAGLIN**, Paris, **J. BINNEY**, Oxford, **A. CORADINI**, Roma, **P. FAYET**, Paris,  
**K. FREEMAN**, Mt Stromlo, **G. GILMORE**, Cambridge, **A. GIMENEZ**, Madrid,  
**M.T. LAGO**, Porto, **M. MAYOR**, Genève, **F. MIGNARD**, Grasse,  
**H.-W. RIX**, Heidelberg, **P.T. de ZEEUW**, Leiden

This School will be dedicated to the presentation and to discussions of the many astrophysical applications of the GAIA satellite, the most recent cornerstone of the European Space Agency's science programme. The GAIA mission will provide a stereoscopic and kinematic map of our Galaxy at micro-arcsec level accuracy. It will observe more than one percent - one billion stars - of the Galactic stellar population with the precision necessary to unravel its composition, formation scenario and subsequent evolution. Additional scientific products will include the discovery and characterisation of tens of thousands of extra-solar planetary systems, a survey of galaxies, the discovery and measurement of enormous numbers of minor bodies in the solar system, and stringent tests of general relativity.

Les Houches' is a resort village in the Chamonix Valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at 1150 m elevation. It is ideally located for mountaineering, skiing or touring as well as for intellectual pursuits.

The school will be open to about 70 participants. Costs are 2110 FF, including full board and lodging, with some specific grants available. This school is financially supported by the High-Level Scientific Conference European Programme (contract HPCF-2000-00093), by CNES, ESA, CNRS and the Observatoire de Paris. A preliminary programme, further information, and registration details are available at <http://astro.u-strasbg.fr/gaia>.

The Physics School in Les Houches is affiliated to the Université Joseph Fourier and to the Institut National Polytechnique in Grenoble. It is subsidized by the MENERT and CNRS and Commissariat à l'Energie Atomique.

Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches.

Director : Martial DUCLOY    Tel. : (33) 1 49 40 39 00 – (33) 4 50 54 40 69 – Fax : (33) 4 50 55 53 25



LES HOUCHEs

1951–2001



Centre de Physique

## Workshop: Physics at TeV Colliders

Les Houches, France 21 may – 1<sup>st</sup> June 2001

### Local Organising Committee:

P. Aurenche, LAPTH, Annecy-le-Vieux  
G. Belanger, LAPTH, Annecy-le-Vieux  
F. Boudjema, LAPTH, Annecy-le-Vieux  
J.-Ph. Guillet, LAPTH, Annecy-le-Vieux  
P. Perrodo, LAPP, Annecy-le-Vieux  
E. Pilon, LAPTH, Annecy-le-Vieux  
L. Poggioli, LAPP, Annecy-le-Vieux

### International Organising Committee:

P. Binétruy, LPT, Orsay, France  
S. Catani, CERN, Geneva, Switzerland  
D. Denegri, CEA Saclay, France  
M. Drees, Tech. Univ. München, Germany  
F. Gianotti, CERN, Geneva, Switzerland  
J. Huston, Michigan State Univ., USA  
M. Mangano, CERN, Geneva, Switzerland  
F. Paige, Brookhaven Nat. Lab., USA  
D.P. Roy, T.I.F.R., Mumbai, India  
Y. Shimizu, KEK, Tsukuba, Japan  
P. Zerwas, DESY, Hamburg, Germany

### Aim of the Workshop

This Workshop is the second in a series whose aim is to bring together theorists and experimentalists working on the phenomenology of the upcoming colliders. The topics cover primarily the physics at the Tevatron and the LHC, although issues relevant to the next generation of colliders will be addressed. Themes to be covered in the Workshop range from Quantum Chromodynamics to the mechanism of electroweak symmetry breaking, notably Higgs Physics, Supersymmetry and the phenomenology of extra-dimensions. The strong interplay between the signals from the New Physics and their respective backgrounds will be emphasized. Three Working Groups have been set up covering these different aspects of the searches at the colliders. The projects are to start in January 2001 and should be completed by the end of the year.

The meeting at les Houches, between May 21st and June 1st, will be the culminating point of the Workshop where, besides the Working Group activities, a few lectures and review talks are planned.

### Working Groups and their Conveners

#### Higgs

M. Spira, C. Wagner (Theory)  
D. Cavalli, K. Jacobs,  
A. Nikitenko, W. Yao (Experiment)

#### Beyond the Standard Model

J. Gunion, K. Matchev, J. Hewett (Theory)  
S. Abdullin, G. Azuelos, G. Landsberg,  
F. Paige (Experiment)

#### QCD and Standard Model

P. Aurenche, E. Pilon (Theory)  
M. Dittmar, J. Huston,  
S. Tapprogge (Experiment)

### Registration

Attendance in Les Houches is limited to about 70 participants. The total fee amounts to FF 5000. It covers full lodging and meals for the whole duration of the meeting in Les Houches. Limited financial support is available. Registration should be made **before 1st March 2001** at the WEB site

<http://www.lapp.in2p3.fr/conferences/LesHouches/Houches2001/>

where more information is available.

*Les Houches is a resort village in the Chamorix valley of the French Alps. The Physics Centre in Les Houches, established in 1951, is located in a group of mountain chalets surrounded by meadows and woods at 1150 m elevation facing the Mont-Blanc. It provides a very favourable environment for intellectual activity in ideal surroundings for hiking and sight-seeing. The Physics Centre is affiliated with the University Joseph Fourier and the Institut National Polytechnique de Grenoble and is supported by MENRT, CNRS and CEA. This session is supported by the European Union (5<sup>th</sup> Framework Programme), CNRS (Formation Permanente) and Université de Savoie.*

Centre de Physique des Houches, Côte des Chavants, F-74310 les Houches.  
Director: Martial DUCLOY

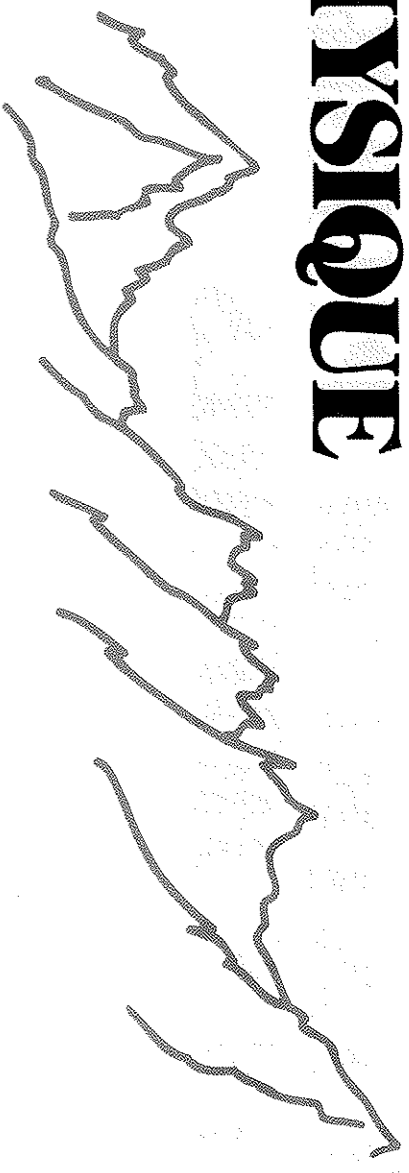
Tel. (33) 1 49 40 39 00  
Fax (33) 1 49 40 32 00

or

(33) 4 50 54 40 69  
(33) 4 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES  
France

## RECENT DEVELOPMENTS IN FOAMS June 10-15 juin 2001

### Organized by

Jean-Marc DI MEGLIO et Nicolas RIVIER,  
University of Strasbourg

The study of foams and emulsions has received recently a renewal of attention from physicists which has led to an impressive collection of new concepts and developments. This renewal has been motivated by the possible connection with granular matter (sandpiles, etc.) and glass and by the increasing interests in highly correlated soft objects whose physical properties are dominated by (random, space-filling-) geometry rather than by constitutive equations. The aim of the workshop is to design the state of the art in foam studies and to bring together different approaches coming from geometry, statistical physics, mechanics and physical chemistry.

### Confirmed speakers

M. Adler, Marne-la-Vallée,  
R. Aveyard, Hull  
J.-J. Benattar, Gif-sur-Yvette  
V. Bergeron, Paris  
L. Cipeletti, Montpellier  
S. Cohen-Addad, Marne-la-Vallée  
S. Cox, Dublin  
G. Debrégeas, Strasbourg  
F. Elias, Paris  
P. Hébraud, Paris  
G. Maret, Mainz  
K. Mecke, Wuppertal  
C. Oguey, Cergy-Pontoise  
J.-F. Sadoc, Orsay  
A. Saint-Jalmes, Orsay  
H. Stone, Harvard

Les Houches is a resort village in the Chamoniix Valley of the French Alps. Established in 1951, the School is located in a group of mountain chalets surrounded by meadows and woods at 1150 m elevation. It is ideally located for mountaineering, skiing and touring as well as for intellectual pursuits.

**The workshop is open to about 70 participants. Costs are 380 Euros, including full board and lodging.**

**Information :** Jean-Marc di Meglio ([dimeglio@ics.u-strasbg.fr](mailto:dimeglio@ics.u-strasbg.fr)), Nicolas Rivier ([nick@fresnel.u-strasbg.fr](mailto:nick@fresnel.u-strasbg.fr)).

The Physics School in Les Houches is affiliated to Université Joseph Fourier and l'Institut National Polytechnique in Grenoble. It is subsidized by the MENERT and CNRS and Commissariat à l'Énergie Atomique.

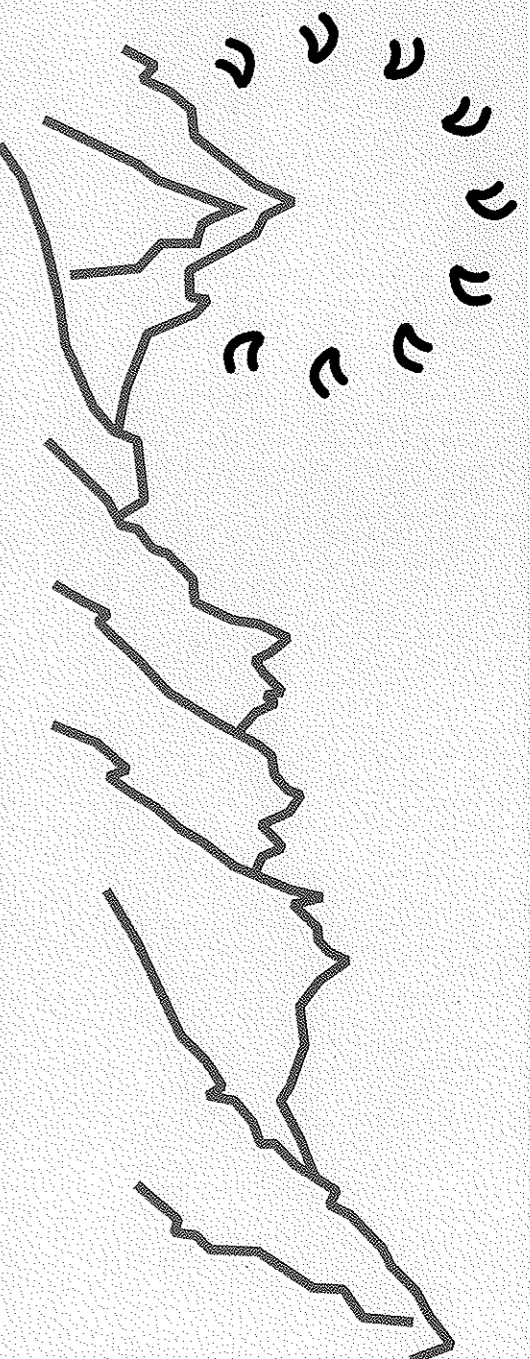
Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches

Director : Martial Ducloy    Tel : (33) 1 49 40 39 00  
(33) 4 50 54 40 69  
Fax : (33) 4 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHEs

Côte des Chavants  
74310 LES HOUCHEs France



Les Houches EuroConference on

# NEUTRINO MASSES AND MIXINGS

18-22 June 2001

*Scientific Committee :*

**G. Altarelli** (CERN, CH)  
**J.-J. Aubert** (Paris, F)  
**S. Bilenky** (Dubna, R)  
**Y. Declais** (Lyon, F)  
**L. di Lella** (CERN, CH)

*Organizing Committee :*

**J. Learned** (Hawaii, USA)  
**P. Ramond** (Gainesville, USA)  
**A.Y. Smirnov** (Trieste, I)  
**M. Spiro** (Saclay, F)  
**Y. Totsuka** (Tokyo, J)

**J. Orloff** (Clermont, F)  
**J. Bouchez** (Saclay, F)  
**S. Katsanevas** (Lyon, F)  
**J. Marteau** (Lyon, F)  
**C. Tao** (Marseille, F)

The goal of this conference is to gather accelerator, astroparticle and solar physicists, phenomenologists, theorists and cosmologists in order to evaluate the evidences for neutrino mass and oscillation and further prospect which measurements may help disentangle competing analyses and theoretical models. The meeting will be organized in five days around the themes:

- atmospheric neutrinos and neutrino telescopes
- stellar neutrinos
- combined analysis
- medium baselines, long baselines and neutrino factories
- theoretical models and cosmology

with workshop discussions and short presentations in the afternoon.

*Speakers and Conveners*

<b>G. Altarelli</b> (CERN, CH)	<b>S.F. King</b> (Southampton, UK)	<b>S. Tilav</b> (Oxford, UK)
<b>D. Autiero</b> (CERN, CH)	<b>J. Learned</b> (Hawaii, USA)	<b>Y. Totsuka</b> (Tokyo, J)
<b>A. Bazariko</b> (Princeton, USA)	<b>M. Lola</b> (CERN, CH)	<b>S. Turck-Chièze</b> (Saclay, F)
<b>A. Blondel</b> (Geneva, CH) *	<b>T. Montaruli</b> (Bari, I)	<b>D. Vignaud</b> (Paris, F)
<b>M. Cribier</b> (Saclay, F)	<b>K. Nakamura</b> (Tokyo, J)	<b>P. Vogel</b> (Pasadena, USA)
<b>F. Feruglio</b> (Padova, I)	<b>J. Rachen</b> (Utrecht, NL) *	<b>C. Weinheimer</b> (Mainz, D)
<b>G. Fogli</b> (Bari, I) *	<b>P. Ramond</b> (Gainesville, USA)	<b>T. Yanagida</b> (Tokyo, J) *
<b>M.C Gonzalez-Garcia</b> (Valencia, E)	<b>A. Rubbia</b> (Zurich, CH) *	
<b>D. Harris</b> (Fermilab, USA) *	<b>A.Y. Smirnov</b> (Trieste, I)	

\* to be confirmed

Les Houches is a resort village in the Chamonix Valley of the french Alps. Established in 1951, the Physics Center is located in a group of chalets surrounded by meadows and woods at 1150m elevation. It is ideally situated for intellectual pursuits and mountaineering.

Participation will be limited to 65. The conference fee (400 euros) covers full board and lodging. Grants will be available, in particular for nationals from EU or Associated States under 35.

**Deadline for applications: 24 March 2001**

For informations about applications, contact

Laboratoire de Physique Corpusculaire, F-63177 Aubière Cedex.

Email: [neutrinhouches@clermont.in2p3.fr](mailto:neutrinhouches@clermont.in2p3.fr) - Tel: +33 473 40 51 25 Fax: +33 473 26 45 98

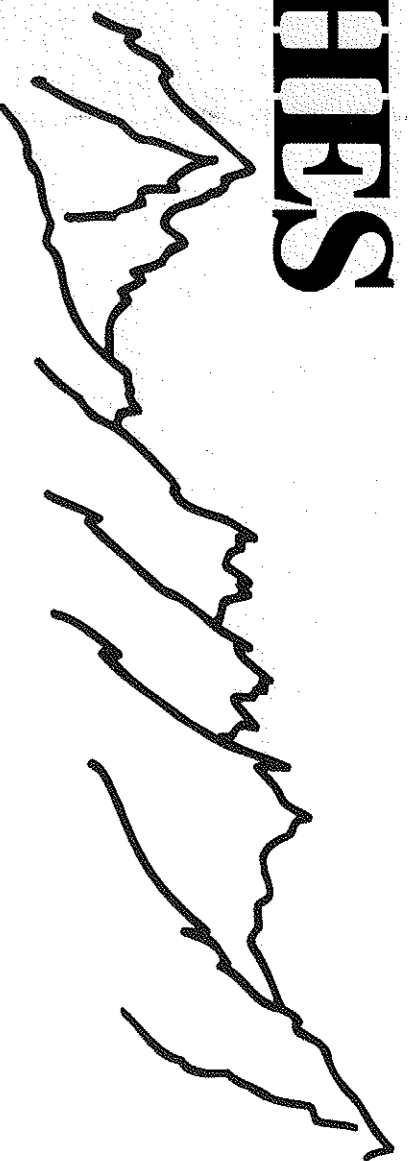
On-line informations and application forms available at <http://neutrinhouches.in2p3.fr>

This conference is supported by the European Commission, Research DG, Human Potential Program, Contract No: HPCF-CT-2000-00208. The Physics School in Les Houches is affiliated to Université Joseph Fourier and Institut National Polytechnique in Grenoble. It is subsidised by the MENRT, the CNRS and the CEA. Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches. Director: Martial DUCLOY Tel: +33 450 54 40 69 Fax: +33 450 55 53 25.



