Spécialité de Master « Optique, Matière, Paris »

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

Proposition de stage

Date de la proposition : 6/10/2016

Responsable du stage / *internship supervisor*:

Nom / *name*:	Boer-Duchemin	Prénom/ *first name* :	Elizabeth
Tél :	01 69 15 73 52	Fax :	01 69 15 67 77
Courriel / *mail*:	Elizabeth.Boer-Duchemin@u-psud.fr		

Nom du Laboratoire / *laboratory name*: Institut des Sciences Moléculaires d'Orsay (ISMO)

Code d'identification :UMR 8214 Organisme : CNRS / Univ Paris-Sud

Site Internet / *web site*: http://www.nanosciences.ismo.u-psud.fr/spip.php?article65

Adresse / *address:* Bâtiment 210, Université Paris-Sud, 91405 Orsay Cedex

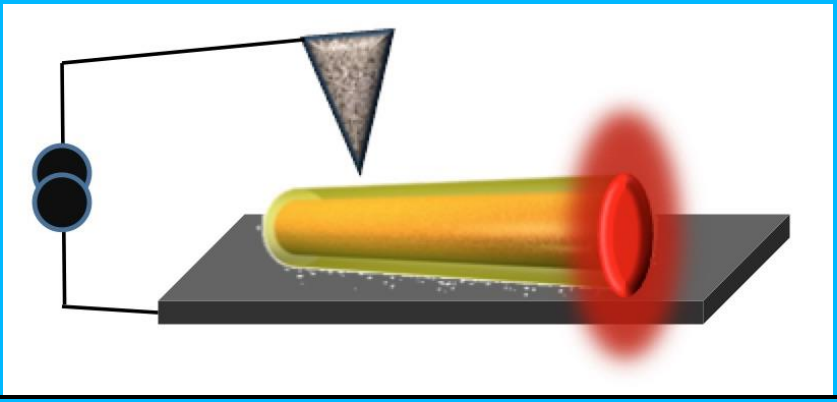
Lieu du stage / *internship place*: ISMO, Bâtiment 210, Université Paris-Sud, Orsay

Titre du stage / *internship title*: **An optical nanosource based on the hybridization of surface plasmons and excitons**

Just as individual atoms can exchange *electrons* and thus create "hybridized" molecular states of different energies, a surface plasmon and a semiconductor nanocrystal can create new states of matter by exchanging *photons*. A surface plasmon is an electromagnetic wave coupled to a collective oscillation of the free electrons in a metal. On the other hand, when a semiconducting nanocrystal is excited (e.g., with a laser), a delocalized electron-hole pair known as an *exciton* is created. It is the strong coupling of these two entities (plasmon and exciton) that is expected to lead to new electronic states of light and matter exhibiting new properties such as enhanced coherence.

The goal of this internship is to fabricate and demonstrate the operation of novel a one dimensional (1D) hybrid optical nanosources based on the strong coupling of plasmons and excitons. Such a nanosource will combine plasmonic and excitonic nanostructures in a nanotube geometry and will be driven either optically or electrically.

During this internship/thesis, the student will investigate the electrical and optical excitation of the hybrid plasmon-exciton nanosource. The student will acquire experience in (i) atomic force microscopy (imaging and manipulation of the gold nanotube filled with semiconductor nanocrystals) (ii) optical excitation (i.e., laser) and optical microscopy (for the optical excitation and detection of the light emitted from the nanosource) and (iii) scanning tunneling microscopy (for the electrical excitation).



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 EDOM**

Lumière, Matière, Interactions	**X**	Lasers, Optique, Matière	**X**

*Fiche à transmettre (fichier pdf **obligatoirement**) sur le site http://stages.master-omp.fr*