

Spécialité de Master « Optique, Matière, Plasmas »

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

Proposition de stage 2012-2013

Date de la proposition : 1er octobre 2012

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| Code d'identification : | UMR7588 | Organisme : Université Pierre et Marie Curie |
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| Lieu du stage / internship place: | idem | |

Couplage électromagnétique entre nanoparticules d'or et matériau photoluminescent.

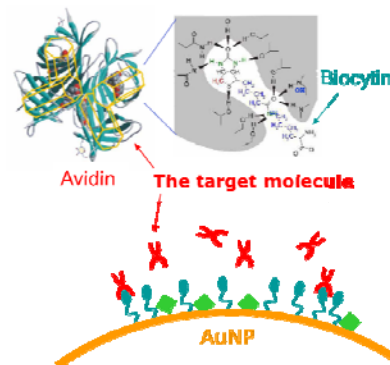
Electromagnetic coupling between gold nanoparticles and photoluminescence.

Summary Internship open to French or foreigner candidates

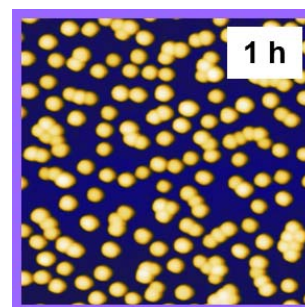
Gold nanoparticles possess unique properties of interest in optics, chemistry or biology. The final aim of this internship is to realize a biosensor based on the combined plasmonic properties of gold nanoparticles and photoluminescent properties of the substrate, able to recognize specific proteins.

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 400x400nm²] 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

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

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