# LES HOUCHES

## SESSION LXXV



1951 - 2001  
50<sup>th</sup> anniversary

École d'été de physique théorique

NATO Advanced Study Institute - Danish Research Agency's  
Graduate School of Biophysics - Euro Summer School

## PHYSICS OF BIO-MOLECULES AND CELLS PHYSIQUE DES BIOMOLÉCULES ET DES CELLULES

July 2-27, 2001

**Scientific Direction:**

Henrik Flyvbjerg (Risø Nat'l Laboratory & Niels Bohr Inst., Copenhagen, Denmark)

Pál Ormos (Biological Research Center of the Hungarian Academy of Sciences, Szeged, Hungary)

Frank Jülicher (Institut Curie, Paris, France)

**Lecture series:**

Mechanics of Motor Proteins and the Cytoskeleton:

J. HOWARD (Max Planck Institute for Molecular Cell Biology and Genetics, Dresden, Germany)

Modelling Molecular Motors: T. DUKE (Cavendish Lab, Cambridge, UK)

Physics of Protein-DNA Interactions: R. BRUNSMMA (University of Leiden, The Netherlands)

Molecular Force Spectroscopy: E. EVANS (Boston University, USA, and University of British Columbia, Canada)

Cell Mechanics and Adhesion: E. SACKMANN (TU-Munich, Germany)

Biological Physics with Micro-fabricated Devices: R. H. AUSTIN (Princeton University, USA)

Gene Regulation: Dissection by probabilistic methods, comparative analysis, and DNA micro-array data:

E. SIGGIA (Rockefeller University, New York, USA)

Thinking About the Brain: W. BIALEK (NEC Research Institute, Princeton, USA)

**Seminars and shorter lecture series:**

S. BLOCK\* (Stanford University, USA), A. BOULBITCH (TU-Munich, Germany), M. DOGTEROM (AMOLF, The Netherlands),

T. DUKE (Cavendish Lab, Cambridge, UK), S. LEIBLER (Princeton University, USA), A. LIBCHABER (Rockefeller Univ., USA),

J. PROST (Institut Curie, Paris, France), T. VICSEK\* (Eötvös Univ., Budapest, Hungary), and others. (\* to be confirmed)

**Scientific Program:** Physics plays an increasing role for the understanding of many phenomena in living systems. This summer school is intended for doctoral and postdoctoral researchers with a background in physics and an interest in biological systems. In-depth lecture series will cover recent examples of physical approaches to biological systems and include introductions to the relevant biology. Shorter lecture series and seminars will present latest developments and trends, e.g. gene regulation, genetic and biochemical networks, the physics of sensory systems, propulsion of *Listeria* and other biological motion, theoretical aspects of micro-fabricated devices. There will also be time for personal work, discussions and working groups.

**Registrations:** Applications must have reached the School **before March 1, 2001** in order to be considered by the selection committee. A financial contribution of 4500 FF - 686 € is requested from each participant (it covers housing and meals at the school). Grants will be available, in particular for students from Eastern Europe and developing countries. To get the application forms and additional information, contact the School at

ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE

La Côte des Chavants

74310 LES HOUCHES, France

Phone: +33 -4 50 54 40 69 - Fax: +33 -4 50 55 53 25

E-mail: [secretariat.houches@ujf-grenoble.fr](mailto:secretariat.houches@ujf-grenoble.fr)

Web: <http://w3houches.ujf-grenoble.fr/>

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*The Physics School is affiliated with Université Joseph Fourier of Grenoble and Institut National Polytechnique de Grenoble, and is supported by the Ministères de l'Education Nationale and de la Recherche, by the Centre National de la Recherche Scientifique (CNRS) and by the Direction des Sciences de la Matière of the Commissariat à l'Energie Atomique (CEA/DSM).*

This session is supported by the NATO Advanced Study Institute program, by the Danish Research Agency's Graduate School of Biophysics and by the European High-Level Scientific Conferences program (HPCF-CT-2000-00122).

Ecole de Physique des Houches, Côte des Chavants, F-74310 Les Houches

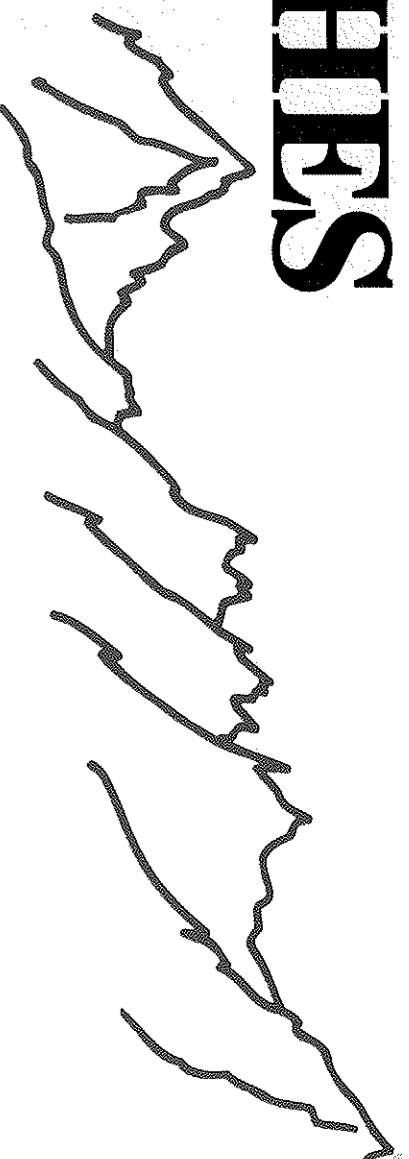
Director: François DAVID



# IHES HOUCHES

## SESSION LXXVI

1951 - 2001  
50<sup>th</sup> anniversary



École d'été de physique théorique

NATO Advanced Study Institute - Euro Summer School

## UNITY FROM DUALITY: GRAVITY, GAUGE THEORY AND STRINGS

### L'UNITÉ DE LA PHYSIQUE FONDAMENTALE: GRAVITÉ, THÉORIE DE JAUGE ET CORDES

July 30 - August 31, 2001

#### Scientific Direction:

Costas Bachas (Ecole Normale Supérieure, Paris, France)  
Nikita Nekrasov (ITEP, Moscow, Russia & IHES, Bures sur Yvette, France)  
Adel Bilal (Univ. of Neuchâtel, Switzerland)  
Michael Douglas (Rutgers Univ. USA & IHES, Bures sur Yvette, France)

#### Main Lecture series:

Calabi-Yau Manifolds, Mirror Symmetry and Number Theory: **P. CANDELAS** (Oxford, UK)  
Supergravities: **B. DE WIT** (Spinoza Institute, Utrecht, Holland)  
Perturbative and non-perturbative String Theory: **M.B. GREEN** (DAMPT, Cambridge, UK)  
Supergravity Description of N=1 Supersymmetric Gauge Theories: **I. KLEBANOV** (Princeton, USA)  
Gauge Theory/Gravity: **J. MALDACENA** (Harvard, USA)  
Supersymmetric Gauge Theories: **E. RABINOVICI** (Hebrew University, Jerusalem, Israel)  
M theory and Dualities: **A. SEN** (Allahabad, India)  
Non-commutative Field/String Theory: **A. STROMINGER** (Harvard, USA)

#### Shorter lecture series and seminars:

These will cover Black Holes, non-BPS branes, String Field Theory, Tachyon Condensation, D-branes in curved Geometries, Brane Worlds and Cosmology, String Phenomenology and other topics of current interest.

**Scientific Program:** In recent years our understanding of string theory - a candidate for the unification of all fundamental interactions including quantum gravity - has been radically modified. This summer school, intended for doctoral and young postdoctoral students, will provide an in-depth introduction to the subject leading up to the most recent developments. The main lectures will cover the modern perspective on string theories, M-theory, compactifications, black holes and the gauge theory/gravity correspondence. Shorter lectures and seminars will be devoted to more recent developments and subjects that are not covered in the main lectures. There will be time also for independent work, working groups and discussion sessions.

**Registrations:** Applications must have reached the School **before March 15, 2001** in order to be considered by the selection committee. A financial contribution of 5500 FF - 838 € is requested from each participant (it covers housing and meals at the school). Grants will be available, in particular for students from Eastern Europe and developing countries. To get the application forms and additional information, contact the School at

ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE  
La Côte des Chavants  
74310 LES HOUCHES, France  
Phone: +33 -4 50 54 40 69 - Fax: +33 -4 50 55 53 25  
E-mail: [secretariat.houches@ujf-grenoble.fr](mailto:secretariat.houches@ujf-grenoble.fr)  
Web: <http://w3houches.ujf-grenoble.fr/>

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This session is supported by the NATO Advanced Study Institute program, by the European High-Level Scientific Conferences program (HPCF-CT-2000-00121), and by the European Research Training Networks "Superstring Theory" (HPRN-CT-2000-00122) and "The Quantum Structure of Spacetime" (HPRN-CT-2000-00131).

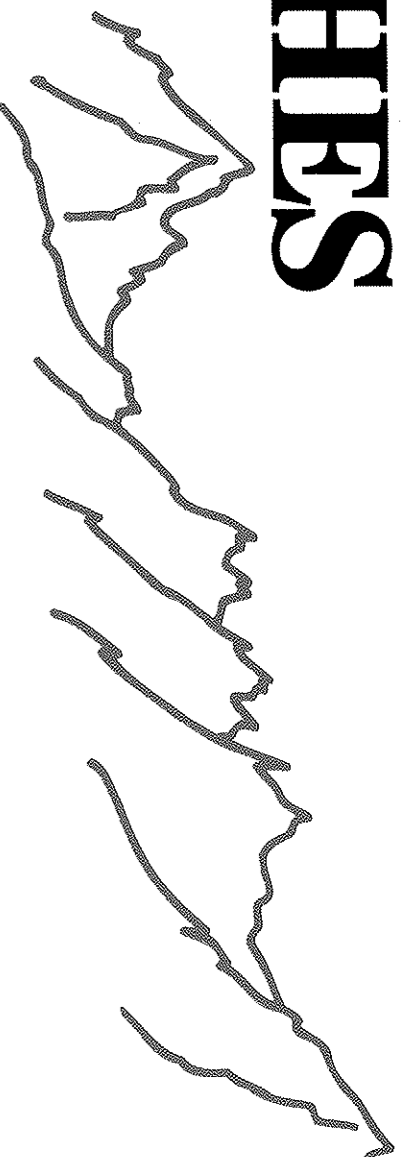
Ecole de Physique des Houches, Côte des Chavants, F-74310 Les Houches

Director: François DAVID



# LES HOUCHES

## SESSION XIV



1951 - 2001

École Prédoctorale

## PHYSIQUE MÉSCOPIQUE

### 2-14 septembre 2001

- Quantification et cohérence électronique : **L.P. Lévy** (Grenoble)
- Électronique à 1 électron : **H. Pothier** (Saclay)
- Transport quantique : **M. Büttiker** (Genève)
- Méscopie et décohérence avec des photons : **B. Van Tiggelen** (Grenoble)

Le besoin de comprendre les nouveaux phénomènes physiques apparaissant aux échelles intermédiaires entre l'échelle atomique et l'échelle macroscopique est à l'origine du développement rapide de la physique dite "mésoscopique". Le but de la session est de présenter une introduction pédagogique aux phénomènes en jeu. Une série de cours magistraux (ci-dessus) traitera les bases théoriques et les concepts fondamentaux.

Ces cours seront complétés par une série de séminaires spécialisés sur des sujets d'actualité : Supraconductivité mésoscopique (**F. Hekking**, Grenoble), Nanotubes (**H. Bouchiat**, Orsay), Calcul Quantique (**O. Buisson**, Grenoble), Nanofabrication, (**D. Mailly**, L2M), Réflexion d'Andreev (**H. Courtois**, Grenoble), Propriétés électroniques des îlots semiconducteurs (**Ch. Delerue**, Lille), Chaos quantique (**R. Jalabert**, Strasbourg), Acoustique et renversement du temps (**A. Tourin**, Paris).

Cet enseignement est destiné essentiellement à des étudiants français venant de terminer un DEA ou doctorants, ainsi qu'à des étrangers de niveau équivalent. Il est également prévu d'accueillir quelques chercheurs post-doctorants. Le nombre des participants sera limité afin de favoriser au maximum les interactions entre les étudiants et les enseignants.

## Candidatures et Financement

Cette école est ouverte aux étudiants ou aux jeunes chercheurs de toutes nationalités. Les candidats doivent envoyer un dossier comprenant un curriculum vitae détaillé, une lettre de recommandation et éventuellement une demande de bourse. Le comité de sélection attribuera des bourses couvrant la totalité ou une partie des frais d'inscription et de séjour lesquels s'établissent à 2600F pour les étudiants.

Le dossier d'inscription doit parvenir :

**avant le 15 juin 2001**

à

Bernard Pannetier

CNRS-CRTBT, BP 166, 38042 Grenoble Cedex 9

Tél : 04 76 88 11 51 - Fax : 04 76 87 50 60 - Email : [pannetie@labs.polycnrs-gre.fr](mailto:pannetie@labs.polycnrs-gre.fr)

## Comité d'organisation

C. Delalande, F. Hekking, B. Pannetier

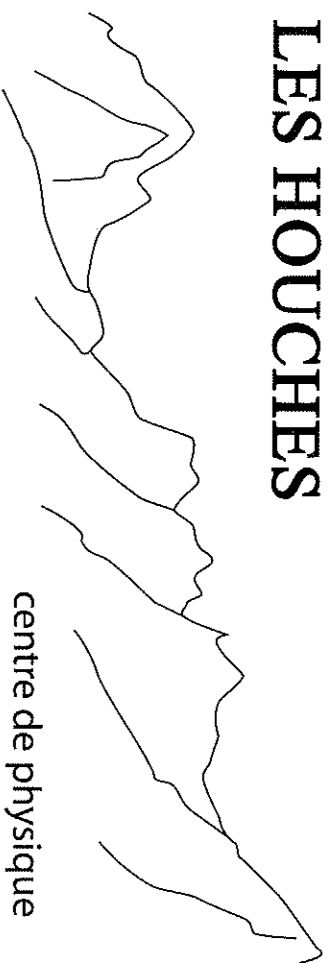
*L'École prédoctorale des Houches est organisée en collaboration avec les Ecoles doctorales de physique. Les Houches est un village de la vallée de Chamoni, dans les Alpes françaises. L'École a lieu dans un groupe de chalets montagnards entourés de prairies et de bois. Il est situé à une altitude de 1150 m. L'hébergement et les repas sont assurés pour tous les participants. Les étudiants bénéficieront en permanence de salles de réunion et d'une bibliothèque.*

Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches. Tél : +33 (0)4 50 54 40 69 - Fax : +33 (0)4 50 55 53 25.

Informations : <http://www.ujf-grenoble.fr/HOUCHES>



LES HOUCHES



centre de physique

# EUROWINTER SCHOOL

## Observing with the Very Large Telescope Interferometer

### 3-8 FEBRUARY 2002

The European Southern Observatory (ESO) in collaboration with European institutes will start operating the Very Large Telescope Interferometer (VLTI) in 2003. Two scientific instruments, AMBER in the near-infrared and MIDI in the thermal infrared, will be offered to the European community.

