北京大学量子材料科学中心

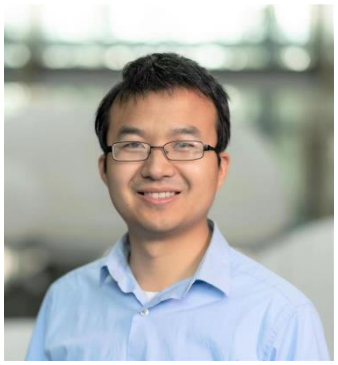
International Center for Quantum Materials, PKU

Seminar

Magnetic Topological Materials: Design, Synthesis and Characterizations

Shiming Lei

Hong Kong University of Science and Technology



Time: 10:00am, May. 23, 2023 (Tuesday)

时间：2023年5月23日 （周二）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

Magnetic topological materials (TSMs) have been at the forefront of many new discoveries in condensed matter research in the past decade. With the intrinsic interplay between magnetic order and electronic properties, magnetic TSMs allow for effective control of the topological electronic states by tuning the spin configuration, making them promising materials for next-generation electronic and spintronic applications. Although many TSMs are theoretically predicted, the number of experimentally verified magnetic ones, preferably with an ideal band structure, is rather limited. In this talk, I will introduce my recent efforts on the design and synthesis of novel magnetic TSMs. I will discuss the role of charge density waves and magnetic configuration in modifying the electronic states and associated electrical transport properties. Additionally, I will introduce the design of a new type of magnetic Weyl nodal ring semimetals and a new mechanism for large non-saturating magnetoresistance.

About the speaker

Dr. Shiming Lei obtained his PhD degree in the Materials Science and Engineering department at the Pennsylvania State University in December 2017. His PhD work primarily focuses on exploring the microstructure-property relationship of a class of materials that lack inversion symmetry, such as ferroelectric materials, multiferroics, and magnetic noncentrosymmetric semimetals. After that, he joined the Department of Chemistry at Princeton University as a postdoctoral research associate, working with Prof. Leslie Schoop. At the end of 2020, he moved to Rice University, and worked as a research scientist in the Department of Physics and Astronomy with Prof. Emilia Morosan. Since April 2023, Dr. Shiming Lei has become an Assistant Professor in the Department of Physics at The Hong Kong University of Science and Technology, where he is leading the laboratory for Integrated Quantum Materials Research. His research interest include: 1) Design and synthesis of novel magnetic topological semimetals and van der Waals materials; 2) Exploration of the tunability of topological states through various means, such as magnetic fields, band engineering, and strain; 3) Novel electrical transport properties of topological materials.