

Post-Doctoral Contract- Photonics

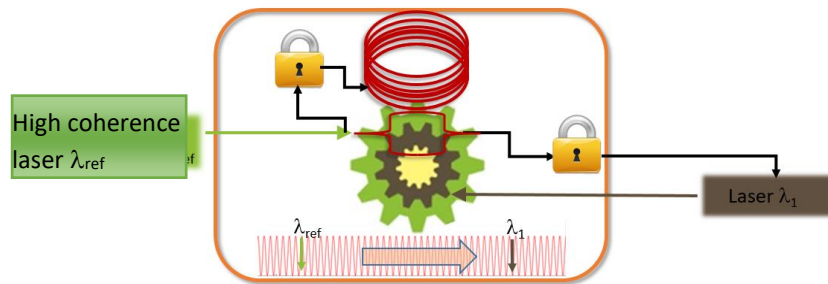
ARTEMIS Lab, NICE, France

Open in sept. 2022

Fiber Interferometer for Laser Frequency Metrology

Key words: *Laser, Noise, Spectral Analysis, Optical Fiber, Interferometry, Servo, Metrology*

Description : In the framework of a research project funded by the French Network of Excellence in Time & Frequency metrology FIRST-TF and the region Sud, a post-doctoral position for 12 months is opened in ARTEMIS Lab, Nice, France, in the topics “Fiber Interferometer, Laser Metrology and Stabilization”. The research subject concerns the study of the transfer of coherence of a laser to another wavelength using a fiber-based interferometer with a large arm imbalance (delay line). The principle is based on the stabilization of the transfer interferometer on the frequency reference laser in order to create a frequency comb of resonance to stabilize one or several lasers of different wavelength.



Spectral transfer interferometer

The goal of the project is to study the performances of this technique at a level of frequency noise below 10^{-16} 1/Hz^{1/2} for Fourier frequencies higher than 100 mHz. The research work, mainly experimental, will consist in studying and compare the performance of different methods of electro-optic servo control of the interferometer and laser, and to study the correlation between the optical length fluctuations and the chromatic dispersion in the optical fibers. A new « super » electro-optic phase modulator inside a Fabry-Perot cavity will be used as a comparison system for frequency offset of several THz. Moreover, ARTEMIS Lab should be connected in 2023 to the ultra-stable optical frequency reference provided through the national equipment of excellence REFIMEVE+. Part of this work will be in collaboration with the team Metrology, Molecules and Fundamental Tests of the Laboratory of Physics of Lasers at University Sorbonne Paris Nord which develops also techniques of stability transfer with optical fiber-based ring interferometer. Scientific missions to this laboratory are forecasted.

Laboratory : ARTEMIS is a commun laboratory of CNRS, the French national research Institution, of the Observatoire de la Côte d’Azur and the Université Côte d’Azur. It is located at 4 km of Nice city center in a wonderful wooded park. ARTEMIS is member of the network of excellence in Time & Frequency LabEx FIRST-TF, and of the equipment of excellence REFIMEVE+. The laboratory is strongly involved in extreme laser frequency metrology projects for gravitational wave detection such as Advanced VIRGO and LISA. His funder was awarded the highest french scientific award in 2017.

Profile : The candidate (M/F) should hold a doctorate in optics, photonics, optoelectronics or experimental physics with lasers. Experience in laser noise measurement, servo, frequency metrology, would be appreciated.

Financial aspect: The salary will be determined according to the frame of wage of the CNRS for contract researcher. Depending on the work experience of the hired person the net salary per month should be between 2100 € et 2850 €

Candidacy procedure : If you are interested by this research subject and want to apply, send a CV and a cover letter to Dr Fabien Kéfélian, fabien.kefelian @ oca.eu