

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 : Octobre 2013

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Lieu du stage / internship place: Bâtiment 210, Université Paris-Sud, 91405, Orsay			

Titre du stage / internship title: Growth and Functionalization of Silicene on insulating thin films

Résumé / summary

The aim of this master thesis is the growth, the characterization and the functionalization of silicene on insulating thin films. We have evidenced, for the first time experimentally, the formation of a new structure - Silicene, as nanoribbons or sheets on silver substrates. Silicene is the silicon counterpart of the graphene and is considered to be a promising novel material for nano-electronics as it naturally benefits from the vast Si-based R&D (Research and Development) infrastructure. For instance, the fabrication of the electrical contacts, which is an important problem in nanotechnology, will be much facilitated in the case of silicene by using silicides (i.e., NiSi₂, ...). Silicene has atomic and electronic structures similar to graphene.

In this master thesis, we propose to extend our studies to grow silicene on insulating thin films (AlN, NaCl). The functionalization of silicene will be obtained initially by doping with hydrogen or oxygen (atomic or molecular) in order to tune the band gap. A combined experimental investigation of the self-assembly of silicene on insulating thin films will be performed at ISMO using surface science techniques (STM, STS, AFM, AES, LEED).

This thesis is expected to provide the basic knowledge of the parameters of silicene growth on different insulating materials. Our aim is to obtain a detailed understanding of the microscopic factors that control the self-assembly and the transport characteristics of this novel nano-scale material, which is of great potential for nanotechnology. Indeed, growing silicene on insulators is an important step towards the fabrication of nano-electronic devices.

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, Bourse du ministère

Lasers, Optique, Matière	X	Lumière, Matière : Mesures Extrêmes	X
Plasmas : de l'espace au laboratoire			

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