The expected performances of the VLTI and its instruments will be unique in terms of flux sensitivity and angular resolution, because of the large collecting area of the 8-m and 1.8-m telescopes and multiple baselines up to 200 meters. However the scientific outcome will be at the same level as the VLT performance only if astronomers get prepared to interferometric observations. With this objective in mind, we organize a winter school to train European astronomers to

the optimal use of the VLTI and to the preparation of the first observations.

The objective of the school is focused on practical exercises. The curriculum of the school consists in general lectures for 30% of the time, practical training for 50% of it and informal seminars for the remaining time. The school is opened to a maximum of 50 participants from any country and any nationality.

The financial support from the European Union together with other sponsors will allow us to cover the most of the costs of the school (housing and travel) for all European participants. This financial aspect should prevent any student or scientist from not taking part to this school.

### ORGANIZING COMMITTEES

**F. Malbet (LAOG, Grenoble)**

<Fabien.Malbet@obs.ujf-grenoble.fr>

**G. Perrin (Observatoire de Paris, Meudon)**

<Guy.Perrin@obspm.fr>

**G. Duvert, A. Chelli, X. Delfosse, D. Mouillet, K. Perraut,  
E. Le Coarer, S. Ortuno, F. Bouillet, G. Buisson**

### LOCATION

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### INFORMATION AND APPLICATION

<http://www-laog.obs.ujf-grenoble.fr/~jimmc/obsvlti>

**A. Boden (JPL/Caltech), M. Fridlund (ESA), A. Glindemann (ESO), C. Haniff (MRAO, Cambridge), C. Leinert (MPIA, Heidelberg), R. Le Poole (NEVEC, Leiden), D. Mourard (Observatoire de Nice), F. Paresce (ESO), R. Petrov (Universite de Nice), J. Surdej (Universite de Liege), D. Queloz (Observatoire de Geneve), G. Weigelt (MPIFR, Bonn)**

**M. Dudley, R. Romestain, B. Rousset, I. Lelievre**

With the support of



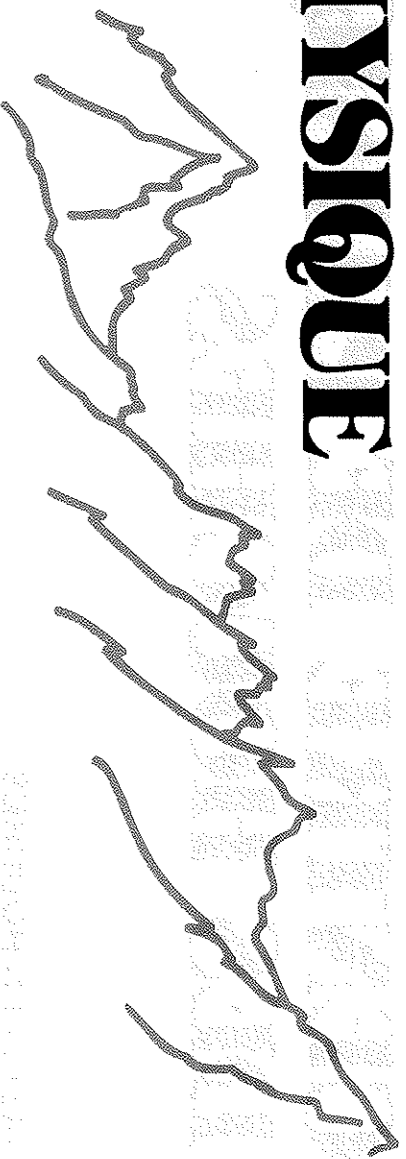
EUROPEAN HIGH LEVEL SCIENTIFIC CONFERENCE, Supported by EC contract n° HCF-2001-00120

The Centre de Physique in Les Houches is affiliated to Université Joseph Fourier and l'Institut National Polytechnique in Grenoble.

It is subsidized by the MENRT, CNRS and Commissariat à l'Energie Atomique. CENTRE DE PHYSIQUE DES HOUCHES - Côte des Chavants - F-74310 Les Houches  
Tel. (33) 4 50 54 40 69 - (33) 1 49 40 39 00 - Fax (33) 4 50 55 53 25



# CENTRE DE PHYSIQUE DES HOUCHEES



74310 LES HOUCHEES  
France

## DYNAMICS AND THERMODYNAMICS OF SYSTEMS WITH LONG RANGE INTERACTIONS February 18th-22th, 2002

### Organizers

**Ennio ARIMONDO**, Pisa University, Italy. arimondo@mail.dfi.unipi.it  
**Thierry DAUXOIS**, Ecole Normale Supérieure de Lyon, France. Thierry.Dauxois@ens-lyon.fr  
**Stefano RUFFO**, Università di Firenze, Italy. ruffo@avanzini.de.unifi.it  
**Martin WILKENS**, Potsdam University, Germany. martinw@elektra.quantum.physik.uni-potsdam.de

### Theme of the School

Properties of systems with long range interactions are to a large extent only poorly understood although they concern a wide range of problems in physics. Recently, the disclosure of new methodologies to approach the study of these systems has revealed its importance also in a trans-disciplinary perspective (astrophysics, nuclear physics, Bose-Einstein condensates, metallic clusters, hydrodynamics,...). The main challenge of this workshop is represented by the construction of a thermodynamic treatment of systems with long range forces and by the understanding of analogies and differences between the numerous domains of applications. Some promising results in this direction have been recently obtained in the attempt of combining tools developed in the framework of usual statistical mechanics with concepts and methods of dynamical systems.

However, the field of applications is still too limited to be able to draw convincing conclusions. Particularly arduous, but very exciting, is the understanding of phase transitions (negative specific heat, non extensive thermodynamics,...) for such systems as well as all the aspects related to non-equilibrium phenomena and their description in terms of dynamical concepts (self-consistent chaos, slow relaxation, formation and role of structures,...). Finally this fundamental and methodological study should help us to detect the depth and the origin of the analogies detected in the different domains mentioned above or on the contrary emphasize their specificities. In particular, we would like to put a special emphasis on Bose Einstein Condensation (BEC) which could be the main field of applications, since experiments and theoretical ideas have reached an impressive quality in the last decade. In that domain, many inequivalences between ensembles have been reported (in particular for the fluctuations) and should be clarified. Moreover, long range interactions in BEC have opened very exciting new perspectives to consider BEC as a model for other systems.

### Invited Speakers

- O. BIHAM** (Jerusalem) Fractals and Power-laws - **M. HOLTHAUS** (Marburg) Thermodynamics for BEC
- P. H. CHAVANIS** (Toulouse) Fluid mechanics - **G. KURIZKI** (Rehovot) 1/r interaction in light-driven BEC
- P. CHOMAZ** (Caen) Nuclear Physics - **U. LEONHARDT** (St. Andrews) BEC as a model system for "black holes"
- E.G.D. COHEN** (New York) Statistical Mechanics - **D. MUKAMEL** (Rehovot) Statistical Physics
- J. DALIBARD** (Paris) Experiment in BEC - **T. PADMANABHAN** (Pune) Astrophysics
- D. DEL CASTILLO NEGRETE** (Oak Ridge) Plasma and Fluid Dynamics - **A. RAPISARDA** (Catania) Chaos in Long range systems
- Y. ELSKENS** (Marseille) Plasma Physics - **C. TSALLIS** (Rio de Janeiro) Non extensive Thermodynamics
- D.H.E.GROSS** (Meiner) Thermodynamics of "Small" Systems

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### Inscription - Fees

For the application forms and additional information please see:  
<http://www.ens-lyon.fr/~tdauxois/Weblongrange.html>

The required documents (application form + 1 recommendation letter for young researchers)  
must be sent as soon as possible and before **December 31, 2001**

by email, mail or Fax to:  
**T. Dauxois, Laboratoire de Physique, ENS Lyon, 46 allée d'Italie, 69364 Lyon cedex 07, France**  
Tel: (33) 4 72 72 81 38 Fax: (33) 4 72 72 80 80 - email: [Thierry.Dauxois@ens-lyon.fr](mailto:Thierry.Dauxois@ens-lyon.fr)

A financial contribution is required from each participant (Accommodation: € 350,+Registration: € 150). It covers full lodging and meals at the School. Participants who would prefer to rent lodging in the village should inquire directly to Office du Tourisme, 74310 Les Houches, France (Tel. +33 -4-50 55 50 62, Fax +33-4 50 55 53 16, E-mail: [ot.les.houches@wanadoo.fr](mailto:ot.les.houches@wanadoo.fr)).

*This school is partially supported by the European Science Foundation (ESF) through its programme BEC2000+.*

*The Physics School in Les Houches is affiliated to Université Joseph Fourier and l'Institut National Polytechnique in Grenoble. It is subsidized by the MENERT, and CNRS and Commissariat à l'Énergie Atomique .*

*Centre de physique des Houches, Côte des Chavants, F-74310 Les Houches*  
Director : *Marial Ducloy* Tel. : (33) 1 49 40 39 00 / (33) 4 50 54 40 69 - Fax : (33) 4 50 55 53 25





**NATO ADVANCED RESEARCH WORKSHOP**  
**"Recent Trends in Theory of Physical Phenomena  
in High Magnetic Fields"**  
**February 25 - March 1, 2002**  
**The Physics School Center, Les Houches, France**

**Organizers**

I.D. Vagner, Holon Academic Institute of Technology, Israel, vagner\_i@hait.ac.il  
P. Wyder, Grenoble High Magnetic Field Laboratory, France, wyder@labs.polycnrs-gre.fr  
T. Maniv, Technion Institute of Technology, Israel, maniv@technix.technion.ac.il  
E. Potemski (secretary), Grenoble High Magnetic Field Laboratory, France, potemska@labs.polycnrs-gre.fr

**Scope**

The aim of the workshop is to hold a stimulating discussion on recent progress in the theory of physical phenomena in strong magnetic fields. Among the subjects to be included :

- quantum Hall effect
- superconductivity
- mesoscopics and nano-physics
- spintronics and quantum information processing

Les Houches is a resort village in the Chamonix valley of the French Alps. Established in 1951, the school is located in a group of mountain chalets surrounded by meadows and woods at an altitude of 1150 m.

**Invited speakers**

Yu.A. Bychkov (Moscow, Russia), T. Dietl (Warsaw, Poland), M. Dyakonov (Montpellier, France),  
G. Eliashberg (Moscow, Russia), A. Finkelstein (Rehovot, Israel), V. Fleurov (Tel Aviv, Israel)  
P. Fulde (Dresden, Germany), L.P. Gorkov (Tallahassee, USA), P. Hawrylak (Ottawa, Canada),  
Y. Imry (Rehovot, Israel), K. Kikoin (Beer-Sheva, Israel), A. Kosevich (Kharkov, Ukraine),  
D. Loss (Basel, Switzerland), T. Maniv (Haifa, Israel), W. Metzner (Dresden, Germany),  
F. Pobell (Dresden, Germany), V. Privman (Potsdam, USA), B. Spivak (Seattle, USA),  
A. Stern (Rehovot, Israel), C. Tejedor (Madrid, Spain), Z. Tesanovic (Baltimore, USA),  
B. van Tiggelen (Grenoble, France), I.D. Vagner (Holon, Israel)

**Registration - Fees**

For additional information and the registration form please see:

<http://ghmfl.polycnrs-gre.fr/Workshop>

The abstract and registration form should be sent before December 20<sup>th</sup>, 2001 to:  
E. Potemski, Grenoble High Magnetic Field Laboratory, MPI/FKF and CNRS,  
25, avenue des Martyrs, B.P. 166, Grenoble Cedex 9, 38042 Grenoble, France  
tel: +33 4 76 88 11 27, e-mail: [potemska@labs.polycnrs-gre.fr](mailto:potemska@labs.polycnrs-gre.fr), fax: +33 4 76 85 56 09

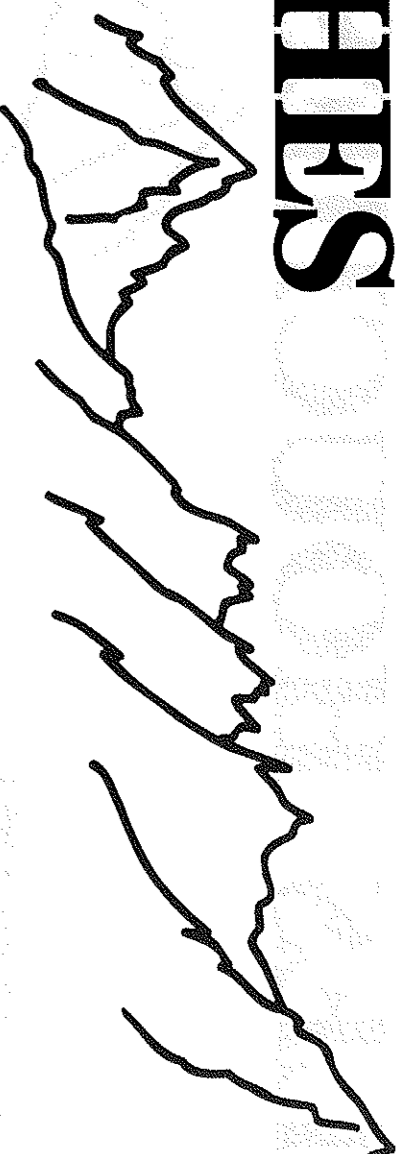
Five days accommodation (room and meals) is estimated to be 350 € (=313 \$).  
The payment is to be made upon arrival at the workshop site.

The Physics School in Les Houches is affiliated to l'Université Joseph Fourier and l'Institut National Polytechnique in Grenoble. It is subsidized by the MENERT, CNRS and Commissariat à l'Énergie Atomique.

Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches  
Director : Marial Ducloy tel. : +33 1 49 40 39 00 / +33 4 50 54 40 69 fax : +33 4 50 55 53 25



# LES HOUCHES



74310 LES HOUCHES  
France

## ULTRACOLD MOLECULES AND BOSE-EINSTEIN CONDENSATION March 4th-8th, 2002

### ORGANIZERS

Olivier DULIEU, Samuel GUBAL, Christian LISDAT  
Laboratoire Aimé Cotton, Orsay, France

### SCIENTIFIC COMMITTEE

O. DULIEU (LAC, Orsay, France), R. COTE (University of Connecticut, USA)  
J. DALIBARD (LKB-ENS, Paris, France), D. J. HEINZEN (University of Texas, USA)

### SCIENTIFIC PRESENTATION

This meeting is the second event in a series of two high-level scientific conferences, entitled "Ultracold Molecules : Formation, Coherent Control, Condensation and Applications", funded by the European Commission, and coordinated by F. MASNOU-SEEUWS (Laboratoire Aimé Cotton, Orsay, FRANCE). The aim of a high level scientific conference is to bring together young researchers and established scientists, with a focussed theme at the cutting edge of research.

During the last decade, extraordinary advances in physics have resulted from the development of laser cooling techniques for neutral atoms, leading in 1995 to the achievement of a Bose-Einstein condensate (BEC) of alkali atoms. Since 1997, the formation of ultracold molecules ( $T \ll 10^{-3}$  K) has been demonstrated via schemes using photoassociation of laser-cooled atoms. A new field of research is opening, and most of the properties and applications of ultracold molecules are still to be discovered. Once dense samples of ultracold molecules are available, the possibility to achieve a BEC of molecules offers a new challenge.

The present conference will bring together two scientific communities working on ultracold molecules and atomic Bose-Einstein condensation. Topics covered during the meeting will include : present status of research on formation and trapping of ultracold molecule : progress towards molecular Bose-Einstein condensation and degenerate Fermi gases ; molecular and collision data, including three-body effects, for the modelization of ultracold gases.

### INVITED SPEAKERS

A. DALGARNO (Harvard, MT, USA), C. M. DION (Marne-la-Vallée, France), R. C. FORREY (Reading, PA, USA), F. GIANTURCO (Roma, Italia),  
K. GORAL (Warsaw, Poland), R. GRIMM (Innsbruck, Austria), D. J. HEINZEN (Austin, TX, USA), E. A. HINDS (Brighton, United Kingdom),  
R. G. HULET (Rice, TX, USA), P. S. JULIENNE (Gaithersburg, MA, USA), J.-M. LAUNAY (Rennes, France), P. D. LETT (Gaithersburg, MA, USA),  
P. PILLET (Orsay, France), C. SALOMON (Paris, France), G. SHLYAPNIKOV (Amsterdam, The Netherlands), E. TIMMERMANS (Los Alamos, USA),  
P. VAN DER STRATEN (Utrecht, The Netherlands), A. VARDI (Harvard, MT, USA)

*Les Houches is a resort village in the Chamoniix valley in the French Alps. Established in 1951, the Physics School is located in a group of chalets surrounded by meadows and woods, at an altitude of 1150 m facing the Mont-Blanc range - a very favourable environment for intellectual activity in ideal surroundings for hiking, mountaineering and sight-seeing.*

### REGISTRATION AND ACCOMODATION

The total number of participants will be strictly limited to 70. All participants will pay a registration fee of 100 Euro. Accomodation and all meals will be provided for all participants at the Centre de Physique, at a fixed rate of 350 Euro. Young researchers (age under 35) are encouraged to apply for financial support, by sending back their application form with a recommendation letter from their supervisor.

