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Surface electronic structure of topological Kondo insulator candidate SmB6: a high-resolution ARPES study[1] NASSER ALIDOUST, MADHAB NEUPANE, SU-YANG XU, CHANG LIU, ILYA BELOPOLSKI, GUANG BIAN, M. ZAHID HASAN, Dept. of Physics, Princeton University, NJ, USA, T. KONDO, S. SHIN, ISSP, University of Tokyo, Japan, T.-R. CHANG, H.-T. JENG, Dept. of Physics, National Tsing Hua University, Taiwan, L. BALICAS, NHMFL, FL, USA, T. DURAKIEWICZ, LANL, NM, USA, H. LIN, A. BANSIL, Dept. of Physics, Northeastern University, MA, USA, D.-J. KIM, Z. FISK, Dept. of Physics and Astronomy, UC Irvine, CA, USA — The Kondo insulator SmB6 has been known to exhibit low temperature transport anomaly and has recently attracted attention as a new topological insulator candidate. By combining low temperature and high resolution of the laser-based ARPES, for the first time, we probe the surface electronic structure of the anomalous conductivity regime. We observe that the bulk bands exhibit a Kondo gap of 14 meV and identify in-gap low-lying states within 4 meV of the Fermi level on the surface of this material. The low-lying states are found to form electron-like Fermi surface pockets that enclose the X and the Γ points of the surface BZ. These states disappear as temperature is raised in correspondence with the complete disappearance of the 2D conductivity channels. While the topological nature of the in-gap metallic states cannot be ascertained, our measurements are consistent with the predicted first-principle topological Kondo insulator phase in this material.

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