

Cargèse International School 2022

Wave propagation and control in complex media – From spatial to temporal degrees of freedom Sept 12 – 16, 2022

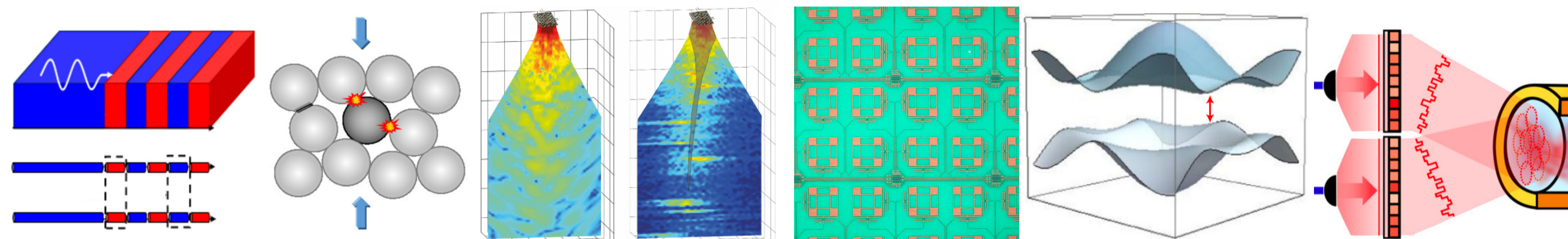
School director
Pr. Mathias Fink

**Scientific and
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Understanding wave propagation in homogeneous media is the basis of classical imaging, sensing or telecommunications techniques. The presence of disorder complicates these problems and the study of propagation in disordered media, associated with spatio-temporal wave control techniques, has enabled major advances in many fields, from acoustics to optics, including seismology and microwave. All these techniques share the same base, namely the wave propagation medium itself. This remains a subject of study in its own right, which we wish to address during this summer school, while keeping in mind the spirit of making crossings between the different communities of wave physics. Indeed, there is a multitude of different propagation media, each coming with its own specificities and its own terminology.

Propagation media typically present fluctuations in the spatial dimensions, and also sometimes in the temporal dimension. While traditionally seen as perturbations, these degrees of freedom can be harnessed to develop new applications. Based on this observation, the main theme of our school is the study and the control of the spatio-temporal degrees of freedom in complex media. The objective is to share fundamentally multidisciplinary knowledge acquired by experts from different fields of research who face similar problems. The subjects treated will allow us to cover the theoretical aspects related to complex environments (correlated disorder, topology, multiple scattering, non-linear media, Anderson localization, metamaterials) as well as their practical applications (microwave, optical, and quantum telecommunications, imaging, sensing).

Main topics will include

Quantum and classical optics, acoustics, microwaves, seismology, granular media, topology, metamaterials, etc.

Eminent scientists in the field will animate the school

Pr. Mathias Fink – ESPCI Paris - PSL
Pr. Sylvain Gigan – Sorbonne Université
Pr. Rémi Carminati – ESPCI Paris - PSL
Dr. Valentina Emiliani – Institut de la Vision
Dr. Eleni Diamanti – Sorbonne Université
Pr. Isabelle Staude – University of Jena
Pr. Marcel Filoche – École Polytechnique
Dr. Alexandre Aubry – ESPCI Paris - PSL, CNRS
Dr. Robin Kaiser – InPhyNi
Pr. Arnaud Tourin – ESPCI Paris - PSL

Pr. Mordechai Segev – Technion
Dr. Geoffroy Lerosey – Greenerwave
Pr. Ad Lagendijk – University of Twente
Dr. Yaron Bromberg – Hebrew University of Jerusalem
Pr. Hui Cao – Yale University
Pr. Angélique Drémeau – ENSTA Bretagne
Dr. Esther Alarcón Lladó – AMOLF
Dr. Perrine Berger – Thales Research and Technology
Dr. Sylvain Ravets – Université Paris Saclay, CNRS

■ **Registration fees (lunch and lodging included)** 600 € for undergraduate and PhD students – 800 € otherwise

■ **WEB** https://www.institut-langevin.espci.fr/cargese_2022

■ **Deadline for applications** June 30, 2022

Image credits V. Pacheco-Peña et al. arXiv:2108.01007 (2021) – J. Brum et al. PRE (2019) – A. Aubry – Greenerwave – T. Ozawa et al. Rev. Mod. Phys. (2019) – S. Gigan