Application forms and additional information are available on the conference Web site:

<http://www.lac.u-psud.fr/coldmolecules/CM2002>.

On-line registration at the conference Web site is encouraged, and should be performed as soon as possible, and **before December 31, 2001**.

Application forms can also be sent by e-mail, regular mail, or fax, to:

Samuel Gubal, Laboratoire Aimé Cotton, Bât. 505, Université Paris-Sud, 91405 Orsay Cedex, France.

Tel: 33-1-69352051; Fax: 33-1-69352100, e-mail: samuel.gubal@lac.u-psud.fr

*This meeting is funded by the European Commission, as part of the "Ultracold Molecules: Formation, Coherent Control, Condensation and Applications" project under the contract HPCF CT 2000-00251.*

The Physics School in Les Houches is affiliated to Université Joseph Fourier and l'Institut National Polytechnique in Grenoble. It is subsidized by the MENERT and CNRS and Commissariat à l'Énergie Atomique.

Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches

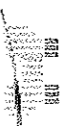
Director : Martial Ducloy

Tel : (33) 1 49 40 39 00  
(33) 4 50 54 40 69  
Fax : (33) 4 50 55 53 25





CONFERENCE SPONSORS



Institute of Physics



## "Liquid state theory: from white dwarfs to colloids"

An international conference on the occasion of Prof. Jean-Pierre Hansen's 60th birthday

April 1 - 5, 2002

ORGANIZERS :

Jean-Louis BARRAT, Département de Physique des Matériaux, Université Claude Bernard - Lyon 1 [jean-louis.barrat@dpm.univ-lyon1.fr](mailto:jean-louis.barrat@dpm.univ-lyon1.fr)  
Gilles ZERAH, Département de Physique Théorique et Appliquée, Commissariat à l'Énergie Atomique, DAM-IE de France, Bruyères-le-Châtel,  
[gilles.zerah@cea.fr](mailto:gilles.zerah@cea.fr)

### SCIENTIFIC COMMITTEE:

David Chandler (Berkeley), David Ceperley (Illinois), Giovanni Cicotti (Rome), Daan Frenkel (Amsterdam)  
Jean-Francois Joanny (Strasbourg), Mike Klein (Philadelphia), Paul Madden (Oxford), Michel Mareschal (Brussels/Lyon)

### CONFIRMED SPEAKERS:

A. Alastuey (Lyon); A. Alavi (Cambridge); M. Baus (Brussels); L. Belloni (Saclay); B. Bernu (Paris); T. Biben (Grenoble); L. Bocquet (Lyon);  
D. Borgis (Paris); D. Ceperley (Illinois); G. Chabrier (Lyon); D. Chandler (Berkeley); E. Charlaix (Lyon); G. Cicotti (Rome); S. Ciliberto (Lyon);  
J. Clerouin (Bruyères); C. Dellago (Rochester); R. Evans (Bristol); M. Fuchs (Strasbourg); D. Frenkel (Amsterdam); D. Langevin (Orsay);  
H. Lekerkerker (Utrecht); D. Levesque (Orsay); B. Janovici (Orsay); J-F. Joanny (Strasbourg); G.Kahl (Vienna); J. Klein (Oxford/Weizmann);  
M.L. Klein (Philadelphia); W. Kob (Montpellier); H. Loewen (Dusseldorf); P. Loubeyre (Bruyères); A. Louis (Cambridge); P. Madden (Oxford);  
M. Mareschal (Brussels); G. Maitland (Cambridge); M. Parrinello (Stuttgart); G. Pastore, (Trieste); G. Patey (Vancouver); J. Pasecki (Warsaw);  
R.. Pollock (Livermore); P. Pusey (Edinburgh); P. Rein ten Wolde (Berkeley); Y. Rosenfeld (Beer Shiva); J-N. Roux (Paris); B. Smit (Amsterdam);  
M. Sprk (Cambridge); G. Tarjus (Paris); E. Trizac (Orsay); P. Turq (Paris); W. Vos (Amsterdam); P. Warren (Port Sunlight); J-J. Weis (Orsay);  
P.G. Wolynes (San Diego); H. Xu (Lyon)

### TOPICS:

Soft condensed matter: colloids, polymers	Quantum fluids, plasmas, and astrophysical applications
Structure of simple and complex fluids, integral equations	Experimental aspects, scattering techniques
Density functional theory and inhomogeneous systems	Complex molecules, biological liquids
Electrolytes and polyelectrolytes	Granular systems
Transport coefficients, kinetic theory	Reactions in solution, rare events
Glasses	Phase transitions, nucleation

PROCEEDINGS : The proceedings of the workshop will be edited as a special issue of Journal of Physics, Condensed Matter (Liquid section).

INSCRIPTION - CONFERENCE FEE : Electronic inscription forms and additional information are available <http://dpm.univ-lyon1.fr/houches2002>.

The number of participants is limited to about 65.

The form must be filled before November 15th, 2001

A registration fee (450 EUR) is required from the participants. It covers full lodging and meals at the School. Some grants covering part of this fee will be available for younger participants (students and postdocs). A free copy of the proceedings will be distributed to all registered participants.

Participants who would prefer to rent lodging in the village should inquire directly to Office du Tourisme, 74310 Les Houches, France (Tel. +33 4-50 55 50 62, Fax +33-4 50 55 53 16, E-mail [olles.houches@wanadoo.fr](mailto:olles.houches@wanadoo.fr)). The conference fee for participants who do not stay at the physics center is reduced to 100 EUR

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The Physics School is affiliated to the Université Joseph Fourier of Grenoble and to the Institut National Polytechnique de Grenoble, and is supported by the Ministère de l'Éducation Nationale, de la Recherche et de la Technologie (MENERD), the Centre National de la Recherche Scientifique (CNRS) and the Direction des Sciences de la Matière of the Commissariat à l'Énergie Atomique (CEA).



ÉCOLE DE PHYSIQUE  
LES HOUCHES



# Protein Aggregation: an Interdisciplinary School

Les Houches, 9-18 April 2002

The discovery that protein aggregation plays a role in a number of neurological diseases has thrust this phenomenon into the limelight as a very important topic in life sciences. The key idea behind the school is to expose students to highly interdisciplinary approach, ranging from the experimental techniques to the biochemical aspects of protein aggregation. For this reason the School is open not only to physicists, but also to students from different fields (biochemists, physicians, etc.)

## Scientific committee

J. Collinge (London), C. Dobson (Oxford),  
V. Forge (Grenoble), E. Shakhnovich (Harvard)

## Speakers

A. Clarke (Bristol)	U. Aebi (Basel)
E. Stanley (Boston)	R. Broglia (Milano)
J. Collinge (London)	A. Lomakin (MIT)
S. Radford (Leeds)	A. Lebre (Jussieu)
H. Flyvbjerg (Copenhagen)	P. Liberski (Lodz)

## Directors

C. Rischel (Copenhagen)      G. Tiana (Milano) *Tiana @ mbl.dk*

*contact :*

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The School fee is ~~4700 EUR~~ <sup>£700</sup>, including full housing and meals. Grants are available from the European Community and The Graduate School of Biophysics/Danish Research Agency.

The Physics School in Les Houches is affiliated to Université Joseph Fourier and l'Institut National Polytechnique in Grenoble. It is subsidized by the MENERT, and CNRS and Commissariat à l'Énergie Atomique.

Centre de Physique des Houches, Cote des Chavants, F-74310 Les Houches.  
Director: Martial DUCLOY Tel. (33) 450544069 Fax. (33) 450555325



# Ultrafast processes

## in solid state nanostructures

Les Houches, France, 22-26 April 2002

<http://www.phy.cam.ac.uk/equont>

This conference will focus on ultrafast optical processes in nanostructures, and will also include optical phenomena in related areas.

Specific sessions will cover quantum wires and dots, microcavities spin effects, polymeric semiconductors, biophysical effects and optical studies of entanglement.

### Invited speakers:

A Alexandrou, École Polytechnique, Paris  
B Dagens, Alcatel, Marcoussis  
R H Friend, University of Cambridge  
R T Harley, University of Southampton  
E Kapon, EPF Lausanne  
W Langbein, University of Dortmund  
D Steel, University of Michigan  
R Zimmerman, Humboldt University Berlin

### Scientific committee:

R T Phillips, University of Cambridge (Chair)  
B Deveaud-Plédran, EPF Lausanne (Local Organiser)  
J F Ryan, University of Oxford  
L Viña, Universidad Autónoma de Madrid

Deadline for application to participate: 28 February 2002

For details about the Conference, including registration fees, bursaries for young researchers and application forms see <http://www.phy.cam.ac.uk/equont>

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Director: Martial DUCLOY Tel: + 33 4 50 54 40 69 Fax: + 33 4 50 55 53 25

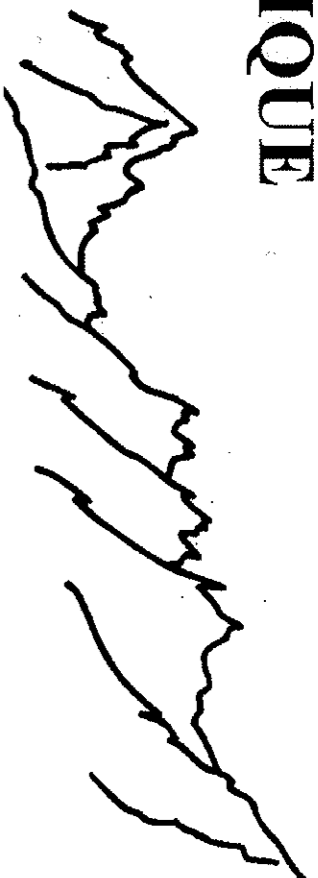
*We thank [www.montagnes.org](http://www.montagnes.org) for use of the photograph*

Euroconference on Quantum Optoelectronics for Nanotechnology

Centre de Physique des Houches



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES

## Traitement et propagation de faisceaux lasers

**DU 29 AVRIL AU 3 MAI 2002**

École organisée par la Société Française d'Optique (S.F.O.)  
avec la collaboration de la Formation Permanente du CNRS - Ile-de-France Sud  
et du Centre de Physique des Houches

### COMITÉ D'ORGANISATION :

**Pierre CHAVEL** (Lab. Charles Fabry de l'Institut d'Optique, Orsay)  
**Pierre GLORIEUX** (Lab. de Physique des Lasers, Univ. Lille 1, Villeneuve d'Ascq)  
**Jean-Paul POCHOLLE** (Thales Research & Technology, Orsay)

### PROGRAMME ET CONFÉRENCIERS :

- Propagation en milieu turbide : **Roger Maynard** (LPM2C, Grenoble), **Claude Boccara** (LSP/ESPCI), **Mathias Fink** (LOA/ESPCI).
- Propagation dans l'atmosphère : **Marc Séchaud** (ONERA), **Jean-Paul Pocholle** (Thales), **André Mysyrowicz** (LOA/ENSTA), **Jean-Pierre Wolf** (LASIM).
- Dynamique spatio-temporelle des sources cohérentes : **Pierre Glorieux** (PhLAM, Lille), **Claude Fabre** (LKB, Paris), **Arnaud Brignon** (Thales, Orsay), **Arnold Migus** et **Christian Sauteret** (LULIX, Palaiseau), **Claude Froehly** (IRCOM, Limoges).
- Les techniques de l'optique adaptative : **Jean-Christophe Chanteloup** (LULIX, Palaiseau), **Brigitte Loiseaux** (Thales, Orsay), **Gérard Roussel** (ONERA, Chatillon), **Renaud Foy** (CRAL, Lyon), **Daniel Rouan** (Obsv. Paris), **Pierre Léna** (Paris7/obsv., Paris).

**Frais d'inscription :** 770 Euros incluant la pension complète,

440 Euros pour les agents du CEA, 570 Euros pour les participants des autres établissements publics,  
280 Euros pour les étudiants,

réduction de 32 Euros pour les membres de la SFO.

*L'École a été reconnue comme École Thématique du CNRS. Agents CNRS : nous contacter.*

**Date limite d'inscription : 30 mars 2002**

Renseignements : **Françoise Chavel**, Société Française d'Optique,  
Centre Scientifique Bât. 503, 91403 ORSAY cedex

Tél. : 01 69 35 88 33 - télécopie : 01 69 85 35 65 - Courriel : francoise.chavel@france-optique.org

*La station du village des Houches (altitude 1150 m) se trouve au centre des Alpes, dans la vallée de Chamoniix. Fondée en 1951 l'École est située dans un groupe de chalets de montagne entouré de prairies et de bois. C'est un lieu idéal pour le travail et les sports de montagne.*

*L'École de Physique des Houches est affiliée à l'Université Joseph Fourier et à l'Institut National Polytechnique de Grenoble. Elle est subventionnée par les ministères de l'Éducation Nationale et de la Recherche, le CNRS et le Commissariat à l'Énergie Atomique.*

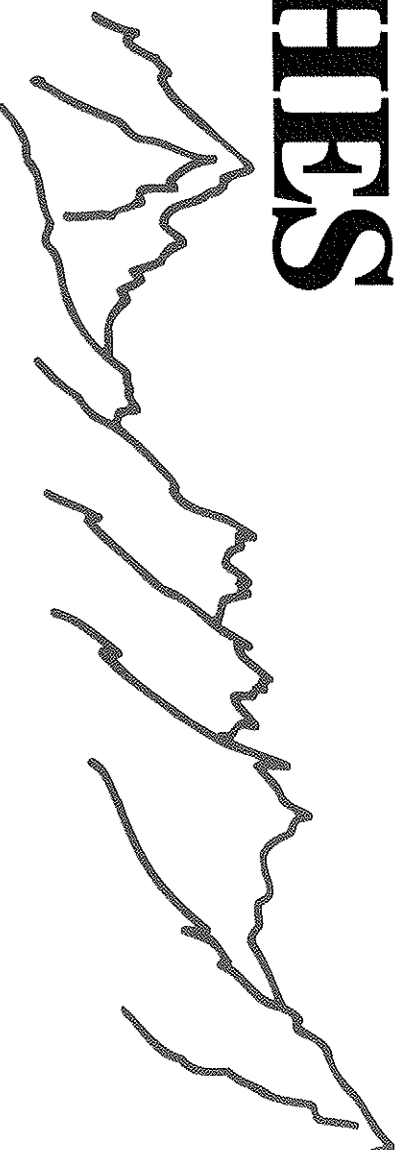
*École de Physique des Houches, Côte des Chavants, 74310 Les Houches*

Tél. : 04 50 54 40 69  
Fax : 04 50 55 53 25

Directeur : **Marial Duclouy** Tél. : 01 49 40 39 00



# LES HOUCHES



SESSION LXXVII

École d'été de physique théorique

**NATO Advanced Study Institute - Euro Summer School**  
**SLOW RELAXATIONS AND NONEQUILIBRIUM DYNAMICS**  
**IN CONDENSED MATTER**  
**RELAXATIONS LENTES ET DYNAMIQUES HORS D'ÉQUILIBRE**  
**EN PHYSIQUE DE LA MATIÈRE CONDENSÉE**

**July 1-26, 2002**

**Scientific Direction:** Jean-Louis BARRAT (Université Claude Bernard, Lyon, France)  
Mikhail FEIGELMAN (Landau Institute, Moscow, Russia)  
Jorge KURCHAN (ESPCI, Paris, France)

**Lecture series :**

J.-P. Bouchaud (CEA Saclay): Granular matter: some ideas from statistical mechanics.  
M.E. Cates (Edinburgh): Rheology and dynamics of soft condensed matter.  
L. Cugliandolo (ENS Paris): Slow non-equilibrium dynamics: analytical methods.  
D. Fisher (Harvard): Dynamics of randomly pinned objects.  
G. Parisi (Roma): Introduction to replica theory for glassy systems.

