

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 :

Responsable du stage / internship supervisor:			
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Nom du Laboratoire / laboratory name: Laboratoire Aimé Cotton			
Code d'identification:	UPR3321	Organisme:	CNRS
Site Internet / web site:	http://www.lac.u-psud.fr/spip.php?rubrique86		
Adresse / address:			
Lieu du stage / internship place: ENS Cachan			

Titre du stage / internship title: Optical spectroscopy of graphene quantum dots
Résumé / summary
<p>Graphene quantum dots (GQD) are the 0D alternative of the sp² carbon systems such as nanotubes (1D), graphene (2D) or graphite (3D). All these materials have shown excellent properties in optoelectronics, chemistry or mechanics. The GQD are potentially very interesting since their properties can be adjusted at will by changing their shape and size, which allows considering applications inaccessible to nanotubes or graphene for the realization of new systems in opto or nano-electronics. However, GQD are less known than nanotubes or graphene because their synthesis began 3 years ago. The first results, verified in preliminary experiments performed show that the optical emission is mainly due to the GQD edge states (carboxylic defects) [1]. However, the expected transitions related to the 3D quantum confinement have still not been observed. Theoretical studies show that the confinement signature is expected in the near IR [2]. The observation of this emission promises long-term interesting developments, such as quantum information: the integration of a single GQD in an optical cavity could constitute a single photon source at Telecom wavelengths, at room temperature. Therefore, the primary objective of this internship is to evidence by spectroscopic techniques the near IR emission of several GQD deposited on a substrate. This will consist on absorption and photoluminescence measurements at room temperature and low temperature. The student will then adapt the deposition technique that is well controlled by the LAC team for single nanotubes to study the emission of a single GQD by confocal micro-spectroscopy experiments.</p> <p>The internship will be supervised in collaboration between the LAC and Laboratoire Pierre Aigrain (Paris).</p> <p>[1] J. Peng et al., Nano Letters 12, 844 (2012) [2] M. Zarenia et al., Phys. Rev. B 84, 245403 (2011)</p>
Toutes les rubriques ci-dessous doivent obligatoirement être remplies

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: ANR, Ecole Doctorale			
Lasers, Optique, Matière	OUI	Lumière, Matière : Mesures Extrêmes	OUI
Plasmas : de l'espace au laboratoire	NON		

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