

Exploration and Band Structure Study of Unconventional Magnets

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The discovery of spin-split, compensated magnetism—exemplified by altermagnetism—has not only expanded the research frontiers of traditional magnetism but also provided new physical principles and technological pathways for spin-based information storage and processing. I will present representative work conducted by our group in recent years regarding the material realization and electronic structure study of unconventional magnets: (1) the realization of a d-wave altermagnet based on RbV₂Te₂O single crystals (Nature Physics 21, 760-767 (2025)); (2) the discovery of d-orbital ordering on the surface of Tb₂CoAl₄Ge₂ single crystals (Nature Physics, DOI: 10.1038/s41567-026-03359-4); and (3) the observation of p-wave spin polarization in CeNiAsO (arXiv:2605.28701). I will discuss the physical characteristics and intriguing connections among these novel magnetic states, as well as the research opportunities opened up by our findings.