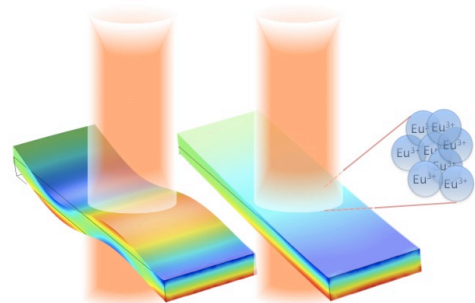


Ph.D. thesis in Paris (LNE-SYRTE/Observatoire de Paris) on

Nano-mechanical hybrid quantum systems based on rare-earth doped crystals

Scope and aim:

The chief endeavor of this project is to investigate the behavior of a macroscopic material object - a mechanical oscillator - in a non-classical state. Many extraordinary quantum states, including entangled states, have been achieved with single atoms, molecules and photons, and larger quantum states, such as Bose-Einstein condensates, with dilute atomic gasses. So far, however, only extremely few quantum physics experiments based on macroscopic material objects have been performed, not because of lack of interest, but largely due to the difficulty of such venture. In this project, we wish to build upon the latest nanotechnology and quantum control developments to work toward placing a mechanical oscillator in a quantum regime. The goal is to shed new perspectives on the transition between quantum and classical behavior. Practically, the idea is to interact with the oscillator (a crystalline structure) by coupling it to “atom-like” systems (rare-earth dopants) via material strain. The successful applicant will both participate in the preparation of the samples as well as perform the optical measurements on the systems.



Context:

The Ph.D. position is offered as part of a larger European Project on Quantum Information Technologies based on rare-earth doped crystals. The global project includes (in addition to France) Germany, Sweden, Denmark and Spain. The successful applicant will participate in scientific meetings with the partners. As the nano-structures will be elaborated in a collaboration with Institut NEEL/Université Grenoble Alpes, if desired, the student will have the opportunity to spend time in Grenoble as well.

The position is open from October 1st 2016 and the European project covers the salary for the full duration of the Ph.D. (3 years), as well as reimbursement for travel fees (scientific meetings, conferences and possible stays in Grenoble).

The applicant:

Must hold a master (M2 or equivalent) in physics, and some experience in experimental physics (in particular in optics) is considered very useful, but not a strict requirement.

CV and references should be sent to Dr. Yann Le Coq (yann.lecoq@obspm.fr)