

FIXED-TERM CONTRACT of 12 month (Research Engineer)

FEMTO-ST – CNRS UMR6174 – Time and Frequency Dpt.

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Characterization of the REFIMEVE+ fiber link.

The Time and Frequency department of the FEMTO-ST institute (UMR CNRS 6174) and the Besançon Observatory are involved in the development of a metrological platform dedicated to the frequency stability and phase noise characterization of frequency sources (oscillators) from 1 s to 1 day of integration time.

This platform will be built with radiofrequency, microwave and optical frequency standards (3 quartz oscillators, 3 Hydrogen Masers, 3 Cryogenic Sapphire Oscillators and 3 Ultra Stable Lasers associated with frequency combs). Moreover, in the frame of the REFIMEVE+ EquipeX, a fiber link between all the French metrological laboratories is under construction. The REFIMEVE+ project (or MEFINEV+ project - Metrological Fiber Network with European Vocation + -), is based on a scientific innovation, the ability to transfer an ultra-stable optical frequency on the Internet network over long-distances without any traffic disruption (<http://www.refimeve.fr/index.php/en/>).

The present position concerns the exploitation and the metrological characterization of this fiber link between Paris and Besançon. In that way an ultra-stable laser in Besançon will be locked onto the REFIMEVE+ signal and will be compared, via microwave generation with an optical frequency comb, to the cryogenic sapphire oscillator and to the Hydrogen Maser. In order to realize this frequency comparison the candidate will have to work also on the fiber link between the cryogenic sapphire oscillators room and the laser room in order to transfer the cryogenic sapphire oscillator spectral purity ($-106 \text{ dB}\cdot\text{rad}^2\cdot\text{Hz}^{-1}$ at 1 Hz) and relative frequency stability ($5\cdot 10^{-16}$ at 1 second) without degradation. The candidate will also have the opportunity to develop and setup experiments based on the REFIMEVE+ ultra-stable signal. Results will be presented at international workshops or conferences.

The candidate will have the opportunity to work in a top-level environment in an internationally recognized time and frequency metrology laboratory, benefiting from high-end metrological characterization equipment and know-how. She-he will join the OHMS team, a team of enthusiastic and experienced metrologists who don't mind doing sports or having a drink once in a while.

Skills:

- **Optics and guided optics**
- **Frequency metrology**
- **Optical frequency comb - femtosecond lasers**
- **Basic knowledge of analog electronics**
- **Electronics: RF and microwave**