

LNE-SYRTE, Observatoire de Paris, France, is opening a post-doc position in:

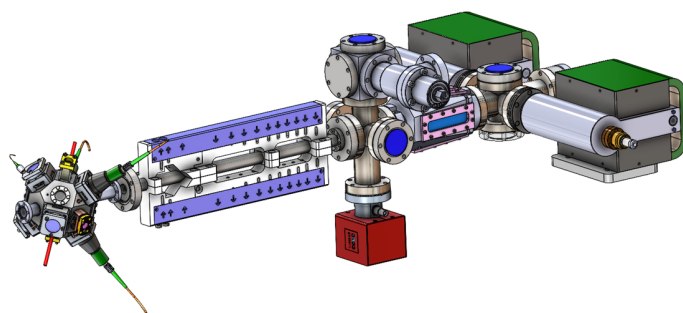
Design of a high stability transportable Yb lattice clock applied to geodesy

Position

Description: The frequency of optical lattice clocks - based on the probing of the narrow transition $^1S_0 \rightarrow ^3P_0$ of $\sim 10^4$ neutral atoms trapped in a "magic" optical lattice - can now be controlled at the 18 digits level. This makes them the most accurate instruments ever built, which opens the possibility of applying this capacity to new fields of science: tests of General Relativity (Lorentz invariance, possible drift of fundamental constants), quest for dark matter, or sensing of the geopotential (chronometric geodesy). In this perspective, SYRTE (Observatoire de Paris) has started the development of a transportable optical lattice clock based on Ytterbium. The device will be connected to the large scale infrastructure REFIMEVE+ (optical fiber network disseminating an ultrastable reference at 1542 nm), in order to enable remote frequency comparisons with the ~ 12 stationary European optical clocks. This raises the prospect of a cartography of the Earth gravitational potential with an unprecedented resolution.

The applicant (M/F) will be in charge of the development of the ytterbium lattice clock itself. He/she will make use of the various atom cooling techniques (optical molasses, permanent magnets based Zeeman slower, 2D MOT, deflexion) already available in the Physics package in order to lattice trap $> 10^4$ ^{171}Yb atoms in < 100 ms. He/she will supervise the programming aspects in order to manage the clock cycle with reliability and agility. Together with the rest of the team, he/she will prepare the instrument for several mid-term goals:

- ▶ remote operation
- ▶ participation to frequency comparisons through the European fiber links
- ▶ contribution to geodetic measurements, evaluation of the performance with respect to traditional methods (spirit leveling and/or satellite-based)



Heart of the SYRTE transportable Yb clock

Start date: Oct. 2023, to be discussed

Work place: SYRTE, Observatoire de Paris, 77, Avenue Denfert-Rochereau, 75014 Paris, FRANCE

Field: Cold atoms, atomic clocks, lattice trapping, quantum engineering

Framework: The position and the project are funded by [ANR ROYMAGE](#), CNES, DIM SIRTEQ, Labex First-TF, and by the European Joint Research Program TOCK.

Profile

The candidate must have completed a PhD in experimental atomic physics. A strong interest for experimental work (cw lasers, optics), numerical simulations and Python programming is required. He/she is expected to take responsibility in the project, and notably to contribute to the supervision of PhD students.

The SYRTE optical lattice clocks team is composed of about 10 people. The Yb clock will benefit from the expertise acquired in the course of the construction of the three stationary optical clocks (2 based on Sr, 1 based on Hg). A good team spirit, as well as an advanced knowledge of English, are therefore absolutely necessary.

Contact

Send a motivation letter, a CV with list of publications, and the name and contact information of two references before August. 15th, 2023 to:

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