

# INTERNSHIP PROPOSAL

Laboratory name: **Laboratoire Kastler Brossel**  
CNRS identification code: UMR 8552  
Internship director's surname: Pierre Cladé and Saïda Guellati  
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Web page: <https://www.lkb.fr/atominterferometry/>  
Internship location: Campus Pierre et Marie Curie, 4 place Jussieu

Thesis possibility after internship: YES  
Funding: YES If YES, which type of funding: ANR  
"Plan quantique"

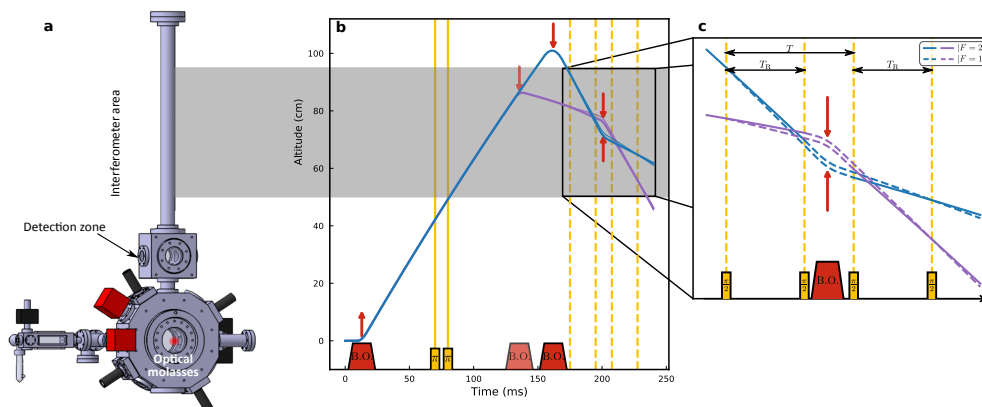
## Next generation of quantum sensors based on atom interferometry

Atom interferometry is a key tool for developing high-precision quantum sensors. The Kastler Brossel Laboratory is a world leader in this field. Thanks to its work on measuring recoil velocity through atomic interferometry, it has provided the most accurate determination of the fine-structure constant  $\alpha$ . This measurement is widely used by the scientific community and, among other things, allows for highly precise testing of the standard model.

We are offering **two experimental internship** subjects, each of which could lead to a doctoral thesis.

The first concerns the construction of a large momentum transfer beam splitter. More specifically, we want to set up a phase-stable optical lattice to be able to produce both Bragg transitions and Bloch oscillations. The ultimate aim of this work is to study these beam splitter in order to produce compact sensors or to improve substantially the sensitivity of atom interferometers for the detection of gravitational waves.

The second subject concerns the construction of an interferometer using Ytterbium atoms. This experiment is currently under construction and the aim of this internship will be to build an ytterbium magneto-optical trap.



Please, indicate which speciality(ies) seem(s) to be more adapted to the subject:

Condensed Matter Physics: NO      Soft Matter and Biological Physics: NO  
Quantum Physics: YES              Theoretical Physics: NO