Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Experimental Observation of Three-Component New Fermions in Topological Semimetal MoP[1] B.Q. LV, Z.-L. FENG, Q.-N. XU, J.-Z. MA, L.-Y. KONG, PIERRE RICHARD, Y.-B. HUANG, Chinese Academy of Sciences (CAS), V. N. STROCOV, Paul Scherrer Institute, C. FANG, H.-M. WENG, Y.-G. SHI, TIAN QIAN, HONG DING, Chinese Academy of Sciences (CAS), PAUL SCHERRER INSTITUTE, SWISS LIGHT SOURCE, CH-5232 VILLIGEN PSI, SWITZERLAND TEAM, SHANGHAI SYNCHROTRON RADIATION FACILITY, SHANGHAI INSTITUTE OF APPLIED PHYSICS TEAM, UNIVERSITY OF CHINESE ACADEMY OF SCIENCES, BEIJING 100190, CHINA TEAM, COLLABORATIVE INNOVATION CENTER OF QUANTUM MATTER, BEIJING, CHINA COLLABORATION, INSTITUTE OF PHYSICS, CHINESE ACADEMY OF SCIENCES, BEIJING 100190, CHINA TEAM — Condensed matter systems can host quasiparticle excitations that are analogues to elementary particles such as Majorana, Weyl, and Dirac fermions. Recent advances in band theory have expanded the classification of fermions in crystals, and revealed crystal symmetry-protected electron excitations that have no high-energy counterparts. Here, using angle-resolved photoemission spectroscopy, we demonstrate the existence of a triply degenerate point in the electronic structure of MoP crystal, where the quasiparticle excitations are beyond the Majorana-Weyl-Dirac classification. Furthermore, we observe pairs of Weyl points in the bulk electronic structure coexisting with the new fermions, thus introducing a platform for studying the interplay between different types of fermions.

[1]We thank Binbin Fu, Nan Xu, and Xin Gao for the assistance in the ARPES experiments.

Baiqing Lyu(Lv)
Chinese Academy of Sciences (CAS)

Date submitted: 04 Nov 2016 Electronic form version 1.4