

Spécialité de Master « Optique, Matière, Paris »

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

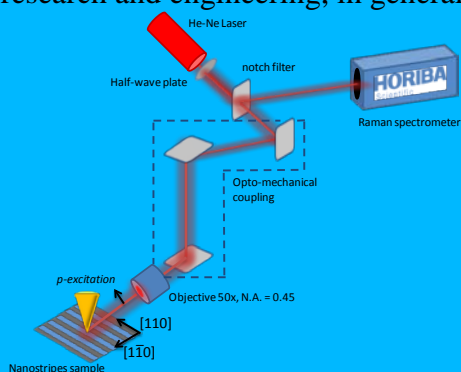
Proposition de stage (**ne pas dépasser 1 page**)

Date de la proposition : 27/10/2015

Responsable du stage / internship supervisor:			
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Nom du Laboratoire / laboratory name: LPICM			
Code d'identification :	UMR7647	Organisme :	CNRS/Ecole Polytechnique
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Adresse / address:	Ecole Polytechnique 91128 Palaiseau		
Lieu du stage / internship place:	Ecole Polytechnique		

Titre du stage / internship title: Applications of tip enhanced Raman spectroscopy (TERS) to the characterization of nanomaterials and nanostructures

Résumé / summary
The recent rapid development of the nanotechnology demands advanced characterization tools for nanomaterials and nanoobjects with nanometer spatial resolution. Tip enhanced Raman spectroscopy (TERS), a combination of conventional Raman spectroscopy with atomic force microscopy (AFM), represents a technique capable of probing the chemical and physical properties of matter at the nanoscale and has been recently implemented by our team. The student will contribute both to the optimization and the extension of the capabilities of the existing setup, as well as to apply it to research fields of industrial or more academic nature. Actual and potential applications of the TERS technique cover topics such as: 1. the measurement of mechanical strain in semiconductor nanostructures, of interest to the microelectronics industry, 2. the nm-scale mapping of self-assembled organic monoatomic layers of thiols and other potentially interesting organic electronics substances, 3. the improved understanding of the near-field optics and physics phenomena involved in the TERS experiment itself. Most of these topics will be addressed in collaboration with other industrial (HORIBA, STMicroelectronics, 3SPhotonics) and academic (Université de Paris XI) partners. Consequently, the student is expected to possess multidisciplinary (optics, electronics, applied programming), together with communication, skills, as well as to be strongly motivated by applied research and engineering, in general.



Principle schematics of the strain measurement experiment

Literature

- H. Kumar Wickramasinghe, M. Chaigneau, R. Yasukuni, G. Picardi, R. Ossikovski, *ACS Nano* **8**, 3421 (2014)
G. Picardi, M. Chaigneau, R. Ossikovski, *Chem. Phys. Lett.* **469**, 161 (2009)
R. Ossikovski, Q. Nguyen, G. Picardi, *Phys. Rev. B* **75**, 045412 (2007)

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: EDX or CIFRE contract (if accepted by the HORIBA company)		
Lumière, Matière, Interactions		Lasers, Optique, Matière