**Shorter Lectures and Seminars:**

A. Ajdari (CNRS Paris): Aging and Rheology in pasty colloidal systems.  
S. Bhattacharya (NEC Princeton): Dynamics of vortices in superconductors.  
B. Cabane (ESPCI Paris): Industrial problems with colloidal suspensions.  
S. Ciliberto (CNRS Lyon): Out of equilibrium systems: an experimentalist point of view.  
A. Finkelstein (Moscow): Protein structures: thermodynamic and kinetic aspects.  
W. Kob (Montpellier): Introduction to the physics of structural glasses: From experiments to computer simulations  
Z. Racz (Budapest): Non-equilibrium phase transitions  
D. Wales (Cambridge): Energy landscapes in complex systems.  
Other seminars will be contributed by participants and short term visitors.

**Scientific Program:**

Many-particle systems having a collective evolution that is much slower than the microscopic motion are a common feature in condensed matter. Systems with such slow relaxations are very often out of equilibrium, since a laboratory experiment generally takes place on time scales shorter than their relaxation time. This makes them very challenging objects of study, as usual statistical mechanics tools are insufficient. In fact, many of the solids that surround us - and the systems we encounter in practical and industrial applications - belong to this category. One may cite, for example :

- Structural glasses, including plastics and colloids, and spin glasses.
- Powders and granular matter undergoing compaction or slow flow.
- Type II superconductors carrying a current.
- Defects in crystals. Ripening of surfaces. Domain growth. Wetting.
- Foams, emulsions and colloids.

The focus of the school will be on the unifying concepts that can lead to a common view of this wide class of systems, based on ideas developed during the late eighties and nineties in the fields of glasses and spin glasses, of complex fluids, and for the study of randomly pinned systems.

**Registrations:** Applications must have reached the School before **March 4, 2002** in order to be considered by the selection committee. A financial contribution of **762 € (5000 FF)** is requested from each participant (it covers housing and meals at the school). Grants will be available, in particular for students from Eastern Europe and developing countries. To get the application forms and additional information, contact the School at

ECOLE D'ETE DE PHYSIQUE THEORIQUE Phone: +33 -4 50 54 40 69 - Fax: +33 -4 50 55 53 25  
La Côte des Chavants Email : [secretariat.houches@ujf-grenoble.fr](mailto:secretariat.houches@ujf-grenoble.fr)  
74310 LES HOUCHES, France Web: <http://www-houches.ujf-grenoble.fr/>

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**Ecole de Physique des Houches, Côte des Chavants, F-74310 Les Houches.**

**Director: François David->Jean Dalibard**

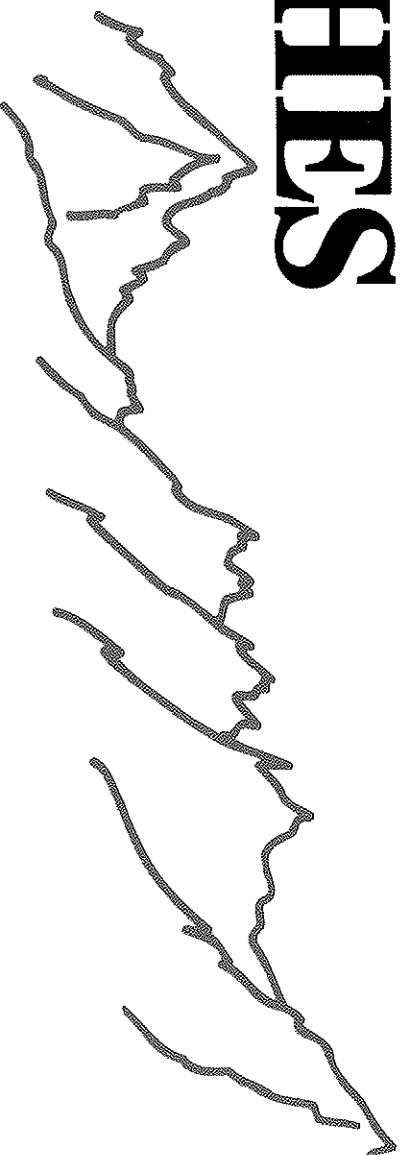
The Physics School is affiliated with Université Joseph Fourier of Grenoble and Institut National Polytechnique de Grenoble, and is supported by the Ministères de l'Education Nationale and de la Recherche, by the Centre National de la Recherche Scientifique (CNRS) and by the Direction des Sciences de la Matière of the Commissariat à l'Energie Atomique (CEA/DSM).

*This session is supported by the NATO Advanced Study Institute program (ASI 978104) and by the European High-Level Scientific Conferences program (HPCF-CT-2001-00075).*



# LES HOUCHES

SESSION LXXVIII



École d'été de physique théorique

NATO Advanced Study Institute - Euro Summer School

## ACCRETION DISCS, JETS AND HIGH ENERGY PHENOMENA IN ASTROPHYSICS DISQUES D'ACCRETION, JETS ET PHÉNOMÈNES DE HAUTE ÉNERGIE EN ASTROPHYSIQUE

July 29 - August 23, 2002

**Scientific Direction:**

Guy PELLETIER (Observatoire de Grenoble, France)  
Gilles HENRI (Observatoire de Grenoble, France)  
François MENARD (Observatoire de Grenoble, France)  
Vassily BESKIN (Lebedev Institute, Moscow, Russia)

**Lecture series:**

M. Camenzind (Heidelberg, Germany): Physics of black holes environment.  
W. Benz (Bern, Switzerland): Hydrodynamics and accretion discs.  
J. Heyvaerts (Strasbourg, France): Magnetohydrodynamics.

**Shorter Lectures and Seminars:**

R. Pudritz (Hamilton, Canada): Accretion-Ejection models.  
B. Achterberg (Utrecht, Netherlands): Particle acceleration theory and high energy cosmic rays.  
N. Calvet (Merida, Venezuela): Accretion diagnostics in Young Stellar Objects.  
B. Czerny (Warsaw, Poland): Accretion around Active Galactic Nuclei.  
E. Waxman (Rehovot, Israel): Gamma-ray bursts.  
V. Berezhinsky (Moscow, Russia): Top-down models of UHE cosmic rays.  
R. Sunyaev (TBC) (Garching, Germany): Galactic compact objects.  
L. Hartmann (Cambridge, USA): Evolution of accretion discs.  
T. Montmerle (Saclay, France): X-ray emission of Young Stellar Objects.

Short seminars presenting the new generation instruments and telescopes and training sessions will be also organised.

**Scientific Program:** The accretion process is thought to play a key role in the Universe. It leads to the formation of new stars; it releases enormous amounts of energy when taking place onto compact objects. It is also believed that gamma-ray bursts are due to the sudden release of energy through a rapid accretion process accompanying the formation of a black hole, either by coalescence of compact objects or the final explosion of a very massive star. These events could explain the highest energy cosmic rays, whose origin is still controversial. The observations have shown that accretion processes are associated with the ubiquitous presence of jets, either in young stellar objects, active galactic nuclei or in X-ray binaries. Magnetohydrodynamics seems to play a key role in jet formation. The school will present the most recent theoretical works on these topics, starting from basic theory to advanced applications, as well as current observational facts. It will also include observational training sessions to help the students and young researchers to practice the most up-to date observing techniques (high energy observations, high angular resolution techniques...).

**Registrations:** Applications must have reached the School before **March 4, 2002** in order to be considered by the selection committee. A financial contribution of **762 € (5000 FF)** is requested from each participant (it covers housing and meals at the school). Grants will be available, in particular for students from Eastern Europe and developing countries. To get the application forms and additional information, contact the School at

ECOLE D'ÉTÉ DE PHYSIQUE THEORIQUE  
La Côte des Chavants  
74310 LES HOUCHES, France

Phone: +33 -4 50 54 40 69 - Fax: +33 -4 50 55 53 25  
Email: [secretariat.houches@ujf-grenoble.fr](mailto:secretariat.houches@ujf-grenoble.fr)  
Web: <http://www-houches.ujf-grenoble.fr/>

*Les Houches is a resort village in the Chamonix valley in the French Alps. Established in 1951, the Physics School is located in a group of chalets surrounded by meadows and woods, at an altitude of 1150 m facing the Mont-Blanc range - a very favourable environment for intellectual activity in ideal surroundings for hiking, mountaineering and sight-seeing.*

*The Physics School is affiliated with Université Joseph Fourier of Grenoble and Institut National Polytechnique de Grenoble, and is supported by the Ministères de l'Education Nationale and de la Recherche, by the Centre National de la Recherche Scientifique (CNRS) and by the Direction des Sciences de la Matière of the Commissariat à l'Energie Atomique (CEA/DSM).*

*This session is supported by the NATO Advanced Study Institute (ASI 978132) program and by the European High-Level Scientific Conferences (HPCF-CT-2001-00018)*

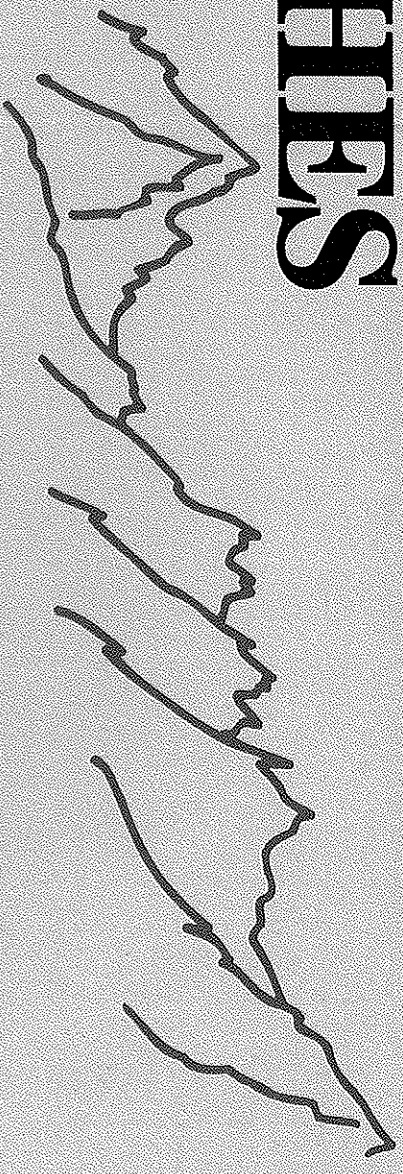
**Ecole de Physique des Houches, Côte des Chavants, F-74310 Les Houches**

**Director: François David->Jean Dalibard**



# LES HOUCHES

## SESSION XV



74310 LES HOUCHES  
France

Ecole pré-doctorale de physique

## MODELISATION ATMOSPHERIQUE

### 26 août - 6 septembre 2002

- Modélisation méso-échelle : Patrick Mascart (LA, Toulouse)
- Assimilation des données : François Boutier (CNRM, Météo France, Toulouse)
- Modélisation de la pollution atmosphérique : Robert Vautard (LMD, IPSL, Palaiseau)
- Convection : Jean-Philippe Lafore et Jean-Yves Grangeix (CNRM, Météo-france, LMD, Paris, CNRM, Toulouse)
- Analyse de la variabilité : Pascal Yiou (LSCE, IPSL, Gif/Yvette)

La modélisation numérique est devenue un outil privilégié d'étude du système climatique que ce soit dans le but de la simulation ou de la prévision quantitative des phénomènes ou pour la compréhension des processus. Depuis quelques années, le domaine de la modélisation intensive s'est étendu au problème des constituants chimiques et biochimiques dans l'atmosphère et l'océan, ainsi qu'à la biomasse terrestre.

L'objectif de cette session est d'offrir à ceux qui s'engagent dans la modélisation numérique du système climatique une série de cours qui les aideront à entrer dans le domaine et à se familiariser avec sa problématique. Les cours des écoles pré-doctorales sont approfondis mais de caractère suffisamment général. Ils sont destinés aux jeunes chercheurs venant de terminer un DEA ou en cours de thèse ainsi qu'aux chercheurs et ingénieurs qui s'engagent dans la modélisation.

Les cours seront donnés par des scientifiques français reconnus parmi les meilleurs spécialistes et alliant une excellente connaissance des problèmes de la modélisation avec une pratique approfondie. Ces cours seront complétés par des séminaires. Des plages horaires seront réservées pour des séances de questions aux conférenciers. Les participants sont incités à préparer un poster sur leurs travaux (stage, début de thèse).

## Candidatures et Financement

Cette école est ouverte aux étudiants de toute nationalité. Les inscriptions doivent s'effectuer en ligne sur le site web de l'école <http://gershwin.ens.fr/houches2002/>

Les candidatures seront examinées par un Comité de Sélection. Des bourses seront attribuées pour couvrir tout ou partie des frais d'inscription et de séjour dont le montant est 350 Euros.

Les inscriptions doivent être faites

### Avant le 2 juin 2002

Pour informations complémentaires, s'adresser à

Bernard LEGRAS et Frédéric HOURDIN

Tel: 01 44 32 22 28 et 01 44 27 84 10 - e-mail: [legras@lmd.ens.fr](mailto:legras@lmd.ens.fr) et [hourdin@lmd.jussieu.fr](mailto:hourdin@lmd.jussieu.fr)

Laboratoire de Méétéorologie Dynamique,

Ecole Normale Supérieure, 24 rue Lhomond, - 75231 Paris cedex 05

## Comité d'organisation

C. Delalande, F. Hourdin, B. Legras,

*L'Ecole pré-doctorale des Houches est organisée conjointement avec les Ecoles Doctorales à composante physique des Universités françaises. Les Houches est un village de la vallée de Chamonix, dans les Alpes françaises. L'Ecole a lieu dans un groupe de chalets montagnards entourés de prairies et de bois. Il est situé à une altitude de 1150m. L'hébergement et les repas sont assurés pour tous les participants. Les étudiants bénéficieront en permanence de salles de réunions et d'une bibliothèque.*

*Ecole de Physique des Houches, Côte des Chavants, F-74310 Les Houches*

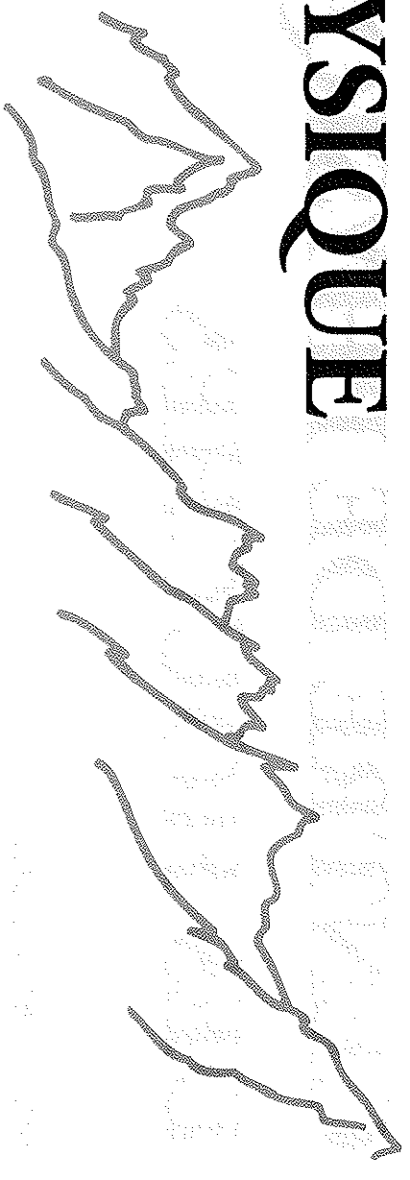
*Tél.: (33) 4 50 54 40 69 - Fax: (33) 4 50 55 53 25*

*Directeur : Claude Delalande*



# CENTRE DE PHYSIQUE DES HOUCHES

74310 LES HOUCHES  
France



## PHYSICS-SIGNAL-PHYSICS ON THE LINKS BETWEEN NONLINEAR PHYSICS AND INFORMATION SCIENCES

**September 8-13, 2002**

Nonlinear physics is a rapidly growing field. Recent theoretical and phenomenological approaches allowed great progress in many domains as different as turbulence, disordered systems, critical phenomena,... Approaches developed by physicists have led theoreticians in signal and image processing to define new models, and to develop new processing techniques applicable in many fields of information sciences. In parallel and independently, signal and image processing have experienced numerous theoretical and algorithmic developments in the fields of nonstationary and / or non Gaussian signals, scaling processes, nonlinear systems, ... These new techniques have in return allowed significant progress in physics. The aim of the session "Physics-Signal-Physics" is to review some of these two way interactions between physics and signal, and from a more general point of view, between physics and information sciences. Topics will include stochastic resonance, chaos and solitons in communication systems, complex networks, scaling laws, wavelets for statistical modelling and PDE's diffusive representations.

