

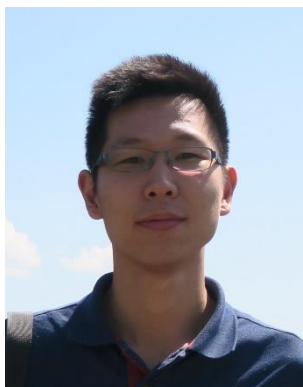


Weekly Seminar

Strong correlation and topology in 2D semiconductor moiré superlattices

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Time: 3:00pm, Sept. 15, 2021 (Wednesday)

时间: 2021年9月15日 (周三) 下午3:00

Venue: Room W563, Physics building, Peking University

地点: 北京大学物理楼, 西563会议室

Abstract

Moiré superlattices formed in van der Waals materials have emerged as a new platform to explore strong correlation physics and topological physics in two-dimensional (2D) electronic systems. In this talk, I will mainly present electronic transport and compressibility studies of moiré superlattices built on 2D transition metal dichalcogenide (TMDc) semiconductors. A series of correlation-driven states, including Mott insulators [1], generalized Wigner crystals [2], and stripe phases [3], formed at either integer or fractional filling factors of the moiré superlattices. Benefiting from the extraordinary tunability of the system, an interaction-driven Mott transition has been realized experimentally [4]. Furthermore, we found the band topology also plays an important role in TMDc moiré superlattices, which enable us to realize a quantum anomalous Hall state in TMDc moiré superlattices [5]. Our studies pave the path for discovery of a wealth of emergent phenomena arising from the combined influence of strong correlation and topology in TMDc moiré superlattices.

[1] Y. Tang et al. *Nature* 579, 353-358 (2020).

[2] T. Li et al. *Nature Nanotechnology* (2021).

[3] C. Jin et al. *Nature Materials* 20, 940-944 (2021).

[4] T. Li et al. *Nature* (in-press).

[5] T. Li et al. arXiv:2107.01796

About the speaker

李昕昕, 现任上海交通大学物理与天文学院副教授, 博士生导师。2011年于西北大学获学士学位, 2016年于北京大学获博士学位(导师杜瑞瑞教授)。2016年至2021年先后在美国莱斯大学(2016.9-2018.3)和美国康奈尔大学(2018.3-2021.5, Prof. J. Shan & Prof. K. F. Mak课题组)从事博士后研究。主要研究兴趣为低维量子材料中的强关联物理、拓扑物理、磁性物理和超导物理等。近几年在二维半导体莫尔超晶格、二维拓扑绝缘体、二维磁性材料等方向取得了一系列研究成果, 发表学术论文20余篇, 其中包括第一作者(含共同一作) *Nature* 一篇、*Nature Materials* 三篇、*Nature Nanotechnology* 一篇、*Physical Review Letters* 两篇。