

INSTITUT D'ETUDES SCIENTIFIQUES DE CARGÈSE

Cargèse International School 2018

Transport, mesoscopy and imaging of waves in complex media

May 28 - June 01, 2018

Web site

Alexandre
AUBRY

Inst. Langevin Paris, FR
alexandre.aubry@espci.fr

Nicolas
CHERRRET

Lab. Kastler Brossel, Paris FR
cherrret@lkb.upmc.fr

Light traveling through thick clouds, electrons conducting in metals or atomic clouds evolving in random optical environments are all examples of waves propagating through complex media: Throughout its trajectory, the wave encounters many heterogeneities and undergoes multiple scattering. During this process, the phase of the wave is never completely lost or erased, and "mesoscopic" interference phenomena may show up. The mesoscopic physics of waves in complex media is important on a fundamental level because it involves universal wave phenomena like Anderson localization. On a practical level, the theoretical understanding of wave propagation in complex media has allowed great progresses towards the control of waves in these systems. Today, for example, we know how to image hidden objects behind a very heterogeneous medium by exploiting the spatial correlations of the wave-field, or even force a wave to propagate along a desired path by designing properly the propagation medium. At the same time, many researchers start to explore new types of complex media, in which the waves are confined or subject to non-linear effects. In optics, the use of such materials highlight phenomena that until now were thought to be far from classical wave physics, such as superfluidity or Bose condensation. All these concepts are strongly related, but they are often tackled with theoretical or experimental approaches and different languages. In this context, it is essential to bring together these different visions through lectures given by experienced researchers from these different communities.

Main topics will include

- * Scattering and transport of waves in complex media,
- * Matter waves in random optical potentials,
- * Random matrix theory, wave front shaping,
- * Metamaterials, photonic and phononic crystals,
- * Simulation of solid-state and cold-atom physics with light

- * Mesoscopic physics,
- * wave imaging,
- * Optical forces,

Eminent scientists in the field will animate the workshop. These include:

Dominique Delande (CNRS, LKB, Paris), Mathias Fink (ESPCI Paris), Yan Fyodorov (King's College London), Sylvain Gigan (Univ. Pierre et Marie Curie, Paris), Geoffroy Lerosey (CNRS, Institut Langevin, Paris), Gilles Montambaux (Univ. Paris-Sud), Fabrice Mortessagne (Univ. Nice), Nicolas Pavloff (Univ. Paris-Sud), Stefan Rotter (Vienna Univ. of Technology), Juan José Saenz (DIPC, San Sebastian), Sergey Skipetrov (CNRS, LPMMC, Grenoble), Diederik Wiersma (Univ. Florence)

Scientific Committee

Alberto Bramati (LKB Paris), Hui Cao (Yale Univ), John Page (Univ. Manitoba Winnipeg), Sergey Skipetrov (LPMMC Grenoble), Diederik Wiersma (European Lab. Florence),

Young scientists will give application seminars of the lectures.

Thibaut Jonkheere (CPT, Marseille), Claire Michel (INPHYNI, Nice), Romolo Savo (ETH Zürich), Giulia Semeghini (LENS, Florence), Shakeeb Bin Hasan (Univ of Twente), Yvan Sortais (Inst d'Optique, Palaiseau) Chia Wei Hsu (Harvard Univ.)

Application and registration

<https://complex2018.sciencesconf.org>

Deadline Application : 2018, March 15th

Registration Fees : 500 € to 700 €

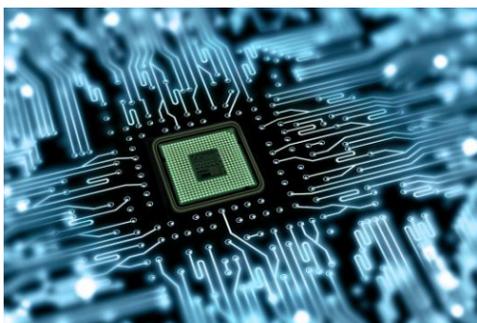
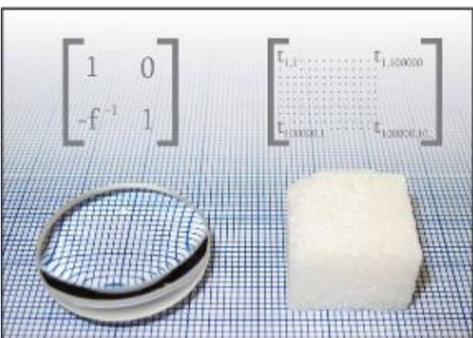


Image credits: E.G. van Putten *et al.*, Physics 3, 22, 2010

H. Hu *et al.*, Nature Phys. 4, 1945, 2008



Contrôle
des Ondes
en Milieu
comPLEXE

