



Weekly Seminar

Theory on Correlated Topological Phases in Semiconductor Moiré Superlattices

Fengcheng Wu

Wuhan University

Time: 3:00 pm, Dec.17, 2025 (Wednesday)

时间: 2025年12月17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 based on semiconducting transition metal dichalcogenides, such as twisted bilayer MoTe₂ and WSe₂, have emerged as a platform for strongly correlated and topological phases. These systems feature tunable flat Chern bands where Coulomb interactions can dominate, leading to quantum phases like integer and fractional quantum anomalous Hall states, quantum spin Hall states, anomalous composite Fermi liquids, superconductors, and more conventional correlated states like antiferromagnets. In this talk, I will review recent experimental advances and present our theoretical work on: (1) the competition between topological and non-topological states at integer fillings, (2) fractional Chern insulators using generalized Landau levels, and (3) antiferromagnetic fluctuation-induced topological chiral superconductivity.

About the speaker

Fengcheng Wu is a Professor in the School of Physics and Technology at Wuhan University. He earned his BSc in 2011 from University of Science and Technology of China and his PhD in physics in 2016 under the supervision of Allan H. MacDonald at the University of Texas at Austin. He then conducted postdoctoral research at Argonne National Laboratory with Ivar Martin and at the University of Maryland with Sankar Das Sarma. His current research focuses on condensed matter theory, particularly the quantum phases of matter in two-dimensional systems.