

# Spécialité de Master « Optique, Matière, Plasmas »

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

## Proposition de stage (**ne pas dépasser 1 page**)

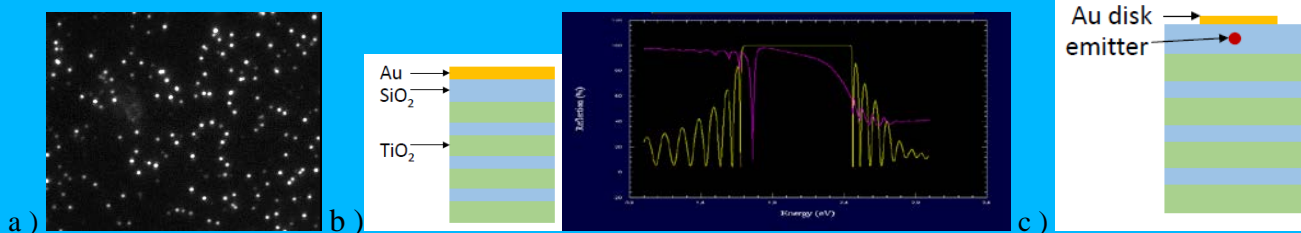
Date de la proposition : 08/10/2014

<b>Responsable du stage / internship supervisor:</b>			
Nom / name:	COOLEN	Prénom/ first name :	Laurent
Tél :	01.44.27.78.31	Fax :	
Courriel / mail:	laurent.coolen@insp.jussieu.fr		
<b>Nom du Laboratoire / laboratory name:</b> Institut de NanoSciences de Paris (INSP)			
Code d'identification :	UMR 7588	Organisme :	UPMC / CNRS
Site Internet / web site:	http://www.insp.upmc.fr/axe3/2_couches_minces/themes_III_25.php		
Adresse / address:	4 place Jussieu, 75005 Paris		
Lieu du stage / internship place: campus Jussieu, couloir 22-32, 5 <sup>e</sup> étage			

### Coupling a fluorescent nano-emitter to an optical cavity

The internship will take place at the INSP, in a group which studies the effect of a **photonic or plasmonic structure** (photonic crystal, optical cavity, nano-antenna...) on the **fluorescence of a single nano-emitter**. The principle of these studies is that the fluorescence properties of a nano-emitter are not only a function of its intrinsic characteristics, but also of its environment and its density of available photonic states (Fermi's golden rule). The nano-emitters in consideration are **nanocrystals**, CdSe spheres of a few nm, obtained by chemical synthesis. These nanocrystals are very bright and versatile ; their emission wavelength is determined by their size (quantum confinement) and tunable over the whole visible spectrum. By fluorescence microscopy, it is possible to image single nanocrystals deposited on a substrate (fig. a).

The internship will consider the coupling of **nanocrystals to Tamm plasmons modes**. These Tamm plasmon modes are coupled photon-plasmon modes which appear at the interface between a Bragg mirror and a metallic surface (fig b). We are currently fabricating samples of metallic disks on top of Bragg mirrors (fig. c), which thus present **confined Tamm plasmon modes**. The subject of the internship will be the fabrication and characterization of these Tamm structures by optical methods and the study of the fluorescence of nanocrystals introduced inside these structures (fig. c), with comparison of the results with simple theoretical models.



**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: Grant from école doctorale**

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

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