



## **MASTER IN PHOTONICS – PHOTONICS BCN EUROPHOTONICS-POESII MASTER COURSE**

### **PROPOSAL FOR A MASTER THESIS**

**Dates: April - September 2017**

**Laboratory : Quantum NanoMechanics group- Plasmon Nano-Optics group**

**Institution: ICFO**

**City, Country : Castelldefels (Barcelona)**

**Title of the master thesis:**

**Quantum optomechanics with hybrid carbon nanotube resonators**

**Name of the master thesis supervisor: Adrian Bachtold and Romain Quidant**

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**Summary of the subject (maximum 1 page):**

In the last 10 years, cavity optomechanics achieved a major milestone by entering into the quantum regime (quantum back-action, ground state cooling). This remarkable achievement was realized because of technological advances in the fabrication and measurement of nanoresonators. In this highly multidisciplinary project, the candidate will employ carbon nanotubes as a robust platform for quantum optomechanics applications. This effort will involve experimentalists of two different research groups combining the expertise of carbon nanotube resonators by the Quantum Nanomechanics group and the optomechanics with levitated nanoparticles by the Plasmon Nano-optics group led by Pr. Bachtold and Pr. Quidant, respectively. The candidate will acquire a strong experience in ultra-sensitive nano-optomechanical measurements including high-frequency optical detection, fiber-optics, phase-sensitive real-time feedback schemes, nano-scale imaging techniques, and nano-fabrication.

**Keywords: optomechanics, optical cavities, carbon nanotubes, thermal motion**

**Additional information:**

- Required skills: We are looking for applicants with possibly a background in photonics, mechanical engineering, or computer science. Solid bases in statistical and quantum physics are appreciated.