

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 :

Responsable du stage / internship supervisor:			
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Nom du Laboratoire / laboratory name: Laboratoire Pierre Aigrain			
Code d'identification :	UMR 8551	Organisme :	CNRS
Site Internet / web site:	http://www.lpa.ens.fr/		
Adresse / address:	24 rue Lhomond 75005 Paris		
Lieu du stage / internship place:	24 rue Lhomond 75005 Paris		

Titre du stage / internship title:	Opto-electronics of 2D materials
Résumé / summary	
<p>Following the isolation of a single layer of graphene from a graphite crystal by mechanical exfoliation in the 2000's, a large class of similar crystals with equivalent mechanical properties have been discovered. This field of research around the so-called "2D materials" has been growing rapidly because those materials can be combined by stacking of monolayers alternatively metallic, semi-conducting or insulating, which allows to foresee new opto-electronic devices with extreme properties in photo-detection, energy harvesting or emission of light. .</p> <p>At Laboratoire Pierre Aigrain (ENS), we are currently focusing our effort on a promising novel 2D material PtSe₂ which is an indirect bandgap semiconductor (ANR 2018 BIRD). The reason for our interest in this material is two-fold : it has a tunable bandgap depending on the number of stacked layer, and its electronic mobility compares favorably to the best 2D materials available today. We aim in particular at exploring this material's potential for photodetection in the telecom wavalengths (1,26-1,63µm). The exploration of carrier generation mechanism, in-plane and out-of-plane electronic transport will be of major importance to determine if this device can be used as an ultrafast photodetector or photomixer (up to 50 GHz).</p> <p>The candidate will have solid bases in physics of condensed matter and a real taste for nano-fabrication and testing combining optical spectroscopy techniques and radio-frequency electronics.</p>	
Methods and techniques: Exfoliation, Van der Waals stacking, photo/electro-lithography, Optical spectroscopy (absorption&PL), cryogenics, electronics, rf electronic and opto-electronic characterization.	
Toutes les rubriques ci-dessous doivent obligatoirement être remplies	

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: Industrial partnership	
Lumière, Matière, Interactions	Lasers, Optique, Matière

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