



Session CV

# Quantum Optomechanics and Nanomechanics

August 3-28, 2015

<http://www.lkb.ens.fr/Optomechanics2015>

## Scientific Direction

**Pierre-François Cohadon** Laboratoire Kastler Brossel, ENS, Paris  
**Jack Harris** Yale University, New Haven  
**Florian Marquardt** Universität Erlangen-Nürnberg

## Long Courses

<b>David Blair</b> (University of Western Australia, Perth)	The quest for the quantum limit for resonant gravitational-wave detectors
<b>Yanbei Chen</b> (California Institute of Technology, Pasadena)	Quantum Optomechanics with Macroscopic Test Masses
<b>Andrew Cleland</b> (University of California, Santa Barbara)	Basics of microwave electro-optomechanics
<b>Aashish Clerk</b> (McGill University, Montreal)	Quantum measurements & quantum optomechanics
<b>Antoine Heidmann</b> (Laboratoire Kastler Brossel, Paris)	Early history and fundamentals of optomechanics
<b>Ania Jayich</b> (University of California, Santa Barbara)	Coupling mechanics and spins in diamond
<b>Konrad Lehnert</b> (JILA, University of Colorado and NIST, Boulder)	Electromechanical entanglement, memory, and transduction
<b>Nergis Mavalvala</b> (MIT, Cambridge)	Advanced gravitational-wave interferometers
<b>Pierre Meystre</b> (University of Arizona, Tucson)	Quantum Optomechanics and quantum heat engines
<b>Oskar Painter</b> (California Institute of Technology, Pasadena)	Design and engineering of optomechanical crystals
<b>Oriol Romero-Isart</b> (IQOQI, Innsbruck)	Quantum Physics with Microspheres
<b>Philipp Treutlein</b> (University of Basel)	Hybrid Optomechanics

## Research Seminars

About 15 research seminars will complement the lectures. Additional information will be given on the website.

## Scientific Program

The school will cover the emerging fields of cavity optomechanics and quantum nanomechanics. These rapidly progressing fields comprise a large variety of systems (including mechanical resonators in superconducting circuits, trapped atomic samples, integrated photonic circuits, and many more). Significant experimental breakthroughs have recently been achieved, such as the experimental demonstration of the quantum ground state of a mechanical resonator, entanglement of a mechanical resonator with a superconducting qubit and a microwave field, and gravitational-wave interferometry with squeezed light. Possible applications include the coherent conversion of quantum information from microwave to optical frequencies, ultrasensitive measurement of displacements, forces and accelerations, and tests of fundamental questions in quantum physics. The courses and seminars by world-leading experts will cover gravitational-wave detection, applications of squeezing, nano- and optomechanics in superconducting circuits, the theory of quantum measurements, optomechanics with photonic crystals, trapped atoms, foundational questions, and more.

## Registration

Applications must reach the School before March 15<sup>th</sup>, 2015 in order to be considered by the selection committee. The full cost per participant, including housing, meals and the book of lecture notes, is 1500€. We should be able to provide financial aid to a limited number of students. All practical information and the application form can be found on the Les Houches website: <http://houches.ujf-grenoble.fr/>.

One can also contact the School at :

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Les Houches is a village located in Chamonix valley, in the French Alps. Established in 1951, the Physics School is situated at 1150m above sea level in natural surroundings, with breathtaking views on the Mont-Blanc mountain range.

**Les Houches Physics School is affiliated with Université Joseph Fourier - Grenoble I (UJF)**, and is funded by the UJF, the Centre National de la Recherche Scientifique (CNRS) and the Direction des Sciences de la Matière of Commissariat à l'Energie Atomique (CEA/DSM).

