



## Special Seminar

### Unconventional superconductivity in twisted bilayer $WSe_2$

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**Time: 10:00 am, Mar.26, 2025 (Wednesday)**

**时间: 2025年3月26日 (周三) 上午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 moiré superlattices have established a flat-band system for simulating strong correlation physics with their unparalleled tunability. Exploring superconductivity in such a flat-band system may advance our understanding of superconductivity associated with strong correlations and shed light on the long-standing puzzle of high- $T_c$  superconductors. In this talk, I will first present transport evidence of superconductivity in twisted bilayer  $WSe_2$ , which emerges at half-band filling and at the verge of the Mott gap closure. The ratio of the superconducting transition temperature  $T_c$  to the Fermi temperature  $T_F$ , comparable to that in high- $T_c$  cuprate superconductors, suggests strong electron pairing. Further exploration of the phase diagram surrounding this superconducting state reveals a host of emergent phenomena, including Fermi surface reconstruction, quantum criticality, and the Mott insulator phase. These findings may provide deeper insights into the nature of superconductivity in strongly correlated systems and help unravel the mystery of high- $T_c$  superconductors.

### About the speaker

Zhongdong Han received his bachelor's degree from the University of Science and Technology of China in 2015. He then pursued his Ph.D. at Peking University under the guidance of Professor Rui-Rui Du. In 2021, he joined Cornell University as a postdoctoral researcher in the joint group of Kin Fai Mak and Jie Shan. His research focuses on the electronic properties of low-dimensional materials, with a particular interest in exploring novel physical phenomena and emergent properties arising from strong electronic correlations and non-trivial band topology.