



Postdoc : Atomic physics with levitating micro-magnets

Duration : 24 months (possibility with 12 additional months)

Job statuts : full time post-doc

Location : ENS Paris

Salary : 2900€ net per month

Description :

Levitated nanomechanical oscillators are prominent emerging platforms for optomechanical studies. Their extreme isolation from environment and their record high mechanical quality factors enables efficient cooling of their motion using embedded spins [1] or using a cavity. The latter method was for instance used to demonstrated cooling of the center of mass motion of a nanosphere down to the ground state [2]. Trapped magnets have also recently become a major focus in this field, offering an extra internal degree of freedom – namely *strongly correlated spins* – that can boost the oscillator frequencies as well as offering broad playground at the crossroad between condensed matter physics and atomic physics [3].

The post-doc will be part of a large consortium of prominent researchers around Europe involved in a QUANTERA project. One of the goals is to demonstrate atom-like Larmor precession of a trapped nano-magnet, a peculiar effect arising from the quantum nature of its intrinsic macro-spin [4]. Such a milestone would open the way to magnetic torque sensing beyond current capabilities and to novel means of controlling the motion of a mesoscopic object in the quantum regime.

The lab at ENS is fully furnished, with a cryostat operating at 4K, with Paul traps operating under low vacuum, and microwave and optical equipment.

Profile of applicant :

The candidate should hold a PhD in physics, should be highly motivated, creative and with solid knowledge on atomic physics.

Supervisors/Contact :

Interested candidates are invited to apply with a CV, a reference and a cover letter by sending an e-mail to gabriel.hetet@ens.fr

[1] Delord T. *et al.* Nature 580 (7801), 56-59 (2020)

[2] Delic U. *et al.* Science 367, 6480 (2020)

[3] Huillery P. *et al.* PRB 101, 134415 (2020), Gieseler J. *et al.* PRL 124 163 (2020)

[4] Kimball D. *et al.* Phys. Rev. Lett. 116, 190801 (2016)