Abstract Submitted
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Planar tunneling spectroscopy of the candidate topological Kondo insulator SmB_6[*] W. K. PARK, L. SUN, L. H. GREENE, University of Illinois at Urbana-Champaign, D. J. KIM, Z. FISK, University of California, Irvine — Topological insulators are a new class of materials harboring topologically protected surface states. SmB_6, a well-known Kondo insulator, has attracted much interest recently due to its possibility to be topological as a system with strong interaction. Despite intensive investigations in recent years, the nature of the surface states in SmB_6 still remains intriguing. We adopt planar tunneling spectroscopy to study the electronic density of states in topological insulators and superconductors. As a surface-sensitive technique, it should be able to detect the surface states in SmB_6. Planar tunnel junctions are made on both (100) and (110) surfaces of high-quality single crystals. Crystal surfaces are prepared by polishing (with sub-nm scale smoothness) and ion-beam cleaning/etching. AlO_x tunnel barrier of varying thickness is formed by sputter deposition of Al and subsequent oxidation. Differential conductance is measured as a function of temperature down to 1.7 K and magnetic field up to 9 T. Our tunneling conductance spectra show asymmetric gap-like features, reminiscent of a Fano resonance in a Kondo lattice, up to $40-50$ K, close to the temperature below which the band renormalization and hybridization is known to occur. We'll discuss how the contributions from the bulk and the surface states can be identified in our conductance data. [*]The work at UIUC is supported by the NSF DMR 12-06766.

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