Abstract Submitted
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Discovery of a new type of topological Weyl fermion semimetal in $\mathbf{Mo}_x\mathbf{W}_{1-x}\mathbf{Te}_2$[1] ILYA BELOPOLSKI, DANIEL S. SANCHEZ, Princeton Univ., YUKIAKI ISHIDA, Univ. of Tokyo, ISSP, XINGCHEN PAN, Nanjing Univ., PENG YU, Nanyang Tech. Univ., SU-YANG XU, Princeton Univ., GUOQING CHANG, Nat. Univ. of Singapore, TAY-RONG CHANG, Nat. Tsing Hua Univ., HAO ZHENG, NASSER ALIDOUST, GUANG BIAN, Princeton Univ., MADHAB NEUPANE, Univ. of Central Florida, SHIN-MING HUANG, Nat. Univ. of Singapore, YOU SONG, HAIJUN BU, GUANGHOU WANG, Nanjing Univ., SHISHENG LI, GOKI EDA, Nat. Univ. of Singapore, HORNG-TAY JENG, Nat. Tsing Hua Univ., TAKESHI KONDO, Univ. of Tokyo, ISSP, HSIN LIN, Nat. Univ. of Singapore, ZHENG LIU, Nanyang Tech. Univ., FENGQI SONG, Nanjing Univ., SHIK SHIN, Univ. of Tokyo, ISSP, M. ZAHID HASAN, Princeton Univ. — The $Mo_xW_{1-x}Te_2$ series hosts Type II, or strongly Lorentz-violating, Weyl fermions and is promising for novel electronics. However, the Weyl cones and Fermi arcs are predicted to sit above the Fermi level, making them strictly inaccessible to conventional ARPES. Here, we use pump-probe ARPES to image the unoccupied band structure of $Mo_xW_{1-x}Te_2$. We directly observe topological Fermi arcs. Unexpectedly, we find that certain Weyl points are close to the Fermi level, making $Mo_xW_{1-x}Te_2$ uniquely suited to transport and device applications of Weyl semimetals.

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