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Local Electronic Structure around a Single Impurity in an Anderson Lattice Model for Topological Kondo Insulators CHENG-CHING JOSEPH WANG, Theoretical Division and Center for Nonlinear Studies, Los Alamos National Laboratory, JEAN-PIERRE JULIEN, Institut Neel CNRS and Université J. Fourier, JIAN-XIN ZHU, Center for Integrated Nanotechnologies, Los Alamos National Laboratory — Shortly after the discovery of topological band insulators, the topological Kondo insulators (TKIs) have also been theoretically predicted. The latter has ignited renewed interest in the properties of Kondo insulators. By starting with a minimal-orbital Anderson lattice model, we explore the local electronic structure in a Kondo insulator. We show for the first time that the two strong topological regimes sandwiching the weak topological regime give rise to a dual location of Dirac cone on the surface of TKI. We further find that, when a single impurity is placed on the surface, low-energy resonance states are induced in the weak scattering limit for the strong TKI and the resonance level moves monotonically across the hybridization gap with the strength of impurity scattering potential; while low energy states can only be induced in the unitary scattering limit for the weak TKI, where the resonance level moves universally toward the center of the hybridization gap. These impurity induced low-energy quasiparticles will lead to characteristic signatures in scanning tunneling microscopy/spectroscopy, which has recently found success in probing exotic properties in heavy fermion systems.

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