

Doctoral positions 2018-2019

Thesis supervisors

Name: Geoffroy Prévot & Romain Bernard

Location: INSP - 4 place Jussieu, 75005 Paris
- Tour 22-12 4^è étage

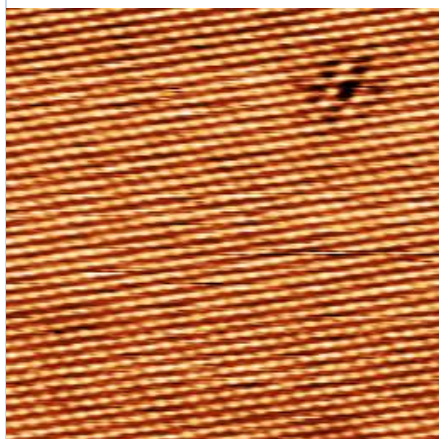
Group: Chemical Physics and Dynamics of Surfaces

E-mail: prevot@insp.jussieu.fr

Phone : +33 (0)1 44 27 46 53

Group website: <http://www.insp.jussieu.fr/-Physico-chimie-et-dynamique-des,20-.html?lang=en>

Thesis topic : Layered structures of Metal Sulphides



STM image ($8.5 \times 8.5 \text{ nm}^2$) of a WS_2 surface with an intrinsic defect (©INSP)

Due to their wide range of electronic properties, metal dichalcogenide (WS_2 , MoS_2) monolayers appear as a very promising new class of 2D material. The combination of a direct gap in monolayers, co-existing with very large exciton energies and strong spin-valley coupling offer exciting opportunities for the design of technological breakthrough devices. Up to now, they have been mostly synthesized by chemical way. On the contrary, sputter deposition which is commonly used in industrial processes has practically not been studied so far. One of the drawback of conventional sputtering is the energetic particle bombardment which may easily break the weak bonds in these types of sensitive materials.

This doctoral project is part of the LAMES project, funded by the ANR in the frame of the Graphene Flagship, involving Uppsala University and Helmholtz Zentrum Berlin. The aim of the thesis is to study the interaction between low energy ions and layered materials. For this purpose, several experimental methods will be used to study the structure of either samples prepared by the Swedish partner or commercial samples sputtered in-situ at INSP with low energy ions (typically Ar^+ of a few eV). This includes Scanning Tunneling Microscopy, High Resolution LEED, Rutherford Backscattering Spectrometry with channeling/blocking experiments and X-Ray Diffraction. The central point will be to implement a microfocused ion beam on the different set-ups to follow in real-time the irradiation damages as a function of energy and fluence.

In collaboration with Swedish and German partners, the student will also participate to synchrotron based experiments to study how the exotic 2D electronic properties are affected by the crystal structure and their defects.



Candidate profile : Candidates holding a master degree in Physics, Nano-sciences, Materials or equivalent are encouraged to apply.

Application file : The following documents are required for considering the application:

- CV
- Transcript of records in higher education
- Letter of motivation
- Master thesis (one chapter)

Send you application in a single pdf file *yourname.pdf* to prevot@insp.jussieu.fr

Upon background, the applicant will be proposed an interview.

Position: the position will start 1st of September 2018 and is appointed to a net salary of about 1400 € per month during a period of 36 months. Doctoral candidate will be registered at Sorbonne University in the doctoral school of "Physics and Chemistry of Materials ED397"

Deadline for application : 30 June 2018

Sources of funding available :

ANR through the FLAG-ERA JTC 2017 Graphene Flagship "LAMES" project