### Session directors :

P.-O. Amblard (LIS, Grenoble) and P. Flandrin (ENS Lyon)

### Organizing committee :

P. Abry (ENS Lyon), A. Arnéodo (CRPP, Bordeaux), R. Gillard (IETR, INSA Rennes), S. Zozor (LIS, Grenoble).

### Invited Speakers :

A. Bulsara (Spawar, San Diego), M. Hasler (EPF Lausanne), W. Hofer (Victoria), G. Millot (LPUB, Dijon), G. Montseny (LAAS, Toulouse), J.-P. Nadal (LPS, ENS Paris), D. Sornette (Uni. Nice and UCLA), B. Vidakovic (Georgia Tech, Atlanta)

The number of participants is limited to 50. The fee is 325 € (VAT included) per participant, which includes food and lodging at the Centre during the school. Application, including a brief CV and if needed a motivated request for financial support, must be sent

**before April, 30st, 2002 to :**

*P.O. Amblard, P-S-P Laboratoire des Images et Signaux, ENSIEG-BP 46, 38002 Saint-Martin D'Hères cedex, France or electronically*

*to houches@lis.inpg.fr*

*Website of the session : <http://www.lis.inpg.fr/houches.htm>*

*More information may be found on the website of the school : <http://w3houches.ujf-grenoble.fr>*

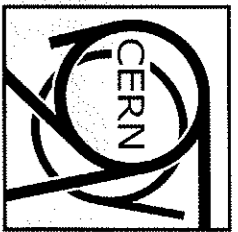
Les Houches is a resort village in the Chamoni valley of the french Alps. Established in 1951, the school is located in a groups of mountain chalets surrounded by meadows and woods at 1150 m elevation. It is ideally located for mountaineering, skiing on touring as well as for intellectual pursuits.

*The Physics School in Les Houches is affiliated to Université Joseph Fourier and to Institut National Polytechnique de Grenoble. It is subsidized by the MENERT, and CNRS and Commissariat à l'Energie Atomique.*

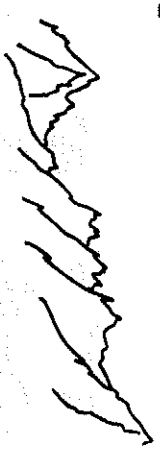
*Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches,*

*Director : Martial Ducloy, Tél (33) 1 49 40 39 00 / (33) 4 50 54 40 69, Fax : (33) 4 50 55 53 25*





# Euro Summer School on Exotic Beams



CERN  
Geneva  
Switzerland

September 12-20, 2002

Centre de Physique  
des Houches  
France

## MAIN LECTURES

*Accelerators: Physics and Technology*

K. Hübner (CERN, Switzerland)

*The nuclear shell model*

A. Poves (Madrid, Spain)

*Decay studies of exotic nuclei*

P. Van Duppen (Leuven, Belgium)

*Reaction studies with exotic nuclei*

W. Catford (Surrey, United Kingdom)

*Lasers in nuclear physics*

R. Neugart (Mainz, Germany)

*Accelerator Mass Spectrometry*

W. Kutschera (Vienna, Austria)

## SPECIAL TOPICS

*Neutrino physics*

A. Blondel (CERN, Switzerland)

*Anti-matter*

R. Landua (CERN, Switzerland)

*The public awareness of science*

J. Gillies (CERN, Switzerland)

## Scientific committee

M. Huyse (Leuven), K. Riisager (Aarhus), E. Roeckl (Darmstadt), A. Mueller (Orsay), J. Äystö (Geneva), J. Al-Khalili (Surrey), B. Rubio (Valencia), A. Vitturi (Padova), and P. Van Duppen (Leuven).

## Local organizing committee

F. Herfurth, J. Äystö, F. Ames, U. Bergmann, K. Blaum, S. Henry, and A. Kellerbauer.

## Application, information:

<http://cern.ch/euroschool2002>

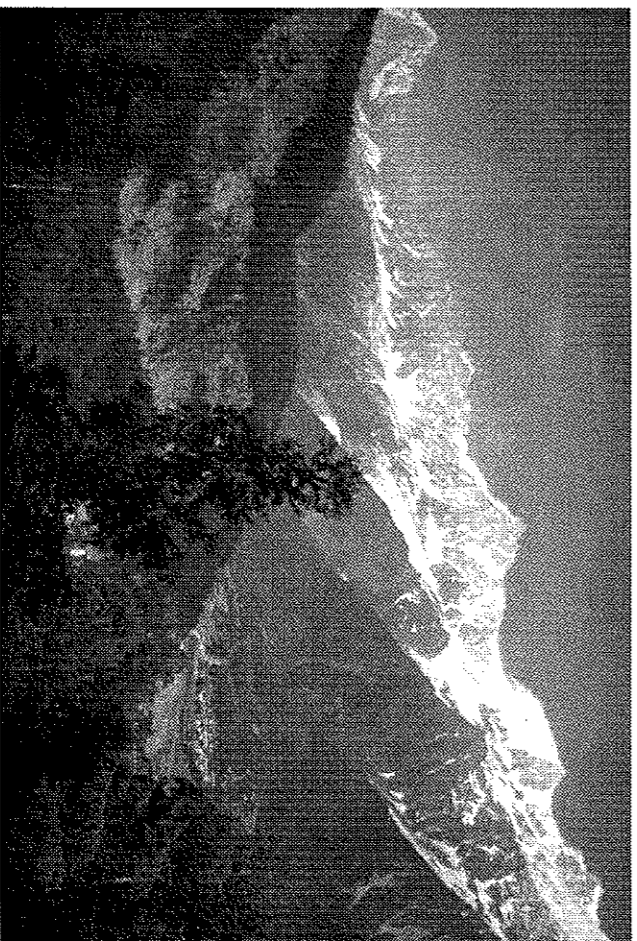
Application deadline: June, 1st

Contact CERN:

F. Herfurth, CERN EP/SOLDE  
CH-1211 Geneva 23, Switzerland  
Tel.: +41 22 767 2780, Fax: +41 22 767 8990  
E-mail: [Euroschool.Contact@cern.ch](mailto:Euroschool.Contact@cern.ch)

Contact Les Houches:

Centre de Physique des Houches  
Côte des Chavants  
F-74310 Les Houches, France  
Tel.: +33 4 50 54 40 69  
Fax: +33 4 50 55 53 25  
Director : Marial Ducloy  
Tel : (33) 1 49 40 39 00



Les Houches is a resort village in the Chamoniix Valley of the French Alps. Established in 1951, the school is located in a group of mountain chalets surrounded by meadows and woods at 1150 m elevation. It is ideally located for mountaineering, skiing or touring as well as for intellectual pursuits.

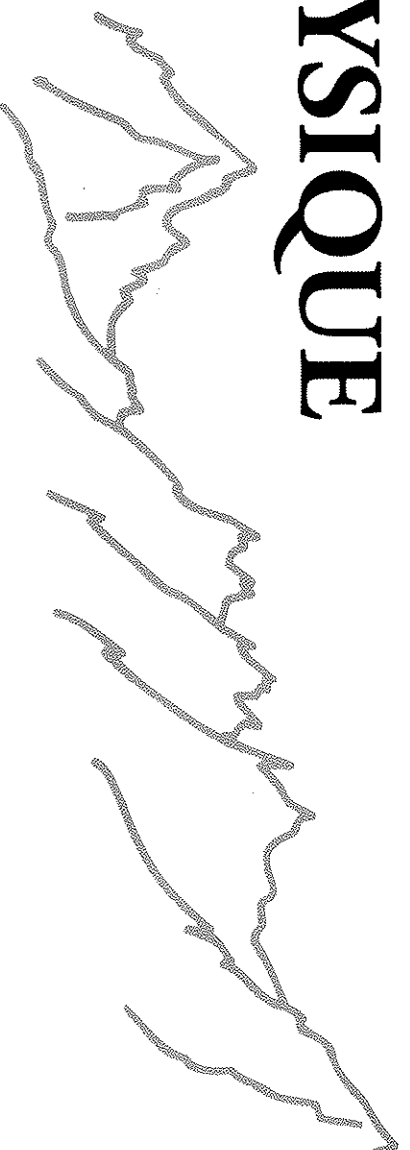
The Physics School in Les Houches is affiliated to Université Joseph Fourier and l'Institut National Polytechnique in Grenoble. It is subsidized by the MENERT, and CNRS and Commissariat à l'Energie Atomique.

The *Euro Summer School on Exotic Beams* is supported by the European Commission, human potential program, high-level scientific conferences (HPCF-2001-00101-01).



# CENTRE DE PHYSIQUE DES HOUCHEES

74310 LES HOUCHEES  
France



## LOCNET TRAINING SCHOOL ON

## "ENERGY LOCALISATION AND TRANSFER IN CRYSTALS,

## BIOMOLECULES AND JOSEPHSON ARRAYS"

**January 27<sup>th</sup>-February 1<sup>st</sup>, 2003**

### Organizing comitee:

Robert MACKAY, Warwick University, UK.  
Michel PEYRARD, Ecole Normale Supérieure de Lyon, France.  
Anna LITVAK-HINENZON, Warwick University, UK.  
Anna SPANOUKAKI, Ecole Normale Supérieure de Lyon, France.  
Thierry DAUXOIS, Ecole Normale Supérieure de Lyon, France

### Theme of the School:

The aim of the school is to give an introduction to localised excitations in spatially discrete systems, from experimental, numerical and mathematical points of view. It will concentrate on "discrete breathers". Also known as "nonlinear lattice excitations" and "intrinsic localised modes", these are spatially localised time-periodic motions of networks of dynamical units. Examples of such networks include molecular crystals, biomolecules and arrays of Josephson superconducting junctions. The school will address the formation of discrete breathers and their potential role in energy transfer in such systems. The lecturers will make a special effort to make their material accessible and attractive to both experimentalists and theorists.

The level will be suitable for postdoctoral researchers and advanced graduate students.

The lecture courses will be complemented by discussion sessions and presentations by the participants.

**LOCNET** is a European Commission Research and Training Network on Localisation by Nonlinearity and Spatial Discreteness, and Energy Transfer, in Crystals, Biomolecules and Josephson Arrays" (EC contract HPRN-CT-1999-00163)

### Lectures:

**François FILLAUX** (Trials) Vibrational spectroscopy of quantum localized modes  
**Sergej FLACH** (Dresden) Computational studies of discrete breathers - a successful blend of numerical and analytical techniques  
**Robert MACKAY** (Warwick) Mathematical tools for localised excitations  
**Juan MAZO** (Zaragoza) & **Alexey USTINOV** (Erlangen) Localized excitations in Josephson arrays  
**To be announced** Biophysics of biomolecules

### Discussion Sessions:

**Serge AUBRY** (Saclay), **Georges KOPIDAKIS** (Heraklion) & **Georges TSIRONIS** (Heraklion)  
New perspectives for applications of nonlinear localised excitations to physics  
**Roberto LIVI** (Firenze) & **Nikos THEODORAKOPOULOS** (Athens) Statistical Physics of localised vibrations

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### Inscription - FEES:

For the application forms and additional information please see: <http://www.ens-lyon.fr/~tdauxois/LOCNET/locnettraining.html>  
The application form **must be sent as soon as possible and before January 15, 2003**

by email, mail or Fax to:

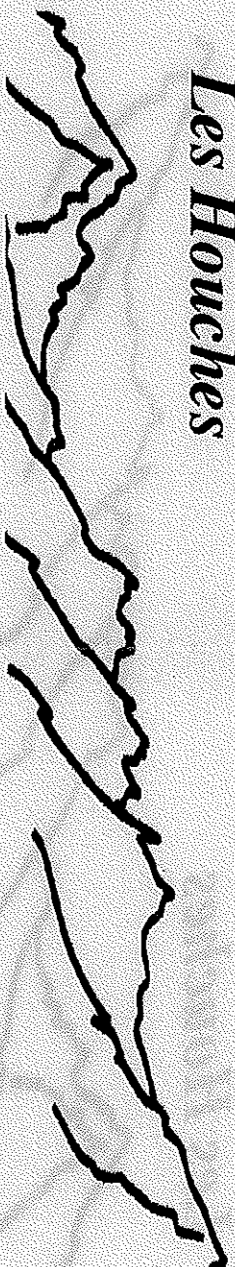
**A. Spanoudaki, Laboratoire de Physique, ENS Lyon, 46 allée d'Italie, 69364 Lyon cédex 07, France**  
**Tel: (33) 4 72 72 84 66 Fax: (33) 4 72 72 80 80, email: Anna.Spanoudaki@ens-lyon.fr**

The financial contribution required from each participant for the accommodation is 432€, and should be payed to the Les Houches' School at arrival. It covers full lodging and meals at the School. Participants are expected to arrive on Sunday January 26th and leave on Saturday February 1st. Participants who would like to arrive earlier or extend their stay beyond Saturday 1st should inquire to Office du Tourisme, 74310 Les Houches, France  
(Tel. +33 -4-50 55 50 62, Fax +33-4 50 55 53 16, E-mail: [ot.les.houches@wanadoo.fr](mailto:ot.les.houches@wanadoo.fr)).

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Centre de physique des Houches, Côte des Chavants, F-74310 Les Houches  
Director: Martial Ducloy Tel: (33) 1 49 40 39 00/ (33) 4 50 54 40 69 - Fax (33) 4 50 55 53 25



# Les Houches



## *From Elasticity to Plastic Flow in Condensed Media*

*Ecole Internationale, Les Houches, France*

Du 2 au 15 février, 2003

L'école se concentrera sur les instabilités élastiques des surfaces, la fracture, la friction solide, les fluides complexes, les gels et les liquides visqueux, la mécanique des milieux granulaires et la rhéologie des mousses. Les phénomènes tels que les déformations, les contraintes, la fracture et des écoulements se rencontrent en géologie, en génie civile, en ingénierie mécanique, en physique des matériaux ainsi que dans bon nombre d'applications industrielles; ils sont confrontés au défi de décrire d'une manière effective les problèmes s'étalant sur un large spectre d'échelles temporelles et spatiales. Récemment, des avancées prometteuses pour décrire ces systèmes complexes ont commencé à émerger. Il est donc opportun de faire se rencontrer les communautés concernées. Un des grands buts de l'Ecole est d'insister sur la nécessité d'une recherche pluridisciplinaire au niveau des outils et des concepts. Cette Ecole favorisera les discussions autour de modèles canoniques choisis pour les études expérimentales ainsi que sur les concepts et les outils théoriques qui sont nécessaires à un rapide développement et à une meilleure compréhension de la statique et de la dynamique des systèmes complexes.

### *Comité d'organisation :*

*Christiane Caroli, Chaouqi Misbah, Philippe Peyla*

### *Comité scientifique :*

*Michel Campillo (France), Martin Graml (Canada), James Langer (USA),*

*Heiner Müller-Krumbhaar (Allemagne), Philippe Nozières (France), Stéphane Roux (France).*

### *Orateurs et programme :*

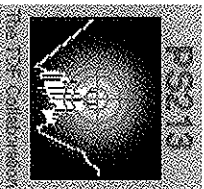
*Friction solide: Christiane Caroli (France), Tristan Baumberger (France), Elisa Riedo (Suisse).  
Surfaces contraintes et instabilités: Chaouqi Misbah (France), Efm Brener (Allemagne).  
Fracture: Michael Marder (USA), Stéphane Roux (France). Séismes et tremblements de terre:  
James R. Rice (USA), Michel Campillo (France). Milieux granulaires: Olivier Pouliquen (France),  
Jacques Desrués (France). Fluides complexes, gels et mousses: John Hinch (UK), Georges  
Debregeas (France), Akira Onuki (Japan), Jean-Michel Piau (France), Ken Sekimoto (France),  
Peter Sollich (UK), Victor Steinberg (Israël).*

Date limite pour les inscriptions : Le 15 novembre 2002.

