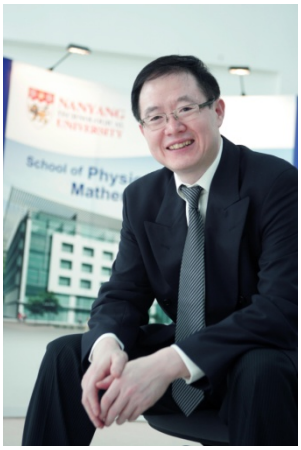
IBS Center for Multidimensional Carbon Materials

Special Guest Seminar



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Tuning the Electro-optical Properties of 2D Materials by Stacking Order

Oct 25
Wed 11am

Bldg. 101
Seminar Room on the 1st floor

It is well-known that the optical and electronic structures of two dimensional transition metal dichalcogenide (2D TMD) materials and perovskite often show very strong layer-dependent properties. It is less well-known however is that the properties can also be tuned by stacking order, which allows us to build electro and optical devices with the same material and the same thickness. Detailed understanding of the inter-layer interaction will help greatly in tailoring the properties of 2D TMD materials for applications, e.g. in pn junction, transistors, solar cells and LEDs. Raman/Photoluminescence (PL) spectroscopy and imaging have been extensively used in the study of nano-materials and nano-devices. They provide critical information for the characterization of the materials such as electronic structure, optical property, phonon structure, defects, doping and stacking sequence.

In this talk, we use Raman and PL techniques and electric measurements, as well as simulation to study 2- and 3-layer 2D TMD samples. The Raman and PL spectra also show clear correlation with layer-thickness and stacking sequence. Electrical experiments and *ab initio* calculations reveal that difference in the electronic structures mainly arises from competition between spin-orbit coupling and interlayer coupling in different structural configurations.

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You are cordially invited to attend!