

Spécialité de Master « Optique, Matière, Plasmas »

Stage de recherche (4 mois minimum, à partir de début mars 2010)

Proposition de stage pour l'année 2009-2010 (ne pas dépasser 1 page)

Date de la proposition : oct. 2009

Responsable du stage / internship supervisor:	
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Adresse / address: Campus Polytechnique-RD 128-91127 Palaiseau Cedex	
Lieu du stage / internship place: Palaiseau	

Titre du stage / internship title: Stimulated Raman diffusion in the evanescent field of nanofibers
Résumé / summary
Research context : in the field of micro and nano optics there is a strong development of components based on micro and nanofibers such as microresonators for the miniaturization of optical circuits. Microfibers are optical fibers made with silica or highly nonlinear glasses with diameter smaller than one micrometer. Some studies have already been published in which the nonlinear optical properties of the fiber material –silica or glass- are used to produce for example a supercontinuum source. In collaboration with the Chinese university of Zhejiang, we propose a radically different approach. When the diameter of the fiber becomes very small –typically a few hundreds of nanometers – the evanescent field of the mode that propagates can become very high outside the fiber. By plunging the nanofiber in a highly nonlinear medium, the power density of the evanescent field probing the liquid will enable to realize optical nonlinear effects in the liquid. This original approach enables to use a wide choice of nonlinear materials.
Research project : we will begin by studying stimulated Raman diffusion in highly nonlinear liquids such as ethanol or benzene. We will begin to study straight nanofibers and demonstrate the principle of stimulated Raman diffusion in the evanescent field of a nanofiber. Then we will realize a resonator based on a microloop with a diameter of several hundreds of micrometers. The pump source will be a pulsed microlaser emitting at the fixed wavelength of 532 nm. In order to enhance the nonlinearities we will have to control the resonance conditions in the microresonator. The student will have to develop techniques using a splicer to draw nanofibers and to realize experiments characterizing the components. Theoretical calculations will be made in parallel of the experiment. Potential applications
Toutes les rubriques ci-dessous doivent obligatoirement être remplies

Ce stage pourra-t-il se prolonger en thèse ? Possibility of a PhD ? : oui
Si oui, financement de thèse envisagé/ financial support for the PhD: ministère, BDI, région

Lasers et matière	x	Lumière, Matière : Mesures Extrêmes	x
Optique de la science à la technologie	x	Physique des plasmas	

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