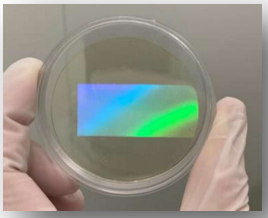
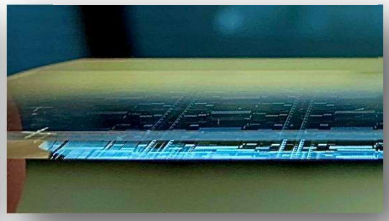
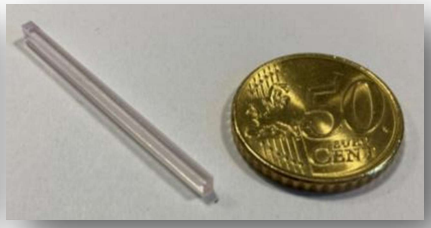
Centre de Radiofréquences, Optique et Micro-nanoélectronique des Alpes

Internship Position - Master 2

Advanced characterizations of high coherence integrated lasers



Context:

Several applications such as next generation wireless communication systems, spectroscopes and Radars require continuous high frequency radio signals.

Generation up to the millimetre wave range (30-300GHz) and even THz range can be obtained using optical signals from two lasers thanks to heterodyning. The precise control of the emitted laser wavelength determine the RF frequency produced. The quality of the obtained RF signal is thus strongly depending on the performance of the optical sources.

Thanks to several years of development, the ion exchange technology developed at the CROMA laboratory makes it possible to produce integrated lasers on glass with outstanding spectral properties with extremely accurate wavelength difference, therefore compatible with such applications. We already successfully demonstrated their use in radio-over-fibre systems operating at millimetre-wave frequencies, according to international communication standards. Test have been carried out up to 300GHz for coherent optical communications through optical fibre system.

Study:

In complement to performing standard laser characterizations (power, optical spectrum), The student will participate in building advanced experimental setups to use them. He/She will perform experimental measurements of advanced parameters such as intensity noise, laser coherence and laser stability. Laser parameters such as relaxation frequencies, damping factor and optical linewidth will be extracted from the measurements. Their precise measurement will be used in our laser models for a better understanding of the involved physic, but also to help us to optimize the fabrication process. The applicant may be involved in additional characterization of laser components fabricated within the lab such as integrated optical cavities and optical amplifier. Preliminary experiments for a proof of concept for THz spectrometry is envisaged depending on realized work.

Skills:

Background in optics and/or laser physics is recommended. Strong interest in experimental work and rigorous scientific method is required to operate laser sources, and opto-RF measurements systems. A will to understand complex theoretical laser

Keywords:

- Lasers
- Integrated optics
- Optical linewidth
- Intensity noise
- Coherence
- Terahertz Generation

Lab:

https://croma.grenoble-inp.fr/

Starting date:

Spring 2026

Contact:

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