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Observation of a non-Kondo-like topological insulator state in the correlated rare-earth hexaboride YbB_6[1] MADHAB NEUPANE, S.-Y. XU, N. ALIDOUST, G. BIAN, C. LIU, I. BELOPOLSKI, Princeton University, USA, T.-R. CHANG, National Tsing Hua University, Taiwan, H.T. JENG, National Tsing Hua University & Institute of Physics, Academia Sinica, Taiwan, T. DURAKIEWICZ, Los Alamos National Laboratory, USA, H. LIN, National University of Singapore, Singapore, A. BANSIL, Northeastern University, USA, D.J. KIM, Z. FISK, University of California at Irvine, USA, M.Z. HASAN, Princeton University, USA — We present angle-resolved photoemission studies on the rare-earth hexaboride YbB_6, which has recently been predicted to be a topological Kondo insulator. Our data do not agree with the prediction and instead show that YbB_6 exhibits a novel topological insulator state in the absence of a Kondo mechanism. We find that the Fermi level electronic structure of YbB_6 has three 2D Dirac cone surface states enclosing the Kramers' points, while the $f-$orbital which would be relevant for the Kondo mechanism is about 1 eV below the Fermi level. Our first-principles calculation shows that the topological state which we observe in YbB_6 is due to an inversion between Yb d and B p bands. I will also present some of our recent results on other member of hexaborides. These experimental and theoretical results provide a new approach for realizing novel correlated topological insulator states in rare-earth materials.

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