

Transport properties and heterostructures of topological kagome metals

Abstract

TKMs (topological kagome metals) have exotic topological band structures with coexistence of Dirac/Weyl bands with linear energy-momentum dispersion and flat bands without energy dispersion.

In this talk I will discuss my PhD work in the realization of high-quality epitaxial films of various binary TKMs T_mX_n ($T = \text{Mn, Fe, Co}$ and $X = \text{Sn}$) and the characterization of their structural and transport (charge, spin and thermal) properties. Transport signatures of Dirac/Weyl bands such as negative magnetoresistance induced by chiral anomaly, intrinsic anomalous Hall effect induced by Berry curvature, and possible nonlinear Hall effect, will be presented. I'll also discuss superconducting proximity effect in $\text{Mn}_3\text{Sn}/\text{Nb}$ heterostructures which exhibit unusual features such as increase of coherence length and sign of Pauli paramagnetic limit violation, suggestive of triplet pairing.