

INTERNSHIP PROPOSAL

(One page maximum)

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Internship location: Collège de France
Thesis possibility after internship: YES
Funding: (Team research contract)

Strongly interacting superfluids

The rubidium team of the Quantum Gases Group at Collège de France has a long-standing experience in the investigation of low-dimensional Bose gases. More specifically, we have developed in the last years new techniques to imprint arbitrary wave functions, spin textures, or to lattice potentials. It has opened many new opportunities for the study of Bose gases. For example, we have recently explored the properties of superfluid state of matter, the non-linear dynamics and solitons physics in one and two dimensions and few-body physics.

We are looking for a master student that wishes to make its M2 internship in the team followed by a PhD. There is a possible funding directly from the host team. The PhD project will consist in the experimental study of strongly interacting Bose gases. We will explore two research lines in parallel and expect them to merge during thesis. The first research line consists in studying low density 1D Bose gases (individual or ensembles of tunnel-coupled gases) and study their superfluid properties. The second research line consists in dressing these gases thanks to a Rydberg excitation protocol that will bring the system into a strongly interacting regime, where the dynamics remains largely unexplored experimentally.

Condensed Matter Physics: YES
Quantum Physics: YES

Soft Matter and Biological Physics: NO
Theoretical Physics: YES