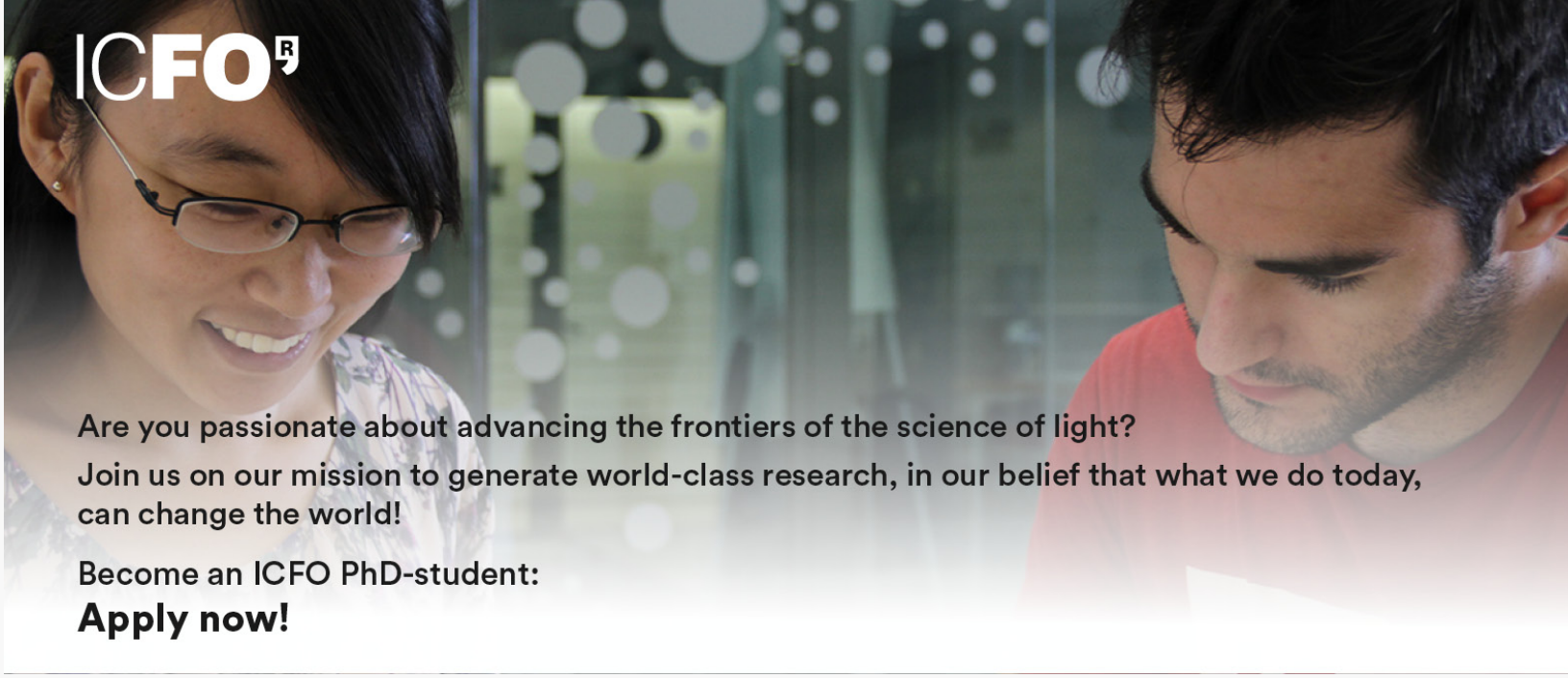
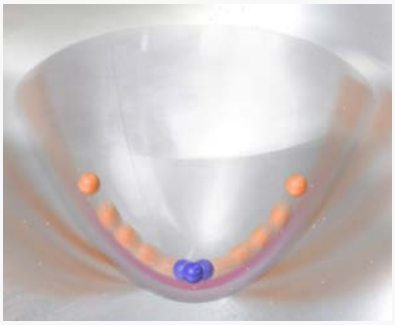


PhD positions available within the ICFOstepstone fellowship program (H2020 MSCA-COFUND action at ICFO)

ICFO's International PhD Fellowship Program welcomes applications from individuals with a degree in a field of science and engineering related to the ICFO research activities. Selected candidates join our focused 4-½ year PhD program, in partnership with the *Universitat Politènica de Catalunya* (UPC – BarcelonaTech), with an emphasis on intensive research-based training. In the scope of our current General Call for applications to the ICFOstepstone PhD fellowship program, an H2020 MSCA-COFUND action at ICFO, we have a

Project available in the field of Experimental Quantum Optomechanics

Quantum physics – well established in the microscopic world with atoms, molecules and ions – challenges our concepts about locality and reality of our everyday macroscopic world. As quantum theory does not know any clear boundaries, mesoscopic optomechanical oscillators (consisting of billions of atoms) give us the opportunity to explore the transition between classical and quantum worlds. In the rich variety of optomechanical systems, levitating nanoparticles stand out due to their long coherence times and are the only optomechanical system without clamping losses and therefore offer a unique playground for testing the laws of quantum mechanics at the mesoscopic scale.



Recently, rapid progress in the new emerging field of levitation optomechanics paved the way towards low phonon occupation numbers. Coupling nanoparticles to a high-finesse optical cavity placed in high-vacuum conditions, promises the unachieved motional ground state (with a phonon occupation less than one) at room temperature. Reaching this regime outside of a dilution fridge would make it the first table-top experiment of its kind exploring the motional ground state, opening the door to explore possible effects such as quantum entanglement and superposition with mesoscopic objects. Despite the rich opportunities along the open questions of fundamental physics, quantum optomechanical systems will also stand as unprecedented tools for quantum metrology and sensing.

The present PhD project sits at the frontier of optomechanics and aims at combining the latest advances of the field to study and experimentally control novel mechanical nanooscillators with unique properties. It offers the exceptional chance of working in a versatile field gaining expertise in various laboratory disciplines such as optomechanics, nanooptics, vacuum, laser physics, computer control, electronics etc. The candidate will be working in a stimulating, multidisciplinary environment, also as part of international collaborations, and will be associated to the *Plasmon Nano-Optics* research group, led by Prof. Dr. Romain Quidant (romain.quidant@icfo.eu).

For call details, as well as to submit your application, see http://jobs.icfo.eu/index.php?detail=320.
Apply by September 17, 2017.