Abstract Submitted
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Discovery of a Weyl fermion state with Fermi arcs in niobium arsenide[1] NASSER ALIDOUST, SU-YANG XU, ILYA BELOPOLSKI, GUANG BIAN, HAO ZHENG, DANIEL S SANCHEZ, TITUS NEUPERT, M ZAHID HASAN, Princeton University, ZHUJUN YUAN, CHENGLONG ZHANG, SHUANG JIA, Peking University, DAIXIANG MOU, YUN WU, LUNAN HUANG, ADAM KAMINSKI, Iowa State University, VLADIMIR N STROCOV, Paul Scherrer Institute, BAOKAI WANG, ARUN BANSIL, Northeastern University, TAY-RONG CHANG, HORNG-TAY JENG, National Tsing Hua University, GUOQING CHANG, CHI-CHENG LEE, SHIN-MING HUANG, HSIN LIN, National University of Singapore — Three types of fermions play a fundamental role in our understanding of nature: Dirac, Majorana and Weyl. A Weyl semimetal is a novel crystal whose low-energy electronic excitations behave as Weyl fermions. Here, we present the experimental discovery of the Weyl semimetal state in an inversion-symmetry-breaking single-crystalline solid, niobium arsenide (NbAs). Utilizing the combination of soft X-ray and ultraviolet photoemission spectroscopy, we systematically study both the surface and bulk electronic structure of NbAs. We experimentally observe both the Weyl cones in the bulk and the Fermi arcs on the surface of this system. Our ARPES data, in agreement with our theoretical calculations, identify the Weyl semimetal state in NbAs, which provides a platform to test the potential of Weyltronics.

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