

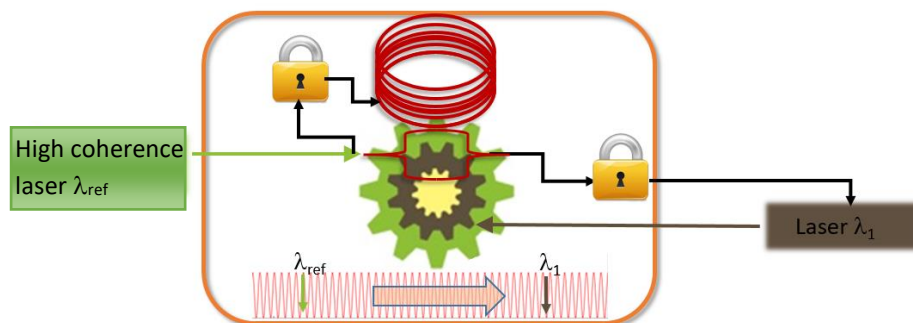
Internship for master 2021 Laser & Photonics systems

Fiber Interferometer and Laser Frequency Metrology

Keywords: *Laser, Noise, Spectrum, Optical fiber, Interferometry, Servo, Metrology*

What is laser interferometry? Laser interferometry uses the purity of the wave generated by a laser in association with a phase sensitive interferometric optical system to perform high sensitivity measurement. It is with this principle that gravitational waves have been recorded for the first time in 2015.

What is laser frequency metrology? Frequency metrology of lasers is the quantitative study of the spectral properties of coherence of the wave generated by those sources. Lasers are now the building bricks of the most stable optical clocks in the world. Numerous other domains such that sensors, optical coherent telecommunications, quantum engineering, benefit from the unique spectral properties of lasers.



Spectral transfer interferometer

What are we working on? We are interested in new concepts for laser frequency stabilization and measurement using fiber-based interferometer. We are studying the potential of a new technique to transfer the coherence between lasers of different wavelengths with a fiber-based Michelson interferometer. We are also interested to probe the fundamental noise floor of laser locking on fiber-based interferometer. The internship subject, mainly experimental, will consist in the implementation, characterization and optimization of the locking of an interferometer on a laser and the study of the performance of spectral transfer of coherence with an electro-optic based frequency comb.

The laboratory: ARTEMIS is located about 20 km from the city center of Nice, France. It is part of the Observatoire de la Côte d'Azur and is associated to CNRS and the University Côte d'Azur. It is a member of the national network of excellence in time and frequency First-TF, of the national equipment of excellence for ultra-stable frequency transfer REFIMEVE+ and is strongly involved in the realization of the gravitational wave detector Advanced VIRGO. The laboratory members have a large expertise in ultra-low noise measurement and laser locking which has been acknowledged by the award of the highest French scientific award to its founder in 2017.

Profile of the successful candidate : Student in optics-photonics master, you have general knowledge of signal processing, an interest for measurement and instrumentation, interest in measurement, instrumentation, physics systems and experiments, you are persevering and able to work in team.

Contact : Dr Fabien Kéfélian : fabien.kefelian@oca.eu Web : <https://tinyurl.com/sytras>