Felicidades a la nueva graduada de doctorado del ICFO

La Dra. Natalia Domingues Alves se ha graduado con una tesis titulada ?Single-atom motional dynamics in an optical dipole trap'

June 16, 2023

Felicitamos la Dra. Natalia Domingues Alves que hoy ha defendido su tesis en el auditorio del ICFO.
La Dra. Domingues Alves obtuvo su master de Fisica Atomica y Molecular por la Universidad Federal de Pernambuco, en Brazil. Se unio como estudiante de doctorado en el grupo de investigacion de Atomic Quantum Optics en ICFO dirigido por el profesor ICREA Dr Morgan Mitchell. La tesis de la Dra. Domingues Alves titulada ?Single-atom motional dynamics in an optical dipole trap' fue supervisada por el profesor ICREA Dr Morgan Mitchell.

RESUMEN:

These thesis studies, using simulation and experiment, the motional dynamics of a single atom in an optical dipole trap. The optical dipole trap we study is a single-beam, red-detuned, far-off-resonance trap (FORT). This FORT is located at the centre of an

arrangement of four high-NA lenses in the "Maltese cross" geometry, which facilitates measurements based on atomic fluorescence.
We make a detailed study, combining simulation with experimental measurements, of the temperature of the atom in this system. We note reasons why a single-temperature description could fail to describe the motional statistics of the atom in the trap.
We then study the sensitivity of an established method, the release-and-recapture, to a possible anisotropic temperature distribution of the atom.
We also measure the optical extinction produced by the atom, from which we extract a lower bound on the strength of interaction.
Finally, we show with simulation results and experiments, how parametric excitation of the atom in the FORT can be used to manipulate its phase-space distribution, which can lead to an effective decrease or increase of the atom's kinetic energy.

Comite de Tesis:
Prof. Dr. Hugues de Riedmatten, ICFO
Prof. Dr. Axel Kuhn, University of Oxford
Dr. Raul Celistrino Teixeira, Universidade Federal de Sao Carlos