



Long-Range Interacting Systems

4-29 August, 2008

Scientific Direction: Thierry DAUXOIS (CNRS & Ecole Normale Supérieure de Lyon, France)
Stefano RUFFO (Università di Firenze & INFN, Italy)

Statistical Physics

Equilibrium, David MUKAMEL, The Weizmann Institute of Science, Israel
Non-Equilibrium, Jorge KURCHAN, CNRS & ESPCI, France
Transport, Dan DUBIN, University of California - San Diego, USA

Mathematical Aspects

Large Deviations Theory, Richard S. ELLIS, University of Massachusetts Amherst, USA
Kinetic Theory, François CASTELLA, Université de Rennes, France

Applications

Self-Gravitating Systems, Thanu PADMANABHAN, Inter-University Center for Astronomy and Astrophysics, Pune, India
Fluid Mechanics (2D, stratified or rotating fluids), Bruce TURKINGTON, University of Massachusetts Amherst, USA
Wave Particle Interactions, Dominique ESCANDE, CNRS & Université de Marseille, France
Dipolar effects in condensed matter, Steven BRAMWELL, University College of London, UK
Synchronization in systems with long-range interactions, Arkady PIKOVSKY, University of Postdam, Germany

Other seminars will be contributed by participants and short term visitors including B. Barbara (France), P. Courteille (Germany), B. Dubrulle (France), P. Gaspard (Belgium), P.E. Jabin (France), M. Kastner (Germany), M.J. Kiessling (USA), G. Robb (Scotland) and W.C. Saslaw (USA).

Scientific Program

The aim of this Summer School is to present the recent development of coherent and comprehensive approaches to the theoretical and experimental study of long-range interacting systems, by integrating different disciplines and gathering together a number of leading scientists in the relevant fields. Scientists working in different fields like: astrophysics/cosmology, plasmas, 2D hydrodynamics, Coulomb or dipolar interactions, theoretical statistical mechanics, will have a unique opportunity to present and discuss the common and closely related problems faced by all of them when dealing with long-range interactions. The defining scientific focus of the school is the common need of understanding the thermodynamics and out-of-equilibrium dynamics of long-range interacting systems. Indeed, in recent years, it has become evident that the statistical physics of long-range interacting systems exhibits a whole set of new qualitative properties and behaviours: ensemble inequivalence (negative specific heat, temperature jumps), long-time relaxation (quasi-stationary states), violations of ergodicity and disconnection of the energy surface, subtleties in the relation of the fluid (i.e. continuum) picture and the particle ("granular") picture. The School will be instrumental for the creation of a community capable of addressing the new scientific problems posed by long-range interactions, by providing the students an interdisciplinary training which will expose them to the problems of long-range interacting systems in a broad context.

Registrations

Applications must reach the School **before March 1, 2008** in order to be considered by the selection committee. The full cost per participant, including housing, meals and the lectures book, is 1500 euros. Thanks to financial support by various funding agencies, a contribution of only **900 euros / participant** is requested. A few additional grants will be available. Application forms and additional information can be downloaded from the site: <http://w3houches.ujf-grenoble.fr/>. One can also contact the School at

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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 and Institut National Polytechnique de Grenoble, and is supported by the Ministère de la Jeunesse, de l'Éducation Nationale et de la Recherche, the Centre National de la Recherche Scientifique (CNRS) and the Direction des Sciences de la Matière du Commissariat à l'Énergie Atomique (CEA/DSM).