



## Weekly Seminar

### Heterostructures within atomic monolayers

#### Sanfeng Wu

Time: 16:00pm, June. 10, 2015 (Wednesday)

时间: 2015年06月10日 (周三) 下午16:00

Venue: Room W563, Physics Building, Peking University

地点: 北京大学物理楼 西563

#### Abstract

Heterostructures with atomically sharp interface not only allowed many electronic and photonic technologies, such as high mobility transistors, light emitting diodes and lasers, but also form the foundation for condensed matter physics, such as the discovery of the fractional quantum hall effects. A new realm of creating and investigating such heterostructures has been rapidly opened up recently, owing to the isolation and recombination of a large variety of atomically thin crystals, such as semi-metallic graphene, insulating boron nitride (BN) and semiconducting transition metal dichalcogenides. In this talk, I will introduce two types of atomic heterostructures. First, I will discuss how we create the first lateral heterostructure within monolayer semiconductors, where the edges of monolayer MoSe<sub>2</sub> and WSe<sub>2</sub> are seamlessly connected with crystalline perfection. Second, I will discuss the optoelectronic properties of vertical graphene-BN heterostructures by building up a new probe to quantum Hall effect, based on photocurrent measurements. A photocurrent Hofstadter's butterfly is observed.

#### About the speaker

Sanfeng Wu is currently a PhD candidate in the Physics department of University of Washington at Seattle, USA. He graduated from University of Science of Technology of China in 2010. His research interests focus on the physics and device applications of materials in small scale, particularly the low-dimensional quantum materials. He has published 17 papers in peer-reviewed high-impact journals, among which he has first-authored 7 papers including 1 Nature, 1 Nature Physics, 1 Nature Materials (also as corresponding author), 1 Nature communications, and 1 Nano letters. In UW, he has won the Hans G. Dehmelt Prize in Experimental Physics and also clean energy institute graduate fellowship.