Laboratoire: Laboratoire de Physique des Lasers

(http://www-lpl.univ-paris13.fr)

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Responsable(s) du stage:

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Titre du stage / Title :

Développement et caractérisation d'interféromètres à fibre pour la stabilisation en fréquence de lasers à semi-conducteurs

Development and characterization of fiber-interferometers for semiconductor-laser frequency stabilization

Internship description:

Context of the study :

Our scientific project concerns the study and stabilization of new integrated sources based on self-pulsated multimode lasers. These compact frequency combs can offer new opportunities for frequency metrology for example in embedded systems (for space, defense and telecommunications) or for remote measurements, needing compact and transportable sources.

The frequency combs are also used, among other things, as stabilized laser sources, or as ultra-pure frequency synthesizer thanks to the beating between two modes of the comb.

The proposed research internship concerns the development of fiber tools for characterizing the frequency stability of our sources.

With a long-term experience in frequency metrology and also in fiber systems field, we study fully fiberized optical cavities to achieve frequency stabilization of 1.55µm laser sources, and to characterize their frequency noise.

Program of the internship :

The trainee will work in a group of 5 persons (1 doctoral students, 2 postdoctoral fellows and 2 researchers) to the realization and characterization of various fiber interferometers (Mach-Zehnder, Michelson, ring cavity). The two-vawe interferometers are used for increasing the spectral purity of tunable lasers (frequency prestabilization) and the ring interferometer is used for frequency stability transfer.

Duration of the internship : 5 months (from march 2018)

Relevant publications :

A. Chaouche-Ramdane, P. Grüning, V. Roncin, & F. Du-Burck (2017). Stability transfer at 1.5 µm for metrological applications using a commercial optical cavity. Applied Optics, 56(1), 8-14.

F. Kéfélian,H. Jiang,P. Lemonde, P., & Santarelli, G. (2009). Ultralow-frequency-noise stabilization of a laser by locking to an optical fiber-delay line. Optics letters, 34(7), 914-916.

Key words : Metrology, Frequency stability, Optoelectronics, Servo control

Level required : master degree, Engineer diploma

PhD possibility : YES