
Job offer --- Post Doc position (12 Months)

Synthesis and processing of nanocomposite films for Q-switched micro-lasers and integrated optical amplifiers

This PostDoc position relates to a collaborative project entitled CRUMBLE: ChRomiUM-Based coatings for LasErs, funded by ANR french Agency. Its objective is to develop a novel material with saturable absorption and gain medium properties dedicated to telecom applications. This material is made of $Y_3Al_5O_{12}:Cr^{4+}$ nanocrystals (NCs) embedded in a silica-type oxide host matrix. Thanks to integration capability of this material, two different optical devices will be addressed:

- A Q-switched microlaser emitting around 1064 nm, in which the composite material will be the saturable absorber element in order to replace existing YAG:Cr⁴⁺ bulk crystal in use today, and finally decrease the pulse duration of the microlasers.
- A glass integrated optics amplifier pumped at 980 nm and emitting at a wavelength of 1550 nm in which our material would be the gain medium. This device will be based on a glass integrated optics platform.

The recruited person will be in charge of the composite matrix development, ie, the development of a sol-gel material that meets all the requirements to be used as the host matrix of the amplifying layer, or the AS layer of the μ -laser. These requirements, which are different in both cases, concern the refractive index, thickness, but also the laser induced damage threshold (LIDT). Based on the expertise of the consortium, different sol-gel formulations will be elaborated and tested to reach the requirements. The sol-gel matrix should also be compatible with a loading by YAG:Cr⁴⁺ NCs. Furthermore, to anticipate an industrial use of such layer, reliability tests will be led on undoped and doped-material.

Depending on the skills of the recruited person, experiments relating to the measurement of optical extinction employing Rayleigh interrogator will be led on hybrid devices made of ion-exchanged glass waveguides with a composite layer on top.

The recruited person will be employed by Jean Monnet University in Saint Etienne at Hubert Curien Laboratory (UMR CNRS 5516), and will work with ICCF, IMEP-LAHC and Teem Photonics.

Commencement date: 2023 May 1th or later. The income is 2270 € (Net) per month during 1 year for early PhD candidate.

Conditions: To applicate to this funding, a PhD degree is required. The applicant should have graduated a PhD in the field of **Materials, Optics or Physical properties of materials**. Knowledge about sol-gel or nanocrystals is an added value. She/He should demonstrate a motivation and skills for experimental studies.

Speaking French is not essential but could be better. If not, English speaking is required.

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