北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Seminar

Generation, transport and detection of pure valley currents in two-dimensional heterostructures

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Time: 10:00am, July 2, 2018 (Monday)

时间：2018年7月2日 （周一）上午午10:00

Venue: Room W563, Physics building, Peking University

地点：北京大学物理楼，西563会议室

Abstract

Two-dimensional (2D) hexagonal materials provide a promising platform for valleytronics devices, owing to the convenient generation and manipulation of valley qubits. However, efficient generation of valley information carriers with long valley lifetime is difficult to achieve in single material due to intrinsic valley relaxation channels. Here we show that, such intrinsic limit can be overcome through combining two materials into a van der Waals heterostructure; and report both near-perfect generation efficiency of valley information carriers, as well as record-high valley lifetime. Furthermore, we demonstrate generation, transport, and spatial-temporal imaging of the valley currents in a single device, which opens up new exciting opportunities to realize novel spintronic and valleytronic applications..

About the speaker

Dr. Chenhao Jin received his physics Ph.D. from University of California, Berkeley in 2017, where he was awarded the Lars Commins Memorial Award in Experimental Physics in 2017. In 2018, he went to Cornell University as a Kavli research fellow. Chenhao Jin has made seminal contributions to understanding electronic, optical and optoelectronic properties of van der Waals systems, ranging from carbon nanotube, graphene, black phosphorous to transition metal dichalcogenides (TMDCs). He demonstrated the role of interlayer electronic coupling in governing the electronic properties of double-walled nanotube and few-layer black phosphorous, the non-trivial moiré potential in graphene-hBN moiré superlattice, and discovered the strong electron-phonon interaction in TMDC-hBN heterostructure. He also studied the ultrafast dynamics in van der Waals systems, establishing the foundation to understanding carrier dynamics in TDMC-TMDC heterostructures, and for potential application in spintronics and valleytronics.