Spécialité de Master « Optique, Matière, Plasmas »

Stage de recherche (4 mois minimum, à partir de début mars 2012)

Proposition de stage pour l'année 2011-2012

Date de la proposition : 4 oct. 2011

Responsable du stage / *internship supervisor*:

Nom / *name*: **Pluchery** Prénom/ *first name* : **Olivier**

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Nom du Laboratoire / *laboratory name*: **Institut des NanoSciences de Paris**

Code d'identification : UMR7588 Organisme : Université Pierre et Marie Curie

Site Internet / *web site*: www.insp.upmc.fr

Adresse / *address:* INSP - 4 place Jussieu – 75005 Paris - Tour 22, 4ème étage, couloir 22-12

Lieu du stage / *internship place*: *idem*

Couplage électromagnétique entre nanoparticules d'or et matériau photoluminescent.

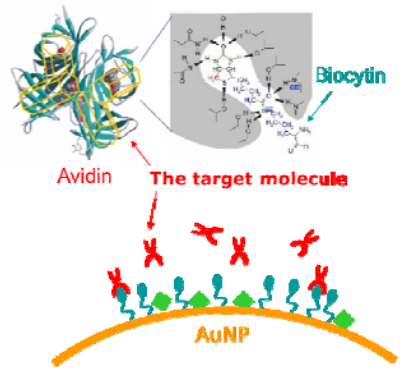
Electromagnetic coupling between gold nanoparticles and photoluminescence.

Summary *Internship open to French or foreigner candidates*

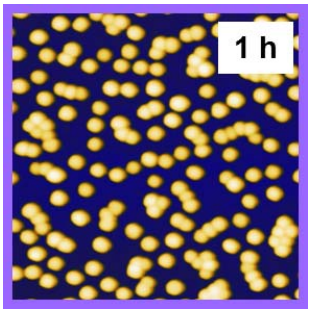
Gold nanoparticles possess unique properties of interest in optics, chemistry or biology. The final aim of this internship is to realize a biosensor based on the combined plasmonic properties of gold nanoparticles and photoluminescent properties of the substrate, able to recognize specific proteins.

After surface modifications (see figure), gold nanoparticles are able to attach selectively a defined protein. This protein is the target that the sensor aims at detecting. When the attachment occurs, it can be measured by UV-visible spectroscopy thanks to the plasmon resonance of the particles which is significantly shifted. This project aims at developing this biological recognition by coupling the plasmon response to photoluminescent material. The sensitivity should be considerably enhanced and this should allow designing an integrated biosensor.

The project is based on a serious study of the interaction between the plasmon of nanoparticles and the photoluminescence of the substrate, combining optical absorption measurements and photo-emission measurements. Deposition of nanoparticles will be improved and studied by Atomic Force Microscopy. In order to understand the origin of the coupling between plasmon absorption and substrate luminescence, we will develop electromagnetic models to account for the experimental data.



Working principle of a gold nanoparticle based biosensor.



Example of deposition of gold nanoparticles on a substrate. [AFM image 400x400nm^2]

One aim of the project is to characterize and understand the electromagnetic coupling of nanoparticles with the photoluminescent substrate.

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 du Ministère de la Recherche**

Lasers et matière	**X**	Lumière, Matière : Mesures Extrêmes	**X**
Optique de la science à la technologie		Plasmas : de l'espace au laboratoire	

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