北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Weekly Seminar

Layer-dependent optical properties of few-layer black phosphorus

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Time: 4: 00 pm, May.15, 2019 (Wednesday)

时间：2019年5月15日 （周三）下午4:00

Venue: Room W563, Physics building, Peking University

地点：北京大学物理楼，西563会议室

Abstract

Black phosphorus is a newly emerged two-dimensional material. It has many interesting properties such as strong anisotropy and significant layer-dependence of the electronic structures. The bandgap of few-layer black phosphorus is in the infrared frequency range, bridging the gap of other 2D materials: zero bandgap graphene and visible frequency bandgap transition metal dichalcogenides. In this talk, I'll present our systematic infrared spectroscopic studies of mono- and few-layer black phosphorus, with layer thickness ranging from 1-15 layers. Each thickness black phosphorus has its characteristic IR spectrum, which can be served as a fingerprint. The layer-dependent exciton binding energies are determined from our high quality samples, which show the importance of quantum confinement and dielectric confinement. In addition, strain effect on few-layer black phosphorus will be discussed as well.

References:

G. Zhang, S. Huang, A. Chaves, C. Song, V. O. Özçelik, T. Low and H. Yan, Infrared fingerprints of few-layer black phosphorus, *Nature Communications* **8**, 14071 (2017)

Guowei Zhang, Andrey Chaves, Shenyang Huang, Fanjie Wang, Qiaoxia Xing, Tony Low, Hugen Yan. Determination of layer-dependent exciton binding energies in few-layer black phosphorus, *Science Advances* **4**, eaap9977 (2018)

Shenyang Huang et al. Strain tunable van der Waals interactions in few-layer black phosphorus, *Nature Communications* (in revision).

About the speaker

晏湖根于2004年本科毕业于复旦大学物理系，2010年在哥伦比亚大学物理系取得博士学位，随后在IBM T. J. Watson 研究所从事博士后工作，于2015年初开始任复旦大学物理系研究员。主要擅长二维材料光谱学、等离激元学及纳米光学等方面的实验研究。