



## Weekly Seminar

### Discovery of a p-wave magnet with a giant anomalous Hall susceptibility

**Max Hirschberger**

*The University of Tokyo*



**Time: 3:00 pm, Feb.19, 2025(Wednesday)**

**时间: 2025年2月19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

Recently, A. Hellenes et al. proposed a p-wave magnet without the need for a Pomeranchuk instability or strong electron-electron interactions (arXiv:2309.01607). We demonstrate the experimental realization of an antiferromagnetic material satisfying the symmetry requirements for p-wave spin polarization in momentum space, based on X-ray and neutron scattering experiments. In consequence of relativistic spin-orbit coupling, the p-wave state acquires a tiny net magnetization and there emerges a large anomalous Hall effect with Hall angle as large as 3~4%. Surprisingly, this is much larger than the anomalous Hall effect in known d-wave and g-wave magnet candidates. Neutron and x-ray scattering help to identify various magnetic orders in the plane of magnetic field and temperature, some of which have much smaller anomalous Hall effect. The results are discussed based on electronic structure models and essential symmetry arguments.

#### About the speaker

Max Hirschberger is an Associate Professor at the Department of Applied Physics, The University of Tokyo, Japan. Prof. Hirschberger is a rising leader in condensed matter physics, focusing on the electronic and magnetic properties of quantum materials. His work is based on the exploration and synthesis of new materials combined with advanced techniques such as resonant X-ray diffraction (RXD), neutron diffraction, and precision measurements of thermoelectric or electric properties. He has published 47 research papers, which have garnered over 4,000 citations. His pioneering studies on Weyl semimetals, magnetic skyrmion vortices, and the thermal Hall effect have led to several high-impact publications. In recognition of his work, Prof. Hirschberger received the Young Scientist Award of the Japanese Physical Society in 2024.