Les frais d'inscription sont de 700 € (Incluant l'hébergement et les repas). Toutes les informations et l'inscription en ligne sont disponibles sur la page web de l'Ecole :

[http://consoude.ujf-grenoble.fr/Leshouches2003/conference\\_homepage.html](http://consoude.ujf-grenoble.fr/Leshouches2003/conference_homepage.html)





ÉCOLE DE PHYSIQUE  
LES HOUCHES



Centre de Physique

# n\_TOF Winter School on Astrophysics, ADS, and First Results

**February 24 to 28, 2003**

## SCIENTIFIC PRESENTATION

The goal of the school is to introduce the participants to the main fields of research at CERN's new spallation neutron facility n\_TOF. The main topic will be the field of Nuclear Data relevant to Accelerator Driven Systems (ADS) and to Stellar Nucleosynthesis. The School is open for all interested scientists from related areas, although is centred around the n\_TOF collaboration. In particular, the participation of the young generation of nuclear and particle physicists is strongly encouraged. The main topics will be introduced by invited lectures of prominent scientists, and are complemented by presentations of results obtained during the first year of n\_TOF operation.

### SCIENTIFIC COMMITTEE

E. Adamov (NIKJET, Moscow)  
G. Charpak (CERN, Geneva)  
P. Pavlopoulos (PULDV, La Défense)  
C. Rubbia (ENEA, Rome)  
M. Salvatores (CEA, Cadarache)  
F.-K. Thielemann (Univ. Basel)

### ORGANIZING COMMITTEE

S. Andriamonje (CEA, Saclay)  
P. Cennini (CERN, Geneva)  
E. Chiaveri (CERN, Geneva)  
F. Kaeppler (FZK, Karlsruhe)  
A. Mengoni (CERN, Geneva)

### LIST OF INVITED SPEAKERS

H. Att Abderrahim (SCK-CEN, Mol, Belgium)  
C. Angulo (Louvain-la-Neuve, Belgium)  
V. Bhatnagar (EC, Brussels, Belgium)  
F. Carré (CEA, Saclay, France)  
R. Gallino (Univ. Torino, Italy)  
S. Hilaire (CEA, Bruyère-le-Châtel, France)  
C. Kounnas (ENS, Paris, France)  
K.-L. Kratz (Univ. Mainz, Germany)  
S. Leray (CEA, Saclay, France)  
J.M. Loiseaux (ISN, Grenoble, France)  
F. Mellier (CEA, Cadarache, France)

S. Monti (ENEA, Bologna, Italy)  
Y. Nagai (Univ. Osaka, Japan)  
V. Orlov (NIKJET, Moscow, Russia)  
U. Ott (MPI, Mainz, Germany)  
L.I. Ponomarev (MUCATEX, Moscow, Russia)  
C. Rolfs (Univ. Bochum, Germany)  
O. Sorlin\* (GANIL, Caen, France)  
F.-K. Thielemann (Univ. Basel, Switzerland)  
L. V. Tocheny (STC, Moscow, Russia)  
L. Van den Driepel (Brussels, Belgium)  
G. Veneziano\* (CERN, Geneva, Switzerland)  
A. Zrodnikov (IPPE, Obninsk, Russia)

*\* to be confirmed*

Additional information on the n\_TOF web-site: [http://cern.ch/n\\_TOF/](http://cern.ch/n_TOF/)

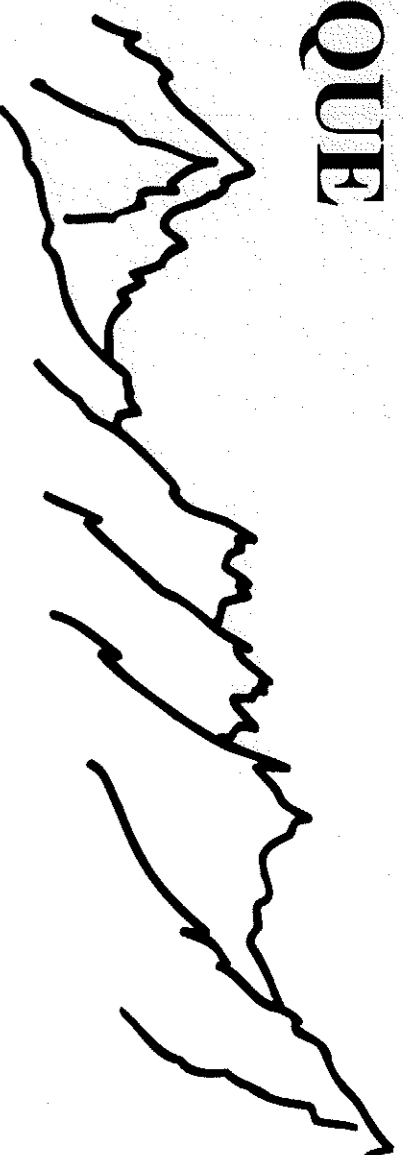
Contact: Dr. A. Mengoni, CERN  
by fax: **+41 22 767 7555**  
by e-mail: [alberto.mengoni@cern.ch](mailto:alberto.mengoni@cern.ch)

or : Dr. S. Andriamonje, CEA-Saclay  
by fax: **+33 1 6908 7584**  
by e-mail: [sandriamonje@cea.fr](mailto:sandriamonje@cea.fr)

Deadline for Registration: 14<sup>th</sup> of February 2003



# CENTRE DE PHYSIQUE DES HOUCHES



74310 LES HOUCHES  
FRANCE

European High Level Scientific Conference

## Frontiers in Number Theory, Physics and Geometry March 9-21, 2003

**Scientific Program:** This Winter school includes basic courses on Dynamical systems, Number theory and Random matrices, on Perturbative Physics and Polylogarithms and finally on Symmetries and non-Perturbative Physics. A large number of seminars will cover active and more advanced domains of research. They will be organized in Working groups for senior participants and young specialists, these include Zeta functions, Euler products in Quantum Field Theory, Modular forms and generalizations... This format will allow Mathematicians and Physicists to share insights as well as tools.

**Scientific Coordinator and Organizing Committee:** Bernard JULIA (ENS Paris) and  
Pierre MOUSSA (CEA Saclay), Thierry PAUL (ENS Paris), Pierre VANHOVE (CERN Geneva)

### Main Lecture series:

- |  |   |
|--|---|
| <b>E. Bogomolny:</b> Quantum and arithmetic chaos.           | <b>W. Nahm:</b> Physics and dilogarithms.                             |
| <b>A. Connes:</b> Galoisian symmetries and renormalisation.  | <b>P. Sarnak:</b> Zeta functions and random matrices.                 |
| <b>R. Dijkgraaf:</b> String dualities and automorphic forms. | <b>C. Soule:</b> Introduction to arithmetic groups.                   |
| <b>P. Di Vecchia:</b> Gauge theories from D-branes.          | <b>J.C. Yoccoz/A. Zorich:</b> Diophantine approximation and dynamics. |
| <b>E. Frenkel:</b> Vertex algebras and algebraic curves.     | <b>D. Zagier:</b> Polylogarithms                                      |
| <b>G. Moore:</b> String theory and Number theory             |   |

### Scientific Committee:

- |                                       |                                     |  |                                     |
|---------------------------------------|-------------------------------------|--|-------------------------------------|
| <b>Frits Beukers</b> (Utrecht, Neth.) | <b>P. Cvitanovic</b> (Atlanta, USA) | <b>Patricio Leboeuf</b> (Orsay, Fr.)       | <b>Claire Voisin</b> (Jussieu, Fr.) |
| <b>Jean-Benoît Bost</b> (Orsay, Fr.)  | <b>Michel Duflot</b> (Jussieu, Fr.) | <b>Werner Nahm</b> (Dublin, Ir.)           | <b>M.Waldschmidt</b> (Jussieu,Fr.)  |
| <b>Pierre Cartier</b> (IHES, Fr.)     | <b>G. Gallavotti</b> (Roma, It.)    | <b>I. Todorov</b> (Vienna, Aust.)          | <b>J.C. Yoccoz</b> (Collège de Fr.) |
|                                       |                                     | and <b>Jean-Bernard Zuber</b> (Saclay Fr.) |                                     |

Many additional seminars will be given during Working groups. The list of speakers includes:

**Z. Bern, P. Candelas, J. Conway, P. Cvitanovic, X. de la Ossa, H. Gangl, G. Gentile, A. Goncharov, D. Kreimer, J. Lagarias, J. McKay, B. Pioline, A. Voros, D. Voiculescu, S. Weinzierl**

Registration can be made at the website: <http://www.lpt.ens.fr/~H03/> (**recommended**)  
or by contacting: Marcelle MARTIN, LPT-ENS, 24 rue Lhomond, 75005 Paris, France.

Phone: 33 1 44 32 25 43 – Fax: 33 1 43 36 76 66 e-mail: [marcelle.martin@lpt.ens.fr](mailto:marcelle.martin@lpt.ens.fr)  
Registration forms are due before **January 9, 2003**

The number of participants is limited to 70, grants are available for selected europeans under 35.

*Les Houches is a resort village in the Chamoniix valley in the French Alps. Established in 1951, the Physics School is located in a group of chalets surrounded by meadows and woods, at an altitude of 1150 m facing the Mont-Blanc range - a very favourable environment for intellectual activity in ideal surroundings for hiking, mountaineering and sight-seeing.*

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This session is supported by the **European High-Level Scientific Conferences** program (HPCF-CT-2002-00334) by CNRS, ENS, IHES, IAMP and by the **European Networks** on Quantum Chaos, on Superstring theory and on Quantum spacetime and geometric interactions.

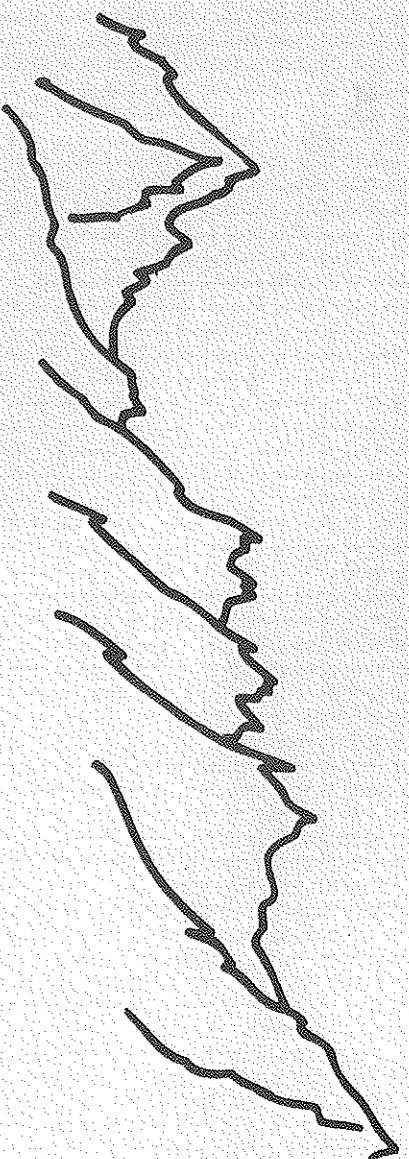
*Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches, France*  
*Director : Martial Ducloy.*

*Tel : (33) 4 50 54 40 69 – Fax : (33) 4 50 55 53 25*  
*<http://www.ujf-grenoble.fr/HOUCHES/>*



# LES HOUCHEs

## Euro School



# QUANTUM GASES IN LOW DIMENSIONS

## 15 – 25 April 2003

### SCIENTIFIC PRESENTATION

The school on "Quantum Gases In Low Dimensions" is composed of six introductory theoretical lectures, including an overview of present knowledge in the field, forthcoming challenges, new theoretical approaches, optical lattices and links with condensed matter physics. These lectures will be completed by a series of seminars which will give the current experimental state-of-the-art in low dimensional quantum gases. The school is especially intended for young scientists, PhD students and post-docs currently or prospectively involved in the field, either experimentalists or theoreticians. Two poster sessions have also been organized. All early afternoons are free of lectures and seminars to encourage informal discussions between participants.

### SCIENTIFIC COMMITTEE

Claude Cohen -Tannoudji  
Marvin D. Girardeau  
Theodor W. Hänsch  
William D. Phillips  
Henk T. C. Stoof

### ORGANIZING COMMITTEE

Ludovic Pricoupenko  
Hélène Perrin  
Maxim Olshanii

### MAIN LECTURES

- Yvan Castin
- Ignacio Cirac
- Benoît Douçot
- Maxim Olshanii
- Gora Shlyapnikov
- Sandro Stringari

Stochastic field methods for interacting Bose gases  
Optical lattices, rotating 2D Bose gases, quantum information  
Condensed matter physics in two dimensions: from bosons to anyons  
Various properties of the 1D Bose gas  
Correlation properties of low dimensional quantum gases  
Phase fluctuations in 1D and 2D trapped Bose gases

A detailed description of the school and an application form are available on the web site

<http://www.lptl.jussieu.fr/QGLD2003>

The fees have been fixed at 800 euros, including all school participation, board and lodging. However, **grants are available**, especially for participants less than 35 years old from an EU member state or associated state to cover partly, or even totally, the fees.

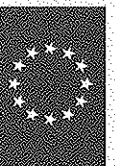
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Centre de Physique des Houches, Côte des Chavants, F-74310 Les Houches.

Director: Martial Ducloy

Tel.: (33) 4 50 54 40 69 or (33) 1 49 40 39 00

Fax.: (33) 4 50 55 53 25







# La Physique du TeV aux Collisionneurs

## Les Houches, France 26 mai – 6 juin 2003

Comité local d'organisation :

P. Aurenche, LAPTH, Annecy-le-Vieux  
G. Bélanger, LAPTH, Annecy-le-Vieux  
F. Boudjema, LAPTH, Annecy-le-Vieux  
J.-Ph. Guillet, LAPTH, Annecy-le-Vieux  
P. Perrodo, LAPP, Annecy-le-Vieux  
E. Pilon, LAPTH, Annecy-le-Vieux  
H. Przysiezniak, LAPP, Annecy-le-Vieux  
I. Wingarter-Seez, LAPP, Annecy-le-Vieux

Comité international d'organisation :

P. Binétruy, LPT, Orsay, France  
M. Carena, FERMILAB, USA  
S. Catani, CERN, Genève, Suisse  
S. Dawson, Brookhaven Nat. Lab., USA  
D. Denegri, CEA Saclay, France  
A. Djouadi, LPM Montpellier, France  
M. Drees, Tech. Univ. München, Allemagne  
F. Gianotti, CERN, Genève, Suisse

R. Godbole, IISc, Bangalore, Inde  
J. Huston, Michigan State Univ., USA  
V. Ilyin, Moscow State Univ., Russie  
M. Mangano, CERN, Genève, Suisse  
H. Murayama, LBL, USA  
D.P. Roy, T.I.F.R., Mumbai, Inde  
Y. Shimizu, KEK, Tsukuba, Japon  
P. Zerwas, DESY, Hamburg, Allemagne

### But de l'atelier

Cet atelier est le troisième d'une série dont le but est de réunir théoriciens et expérimentateurs travaillant en physique des particules auprès des futurs collisionneurs. Dans le cadre de cet atelier, on considèrera divers aspects de la Chromodynamique Quantique, du Modèle Standard et de ses extensions, en relation avec la brisure de symétrie électrofaible : physique du boson de Higgs, supersymétrie et phénoménologie des dimensions supplémentaires. L'atelier débutera en janvier 2003 pour se terminer à la fin de l'année.

La rencontre des Houches du 26 mai au 6 juin 2003 permettra une discussion approfondie entre les participants des groupes de travail. L'essentiel des activités de la rencontre aura lieu au sein de groupes de travail et sera complété par quelques exposés de revue.

### Groupes de travail et responsables

Higgs  
M. Spira, D. Zeppenfeld (Théorie)  
K. Assamagan, M. Narain,  
A. Nikitenko (Expérience)

Au-delà du Modèle Standard  
B. Allanach, M. Nojiri, T. Rizzo (Théorie)  
M. Battaglia, M. Spiropulu, D. Tovey (Expérience)

QCD et Modèle Standard  
E. Laenen, S. Frixione (Théorie)  
M. Dobbs, A. de Roeck,  
K. Tollefson (Expérience)

### Inscription

Le nombre de participants aux Houches est limité à 70. La pension complète se monte à 850 Euros pour la durée totale de la réunion aux Houches. Un nombre limité de bourses est disponible. S'inscrire avant le **15 février 2003** sur le site web :

**<http://www.lapp.in2p3.fr/conferences/LesHouches/Houches2003/>**

où sont également disponibles toutes les informations concernant l'atelier.

