



## JOB OFFER

**Profile:** Engineer or Physicist in Time-Frequency, Laser Physics, or Telecommunications

**Goal:** Develop time-frequency dissemination through the Belgian fiber optic network.

**Duration:** 1-year position

The Royal Observatory of Belgium (ROB) has a time-frequency laboratory equipped with atomic clocks that contribute to the international UTC (Coordinated Universal Time) reference. These clocks also generate a precise realization of UTC, namely UTC(ROB), which is available to Belgian users. The scientific team also conducts cutting-edge research on remote atomic clock comparisons, the physics of the ionosphere and plasmasphere, electromagnetic signal disturbances, and fundamental physics, using satellite navigation systems (GNSS, such as the American GPS or the European Galileo).

Time and frequency transfer (T&F) via GNSS is the most used technique for precise T&F synchronization, with a typical daily uncertainty of  $10^{-16}$  in relative frequency, and is available everywhere at a reasonable cost. However, GNSS T&F transfer is vulnerable to disturbances (interference, spoofing, jamming) and is not suitable for applications requiring increased precision and security. The most promising alternative is T&F transfer via fibre optics, which can exceed GNSS T&F transfer performance by several orders of magnitude. Several European metrology laboratories are already interconnected, and the dissemination of their UTC realization to scientific institutes and industries via fibre optics has already begun.

The ROB has recently secured funding to develop a T&F transfer network via fibre optics in Belgium and connect it to the European metrology network. This project is called BOOSTED, for Belgium Optical Network for Optical Frequency Standards and Time Dissemination. According to the proposed approach, the signal propagates parallel to the data traffic on the active telecommunications network of BELNET, which connects Belgian research institutions. This Belgian network will also be connected to the future European network already distributing an ultra-stable reference frequency. In Belgium, a connection will be established between the ROB and Belgian universities, where the ultra-stable frequency will be used for high-resolution laser spectroscopy (e.g., IMCN at UCLouvain), photonics research (ULB or UGent), etc. Finally, this project paves the way for accurate dissemination of the Belgian legal time and easy synchronization to it for various companies with high synchronization needs on a single site or between remote sites, such as in telecommunications, electricity distribution, trading, or particle accelerators.



### Job Description:

During the contract period, the selected person will be responsible for:

- Monitoring the execution of public procurement for the purchase and installation of equipment dedicated to time and frequency transfer.
- Performing the necessary calibrations for the optimal operation of the infrastructure.
- Developing and implementing monitoring for all deployed equipment.
- Writing installation, calibration, and documentation reports, as well as user manuals for the infrastructure and its supervision system.

### Desired Profile:

The candidate must hold at least a Master's degree in physics or engineering at the time of signing the contract. Candidates who are at the end of their master studies and who will get their diploma less than 3 months after the application deadline) may also apply, but cannot start the contract until after the Master's degree is obtained.

Applications with one or more of the following characteristics/qualities will be given priority:

- Field experience in laser physics, laser interferometry, or fibre optic telecommunications.
- Good knowledge of the White Rabbit protocol and frequency transfer by phase stabilization.
- Good knowledge of various programming languages and databases is an asset.
- Good knowledge of time-frequency metrology is an asset.
- Proficiency in written and spoken English. Knowledge of French, Dutch, or German is a plus.

The selected candidate will join the Time and Ionosphere team of the ROB. They must be able to work both in a team and independently. Strong communication skills and an open-minded personality are also expected.

### Offer:

This position offers a one-year fixed-term contract at salary level SW11, funded by INFRA-FED, a federal initiative aimed at promoting the development of emerging research infrastructures within federal research institutions. The successful candidate will be recruited in activity group 2 (scientific services).

### How to Apply:

The candidate must send a CV and a cover letter to [raphael.marion@oma.be](mailto:raphael.marion@oma.be), with copy to [dir-rob@oma.be](mailto:dir-rob@oma.be), no later than August 15, 2024. An application accompanied by a recommendation letter will be an additional asset.