



PHOTONICS - EUROPHOTONICS MASTER COURSE

MASTER THESIS PROPOSAL

Course 2014 –2015

Laboratory : ICFO
City, Country : Castelldefels, Spain

Title of the master thesis : Squeezing the mechanical motion of graphene resonators

Name and affiliation of the tutor of the master thesis : Darrick Chang

Institution: ICFO

Mail address : Mediterranean Technology Park

Email address : darrick.chang@icfo.es

Phone number : +34 935534178

Summary of the subject (maximum 1 page):

Over the past decade, the level of sensitivity and control of nano- and micro-mechanical systems has substantially increased, to the point that such systems could become a viable future technology to generate, manipulate, and transfer quantum states of motion. One of the major current goals in the field is to generate a squeezed state, in which the quantum fluctuations of the motion are reduced below the level naively expected from Heisenberg's uncertainty principle. The goal of this project is to theoretically investigate and optimize a protocol for squeezing under realistic conditions, and apply this analysis to a specific novel system consisting of a graphene micro-mechanical resonator coupled to a superconducting electrical circuit. The researcher will interact both with Prof. Darrick Chang on the theoretical aspects of the project, and with Prof. Adrian Bachtold, whose experimental group has expertise on carbon nanotube and graphene-based mechanical systems.

Keywords : graphene, quantum optics, nanomechanics

Additional information :

- * Amount of the monthly allowance (if it is the case):
- * Required skills: familiarity with theoretical quantum mechanics and quantum optics, good command of mathematical and analytical techniques
- * Miscellaneous: