2D Materials and their heterostructures

Mini-colloquium

Emmanuel Baudin
Laboratoire Pierre Aigrain - ENS
24 rue Lhomond
75005 Paris

Nedjma Bendiab
NEEL Institute - Grenoble Alpes University
25 rue des Martyrs
38402 Grenoble Cedex 09

Julien Renard
NEEL Institute - CNRS
25 avenue des Martyrs
38042 Grenoble Cedex 09

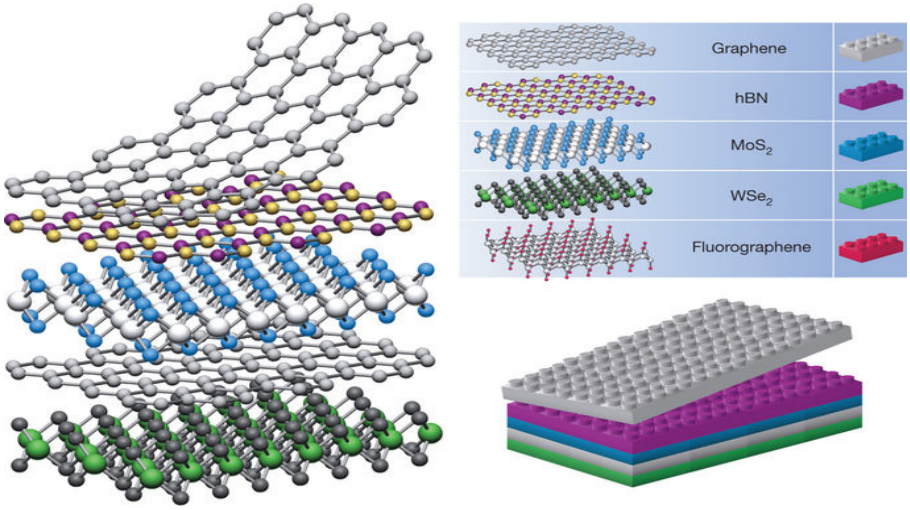

Figure 1 : 2D crystals compare to legos at the atomic scale and likewise can be assembled as lamellar structures in a huge variety. Such heterostuctures possess emergent electronic, optical or mechanical properties, most of them have yet to be discovered. [1]

Following graphene, the family of 2D materials have emerged in the last few years as an exceptional playground for new physics. Both the quality of crystals and the possibility to assemble them in heterostructures via the Van der Waals interactions now allow the observation of coherent electronic transport or room temperature excitons. Moreover, the 2D material boom makes more and more lamellar materials available which further accelerate the evolution of this field. The different stacking strategies offer the opportunity to realize new functions, from accurate sensors to optoelectronic and quantum devices.

This mini-colloquium aims at gathering newcomers and experts working on van der Waals heterostructures who use common fabrication techniques and study a broad class of physical phenomena in order to share ideas and bring cross-fertilization. The scope of this mini-colloquium covers the broad spectrum of 2D materials and van der Waals heterostructures physics, from theory, fabrication and characterization, to physical properties (electronic, spin- and valley-tronics, optical, biological, mechanical, chemical properties) and finally applications.

Acknowledgements : We acknowledge the financial support from GDR “Graphene and Co”.

[1] *Van der Waals heterostructures,* A. K. Geim& I. V. Grigorieva, Nature **499**, 419 (2013)