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Discovery of Lorentz-violating type-II Weyl fermions in LaAlGe<sup>1</sup> DANIEL S. SANCHEZ, SU-YANG XU, NASSER ALIDOUST, Princeton University, GUOQING CHANG, Research Centre National University of Singapore, HONG LU, Peking University, BAHADUR SINGH, Research Centre National University of Singapore, ILYA BELOPOLSKI, Princeton University, XIAO ZHANG, Peking University, GUANG BIAN, HAO ZHENG, Princeton University, MARIUS-ADRIAN HUSANU, Paul Scherrer Institute, YI BIAN, Peking University, SHIN-MING HUANG, CHUANG-HAN HSU, Research Centre National University of Singapore, TAY-RONG CHANG, HORNG-TAY JENG, National Tsing Hua University, ARUN BANSIL, Northeastern University, TITUS NEUPERT, Princeton University, VLADIMIR N. STROCOV, Paul Scherrer Institute, HSIN LIN, Research Centre National University of Singapore, SHUANG JIA, Peking University, M. ZA-HID HASAN, Princeton University — Recently, a few crystal candidates were predicted to be type-II Weyl semimetals, but have yet to be conclusively confirmed with conventional ARPES techniques. Here we present the first direct experimental observation of a type-II Weyl semimetal in LaAlGe by using ARPES to resolve its type-II Weyl nodes and cones. Unlike the previously proposed type-II Weyl semimetals, the type-II Weyl nodes in LaAlGe are observed to be located at the Fermi level and, therefore, dominate the low-energy physics.

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