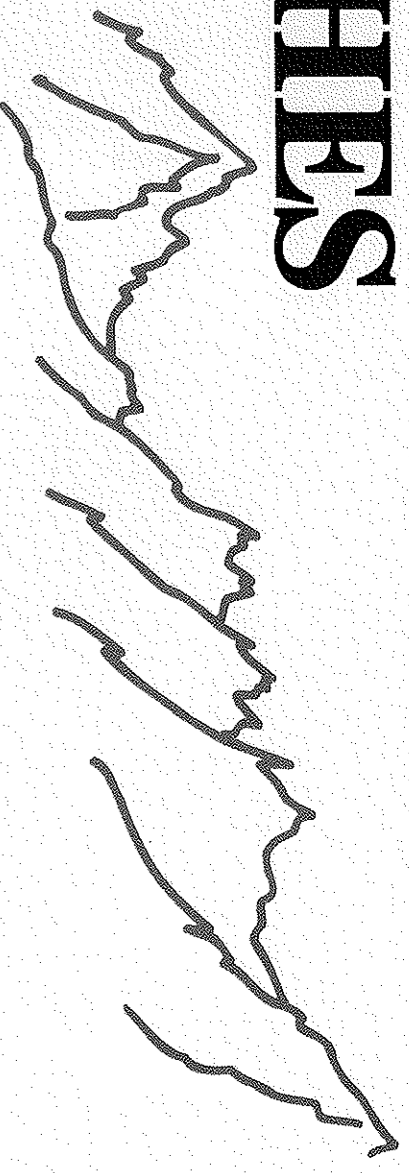
*Le village des Houches (altitude 1150 m) se trouve au centre des Alpes, dans la vallée de Chamorix. Fondée en 1951, l'École de Physique des Houches est située dans un groupe de chalets entourés de prairies et de bois. C'est un lieu idéal pour le travail intellectuel et les sports de montagne. Le Centre de Physique est affilié à l'Université Joseph Fourier et à l'Institut National Polytechnique de Grenoble. Il est subventionné par le MENRT, le CNRS et le Commissariat à l'Énergie Atomique. La session est subventionnée par le CNRS Formation Permanente, l'Université de Savoie et le Ministère de l'Éducation Nationale, de la Recherche et de la Technologie.*

Centre de Physique des Houches, Côte des Chavants, F-74310 les Houches.  
Directeur: Martial DUCLOY  
Tel. 01 49 40 39 00 or 04 50 54 40 69  
Fax 01 49 40 32 00 or 04 50 55 53 25



# LES HOUCHES

## SESSION LXXIX



École d'été de physique théorique

Euro Summer School

## QUANTUM ENTANGLEMENT AND INFORMATION PROCESSING INTRICATION ET TRAITEMENT D'INFORMATION QUANTIQUES

June 30- July 25, 2003

### Scientific Direction:

Daniel ESTEVE (Quantronics group, SPEC, CEA-Saclay, France)  
Jean-Michel RAIMOND (Laboratoire Kastler Brossel, ENS, Paris, France)

### Lecture series:

R. Blatt (U. Innsbruck) and D. Wineland (NIST, Boulder): Quantum information processing in ion traps.  
I. Chuang (MIT, Cambridge): Principles of quantum computing.  
M. Devoret (Yale U.) and C. Glattli (CEA and ENS, Paris): Introduction to quantum electronic circuits.  
S. Haroche (Collège de France and ENS, Paris): Introduction to quantum optics and decoherence.  
J. Jones (Oxford U.): Quantum information and Nuclear Magnetic Resonance

### Shorter Lectures and Seminars:

M. Brune (ENS, Paris): Cavity quantum electrodynamics.  
N. Gisin (U. Genève): Quantum cryptography.  
P. Grangier (IOTA, Orsay): Quantum cryptography: from single photons to many photons.  
J. Martinis (NIST, Boulder): Phase superconducting quantum bit circuits.  
H. Mooij (T.U. Delft): Flux superconducting quantum bit circuits.  
D. Vion (SPEC, CEA-Saclay): Charge superconducting quantum bit circuits.  
A. Wernsdorfer (CRTBT, Grenoble): Quantum nanomagnets.  
A. Zeilinger (U. Vienna): Entangled photons and quantum communication.  
P. Zoller (U. Innsbruck): Quantum communication and quantum computing with cold atoms and photons.

Other seminars will be contributed by participants and short term visitors.

### Scientific Program:

The recent discovery that the laws of quantum physics could be used for efficient information processing or transmission led to a considerable upsurge of interest in developing a deeper understanding of quantum mechanics, and in fabricating genuine quantum processors. This new field gathers around common objectives various communities, such as theoretical physics, quantum optics or solid state physics. On the theoretical side, the major advances concern quantum algorithms and quantum error correction codes. On the experimental side, significant advances have been realized in quantum optics, solid state physics and nuclear magnetic resonance. In particular, quantum logic gates have been demonstrated, and small-size quantum algorithms have been operated.

This school aims to provide a comprehensive overview of the theoretical and experimental aspects of quantum entanglement and information processing. It is opened to young researchers interested in learning the essentials of this new field. Introductory lectures will provide them with a common background, while more specialized lectures and seminars will give an up to date panorama.

**Registrations:** Applications must be reached the School before **March 7, 2003** in order to be considered by the selection committee. The full cost per participant, including housing, meals and the lectures book, is 1400 €. Thanks to financial support by various funding agencies, a contribution of only **750 € / participant** is requested. A few additional grants will be available. To get the application forms and additional information, contact the School at

ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE  
La Côte des Chavants  
74310 LES HOUCHES, France

Phone: +33 4 50 54 40 69 - Fax: +33 4 50 55 53 25  
E-mail: [secretariat.houches@ujf-grenoble.fr](mailto:secretariat.houches@ujf-grenoble.fr)  
Web: <http://www-houches.ujf-grenoble.fr>

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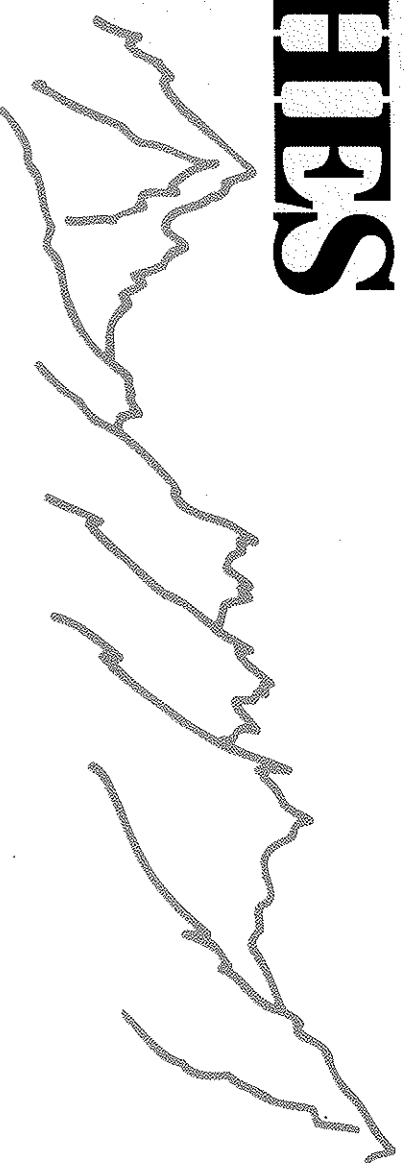
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Supported by the European High-Level Scientific Conferences program (HPCF-2002-00041) and the QUIPROCONE Network (IST-1999-29064)



# LES HOUCHES

## SESSION LXXX



École d'été de physique théorique

### NATO Advanced Study Institute

## METHODS AND MODELS IN NEUROPHYSICS

## MÉTODES ET MODÈLES EN NEUROPHYSIQUE

### July 28 - August 29, 2003

#### Scientific Direction:

- C. C. Chow (Pittsburgh, USA)
- B. Gutkin (London, UK)
- D. Hansel (Paris, France)
- C. Meunier (Paris, France)
- I. Segev (Jerusalem, Israel)

#### Opening lecture:

- E. Marder (Waltham, USA): Why would a self-respecting experimental biologist be susceptible to theory?

#### Lecture series:

- L. Abbott (Waltham, USA): Synaptic plasticity and learning.
- P. Bressloff (Salt Lake City, USA): Pattern formation and visual cortex.
- E. Brown (Boston, USA): Statistical analysis of data.
- J. Rinzel (New York, USA): Non-linear dynamics of neurons.
- H. Sompolinsky (Jerusalem, Israel): Theory of large networks: from spikes to behavior.
- D. Terman (Colombus, USA): Singular perturbations analysis of neuronal dynamics.
- T. Tishby (Jerusalem, Israel): Biological information processing - an information theoretic perspective

#### Shorter Lectures and Seminars:

- N. Brunel (Paris, France): Stochastic dynamics of neurons.
- W. Gerstner (Lausanne, Switzerland): Models of synaptic plasticity.
- D. Golomb (Beersheva, Israel): Propagating activity in cortical circuits.
- G. Mato (Bariloche, Argentina): Theory of neural synchrony.
- C. Pouzat (Paris, France): Techniques for spike sorting.
- M. Shelley (New York, USA): Large scale models of primary visual cortex.
- A. Treves (Trieste, Italy): Information-theoretic approach to the evolution of the mammalian cortex
- M. Tsodyks (Rehovot, Israel): Synaptic dynamics.
- C. van Vreeswijk (Paris, France): Balancing excitation and inhibition in large networks.
- F. Wolf (Göttingen, Germany): A theory of cortical maps.

These lectures will be complemented by short topical workshops dedicated to specific neurophysiological issues and experimental aspects.

#### Scientific Program:

Many concepts and methods borrowed from Theoretical Physics, Dynamical Systems Theory, Signal Processing and Information Theory have been introduced, elaborated and used over the past years to study the nervous system. This school will focus largely on analytical approaches with a strong emphasis on the underlying physical concepts and on the mathematical techniques. It will provide the participants with the appropriate background for research in Neurophysics. In parallel, through the talks given by experimentalists during the workshops, the participants will become acquainted with some of the open issues in Neuroscience, particularly those in the somatosensory and the motor systems. This summer school is aimed at young researchers and established scientists with a background in Physics or Mathematics.

**Registrations:** Applications must be received by the School before **March 7, 2003** in order to be considered by the selection committee. The full cost per participant, including housing, meals and the lectures book, is 1500 €. Thanks to financial support by various funding agencies, a contribution of only **900 € /participant** is requested. A few additional grants are available. Application forms and additional information are available from the School at

ÉCOLE D'ÉTÉ DE PHYSIQUE THÉORIQUE

La Côte des Chavants

74310 LES HOUCHES, France

Phone: +33 -4 50 54 40 69 - Fax: +33 -4 50 55 53 25

E-mail: [secretariat.houches@ujf-grenoble.fr](mailto:secretariat.houches@ujf-grenoble.fr)

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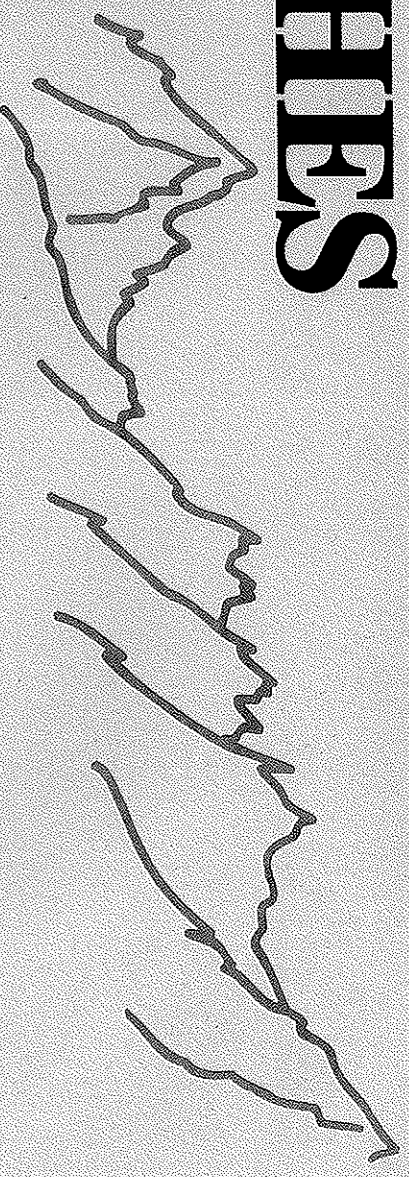
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This session is supported by the NATO Advanced Study Institute program (ASI 979042), by IBRO and by CNRS



# LES HOUCHES

## SESSION XVI



**École pré-doctorale de physique**

## OPTIQUE ET BIOLOGIE

### 31 août - 12 septembre 2003

- Microscopie de fluorescence : **Brahim Lounis** (CPMOH, Bordeaux)
- La cellule : dynamique d'un espace contrôlé temporellement et spatialement : **Jean-Louis Martin** (LOB, Palaiseau)
- Microscopie et imagerie non-linéaire : **Jérôme Mertz** (ESPCI, Paris)
- Techniques avancées d'optique linéaire pour la biologie : **Matthieu Coppey-Moisan** (J.M, Paris)
- Imagerie fonctionnelle et morphologique dans les tissus : **Claude Boccara** (ESPCI, Paris)
- Pincés optiques et micromanipulations d'assemblages biologiques : **Francois Gallet** (LBHP, Paris)

Les techniques et les concepts optiques les plus avancés sont maintenant utilisés pour répondre à des questions biologiques originales, non-résolues par d'autres approches. Pour identifier et répondre à ces questions, le scientifique doit avoir connaissance des outils disponibles à la fois en optique et en biologie, mais aussi assimiler les concepts issus des deux facettes de son champ d'investigation.

L'objectif de cette session est d'offrir à ceux qui s'engagent dans l'interface physique-biologie une vision interdisciplinaire sur les approches offertes par les techniques optiques pour l'étude de systèmes biologiques (essentiellement moléculaires et cellulaires). Les cours, à caractère général, sont destinés aux étudiants de niveau DEA ou en cours de thèse ainsi qu'aux jeunes chercheurs (issus de la physique ou de la biologie) cherchant à acquérir ou compléter leur formation.

Les cours seront donnés par des scientifiques français reconnus parmi les meilleurs spécialistes et ayant une excellente connaissance des problèmes spécifiques de l'interface optique-biologie. Ces cours seront complétés par des séminaires. Des plages horaires seront réservées pour des séances de questions aux conférenciers. Les participants sont incités à préparer un poster sur leurs travaux (stage, début de thèse).

## Candidatures et Financement

Cette école est ouverte aux étudiants de toute nationalité. Les inscriptions liées aux inscriptions se trouvent sur le site web de l'école :

<http://www.lkb.ens.fr/recherche/optetbio/houches2003/index.htm>

Les candidatures seront examinées par un Comité de Sélection. Les frais d'inscription et de séjour s'élèvent à 675 € (450 € pour les étudiants). Des bourses seront attribuées pour couvrir tout ou partie des frais d'inscription et de séjour.

Les inscriptions doivent être faites

**avant le 1er Juin 2003**

Pour informations complémentaires, s'adresser à

Maxime Dahan, Tel : 01 44 32 33 80, e-mail: [maxime.dahan@lkb.ens.fr](mailto:maxime.dahan@lkb.ens.fr)

Laboratoire Kastler Brossel, Ecole Normale Supérieure, 24 rue Lhomond - 75231 Paris cedex 05

Laurent Cognet, Tel : 05 56 84 62 12, e-mail : [lcognet@cpmoh.u-bordeaux.fr](mailto:lcognet@cpmoh.u-bordeaux.fr)

CPMOH, CNRS-Université Bordeaux1, 351 cours de la libération - 33405 Talence

## Comité d'organisation

**C. Delalande, M. Dahan, L. Cognet,**

*Cette école s'inscrit dans la série des écoles thématiques de la Société Française d'Optique. L'école pré-doctorale des Houches est organisée conjointement avec les Ecoles Doctorales à composante physique des Universités françaises. Les Houches est un village de la vallée de Chamoni, dans les Alpes françaises. L'école a lieu dans un groupe de chalets montagnards entourés de prairies et de bois. Il est situé à une altitude de 1150 m. L'hébergement et les repas sont assurés pour tous les participants. Les étudiants bénéficieront en permanence de salles de réunions et d'une bibliothèque.*

Ecole de Physique des Houches, Côte des Chavants, F-74310 Les Houches

Tel.: (33) 4 50 54 40 69 - Fax: (33) 4 50 55 53 25

Directeur : **Claude Delalande**