

Spin-orbit coupling and crystal symmetry in electronic structure

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Abstract:

We can discern many properties of quantum materials from a detailed knowledge of their electronic structure. Therefore, a fundamental understanding of this electronic structure presents an important avenue towards the designing of materials with desirable electronic behaviour.

We will use angle-resolved photoemission spectroscopy (ARPES) to focus on the effects of spin-orbit coupling and crystalline symmetries and see how their interplay can bring about unexpected new electronic phenomena in two different materials: a non-interacting square net system, NbGeSb, which hosts Weyl-like band crossings of its surface states, and an antiferromagnetic layered perovskite ruthenate, $\text{Ca}_3\text{Ru}_2\text{O}_7$, where this interplay leads to a complex magnetic, structural and electronic phase transition.