Spécialité de Master « Optique, Matière, Plasmas »

Stage de recherche (4 mois minimum, à partir de début mars)

Proposition de stage

Date de la proposition : 03/11/2014

Responsable du stage / *internship supervisor*:

Nom / *name*:	Braive	Prénom/ *first name* :	Rémy
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Courriel / *mail*:	Remy.braive@lpn.cnrs.fr		

Nom du Laboratoire / *laboratory name*: Laboratoire de Photonique et de Nanostructures (LPN)

Code d'identification : UPR 20 Organisme : CNRS

Site Internet / *web site*: www.lpn.cnrs.fr

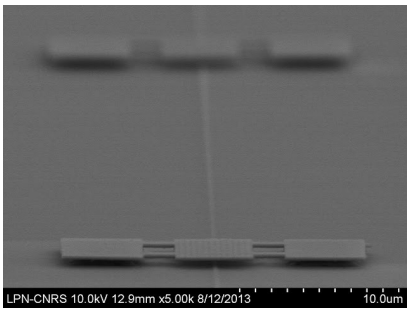
Adresse / *address:* Route de Nozay – 91460 Marcoussis

Lieu du stage / *internship place*: LPN

Titre du stage / *internship title*: ***Optomechanics in photonic crystals***

Résumé / *summary*

Optomechanics deals with the interaction of light with a mechanical oscillator. It utilizes the coupling between light and the geometry of a mechanical oscillator (for example through radiation pressure) to read or tailor the mechanical motion of the oscillator. Optomechanical coupling can be enhanced by use of an optical cavity that confines the electromagnetic field and thus increases the optical power seen by the mechanical oscillator. This coupling is also stronger at the nano-scale because of the very small mass of nano-mechanical oscillators.



Optomechanical resonators under study, consisting of a suspended photonic crystal membrane bonded over an integrated optical waveguide, funelling light to the resonator.

The project is focused on novel compact optomechanical nano-resonators, based on photonic crystals slab resonators. Such platforms have already been studied for more than one decade and have been widely employed in nanophotonics or in solid state quantum optics, due to the tight optical confinement they provide. It has been realized that such suspended structures also sustain mechanical excitations interacting strongly to the optical degrees of freedom via optical forces: Photonic crystal slab resonators sustain mechanical excitations and in particular localized high-frequency vibrations (up to 1 GHz) that are strongly coupled to photons. The intern will be involved in the experimental demonstration of optomechanical effects on such devices, in particular in the linear regime (the so called optical spring effect, a modification of the mechanical frequency and damping induced by the light force).

The training may lead to a PhD work, extending the investigation of optomechanical effects to the non-linear regime and assessing their potential for microwave photonics applications (in particlar microwave oscillators and clocks).

Ce stage pourra-t-il se prolonger en thèse ? *Possibility of a PhD* **? : Yes**

Si oui, financement de thèse envisagé/ *financial support for the PhD***: Bourse Ecole Doctorale**

Lasers, Optique, Matière	**x**	Lumière, Matière, Interactions	***x***
Plasmas : de l'espace au laboratoire			