

Nano-OptoMechanics: An introduction

September 25-26, 2014

IPCMS – Institut de Physique et Chimie des Matériaux de Strasbourg

Theoretical studies and huge technological progresses over the last decades made it possible to reach a considerable level of control over quantum states of matter in a large variety of physical systems, ranging from photons, electrons and atoms to bigger solid state systems such as quantum dots and superconducting circuits. This opened the possibility for novel tests of quantum mechanics and allowed, among other things, to take important steps forward in investigating the quantum regime of macroscopic objects. In this perspective, one of the main goals in today quantum science is controlling nano- and micromechanical oscillators at the quantum level. Quantum optomechanics, i.e. studying and engineering the radiation pressure interaction of light with mechanical systems, comes as a powerful, well-developed, tool to do so.

This lecture series provides an introduction to the science of Nano- and Opto-Mechanics. The basic ideas will be presented together with a panorama of key recent experiments and theoretical breakthroughs in this field, which presents many exciting research opportunities for young researchers both in basic science and technology.

Program:

Thursday, September 25th 2014

8:50 – 9:00 Welcome addresses

9:00 – 10:45 **Prof. Klemens Hammerer**, Universitaet Hannover, DE

Opto-Mechanics: Theory overview from membranes to gravitational waves

11:00 – 12:45 **Prof. Pierre-Francois Cohadon**, Ecole Normale Supérieure, Paris, FR

Opto-Mechanics with micropillars and photonic crystals nanomembranes

13:00 – 14:00 Lunch

14:00 – 15:45 **Dr. Ivan Favero**, CNRS – LMPQ, Paris

Quantum optomechanics with GaAs nanodisc resonators

16:00 – 17:45 **Prof. Martino Poggio**, University of Basel, CH

Hybrid mechanical systems: detectors at the quantum limit

Friday, September 26th 2014

9:00 – 10:45 **Prof. Peter Rabl**, ATI – Technische Universitaet Wien, AT

Optomechanical quantum information processing with photons & phonons

11:00 – 12:45 **Prof. Philipp Treutlein**, University of Basel, CH

Coupling ultracold atoms to mechanical oscillators

Contacts: Dr. Guido Pupillo, IPCMS – ISIS, University of Strasbourg (pupillo@unistra.fr)

Dr. Cyriaque Genet, ISIS, University of Strasbourg (genet@unistra.fr)