

Topological Surface States in a Kondo Insulator

W.K. Park (NHMFL/FSU), W.A. Phelan (now LANL),
T.M. McQueen and C.L. Broholm (JHU)

Topological insulators have great potential in novel electronic devices but are handicapped due to the difficulties in making macroscopic specimens insulating. Topological Kondo Insulators (TKI) have been proposed as a solution as the direct coupling between localized and delocalized electrons necessary for the Kondo effect forces insulating behavior in the bulk. Due to crystal availability constraints, most work on TKIs has focused on the material SmB_6 .

To understand and elucidate the universal behaviors of surface states of a TKI, researchers at NHMFL teamed up with PARADIM to produce crystals of YbB_{12} , another TKI. With this **first successful growth in the US, crystals of YbB_{12} from PARADIM** are enabling a new generation of studies of surface states in TKIs.

Planar tunneling spectroscopy at NHMFL shows the existence of surface Dirac fermions, with many similarities, and some key differences, to that found in SmB_6 . The work advances the understanding of the surface chemistry and electronic structure of topological Kondo insulators, and the production of improved single crystals of this novel electronic material lay the groundwork for future explorations.

A. Gupta, *et al.* [Phys. Rev. B 107, 165132 \(2023\)](#).
Access to data: <https://doi.org/10.34863/r874-fw50>.

