

## Postdoctoral position at SYRTE

### “Atom Interferometry and Inertial Sensors” Team

# Delta Kick Squeezing for Atom Interferometry

The post-doctoral researcher will work on the implementation at SYRTE of measurement noise reduction methods below the standard quantum limit, in the framework of a collaborative research project named "SQUEIS" (Squeezed Quantum Inertial Sensors) and funded by the ERA-NET Quanteria. He or she will implement more particularly the "Delta-Kick squeezing" method, recently proposed by Robin Corgier, currently a postdoctoral fellow at SYRTE, and his collaborators. He or she will work on the implementation of this method in a free-falling atom interferometer, based on the use of Raman light beamsplitters and ultra-cold atoms produced by evaporative cooling.

The work, essentially experimental in nature, will first consist in optimizing the preparation sequence of ultra-cold atoms, to obtain Bose Einstein condensates in a robust and efficient way, and in optimizing the detection method of the two output ports of the interferometer. The candidate will then demonstrate the possibility of realizing strongly spin-squeezed states through atomic lensing methods based on pulse sequences realized with highly detuned high power laser beams. Finally, he or she will study the impact of the use of these quantum states in an interferometer on the sensitivity of measurements. He or she will conduct the experimental studies, participate in the analysis of the results, which he or she will present at SQUEIS progress meetings and conferences in the field. He or she will have extensive theoretical support for the modeling of the experiment, the optimization of the measurement sequence and for the analysis of the results. He or she will write the progress reports, as well as the publications resulting from his or her research.

The post-doctoral researcher will join the “Atomic interferometry and inertial sensors” team at SYRTE, a leading laboratory in the development of high sensitivity inertial sensors based on atomic interferometry, such as gravimeters and gyrometers, using cold atoms trapped or in free fall. He or she will work under the direction of Franck Pereira dos Santos, Research Director at CNRS and team leader at SYRTE, on an experimental setup operational today.

**Start date:** Early 2022, as soon as possible

**Profile:** The candidate should hold a PhD in physics and have strong experimental skills in laser physics, atomic physics, electronics and instrument control. Research experience in the field of cold atoms is mandatory. Any experience in the field of atomic interferometry will be highly appreciated.

**Nationality:** No restrictions.

**Contact:** Send CV, publication list, motivation letter and references to the project leader, Franck Pereira dos Santos, [franck.pereira@obspm.fr](mailto:franck.pereira@obspm.fr)