

## **A vapor cell atomic clock for space applications**

### Detailed topic description

Because of their reliability, compactness and good performances, vapor-cell atomic clocks are nowadays employed in a large variety of scientific and technological applications which require precise timekeeping, jointly to reduced size, weight and power consumption.

This PhD research project proposes to develop a Rb compact atomic clock particularly suited for space applications, such as satellite navigation (namely Galileo). This clock is based on the principle of pulsed optical pumping which guarantees high stability performances. The prototype will make use of 1) a microwave cavity specifically designed to reduce the physics package size, 2) an optics setup based on a diode laser working in pulsed regime and used to pump the atoms and to detect the clock transition; 3) a low phase noise electronics to interrogate the atoms.

The PhD candidate will be directly involved in the designing phase, as well as in the implementation and characterization of the clock's performance in terms of stability and sensitivity to environmental parameters fluctuations.

The PhD will be located at INRIM facilities. However, to increase his/her competence, during the PhD period, the candidate will be encouraged to visit an international research group within INRIM's scientific network active in the development of compact atomic clocks.