北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Seminar

Revealing Excitonic Complexes in Monolayer WSe_2

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Time: 13:30pm, Dec. 13, 2018 (Thursday)

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Venue: Room W563, Physics building, Peking University

地点：北京大学物理楼，西563会议室

Abstract

Single layer transition metal dichalcogenides (TMDs) represent a new class of atomically thin semiconductors with superior optical and optoelectronic properties. The two-dimensional nature of single-layer TMDs results in reduced screening and enhanced Coulomb interaction, giving rise to excitonic complexes such as exciton, trion, and biexciton with binding energy orders of magnitude larger than that of conventional semiconductors such as GaAs. The excitonic complexes also possess valley degree of freedom and can be accessed selectively through circularly polarized light. Here we show that by encapsulating the monolayer WSe_2 with BN, we can construct devices with high-quality optical spectra which helps to identify fine features of excitonic complexes. The BN encapsulated monolayer WSe_2 thus provides an exciting playground for the strong light-matter interaction in 2D.

About the speaker

Sufei Shi is currently an Assistant Professor in the Chemical and Biological Engineering Department of Rensselaer Polytechnic Institute (RPI). His group is focused on the optoelectronics study of two-dimensional (2D) materials and related van der Waals (vdW) heterostructures. He worked with Prof. Dan Ralph at Cornell Univ. and obtained Ph.D. in Physics in 2012, working on nanoscale electrical transport and photocurrent study at low temperature. He then did his postdoc research with Prof. Feng Wang at UC Berkeley, with a focus on ultrafast and broadband optical spectroscopy. He joined RPI since 2015 and is leading an ultrafast nanoscale optoelectronics group studying devices made of 2D vdW heterostructures. He also holds a joint position with the Electrical, Computer and Systems Engineering Department at RPI.