Abstract Submitted
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Topological nodal loop semimetals and insulators in alkaline earth triarsenides[1] WARREN E. PICKETT, UC Davis, YUNDI QUAN, Beijing Normal University, LIANYANG DONG, THEO SIEGRIST, FAMU-FSU, JENNIFER TRINH, ARTHUR J. RAMIREZ, UC Santa Cruz, HAOXIANG LI, XIAOQING ZHOU, DANIEL S. DESSAU, University of Colorado Boulder — The $X\mathrm{As}_3$ class of semimetals has remained unexplored since their discovery in the 1980s by Bauhofer and von Schnering. We have discovered that this class, with X=Ca, Sr, Ba, Eu, are nodal loop semimetals (NLS), having a single loop of accidental degeneracies crossing the Fermi energy and a gap elsewhere in the zone: the nodal loop region dominates the transport Large single crystals of monoclinic SrAs_3 have been synthesized, allowing studies of its magnetotransport properties andits ARPES spectrum. Density functional calculations reveal that monoclinic CaAs3, the sole insulating member of this class, would be a NLS in the absence of spin-orbit coupling (SOC). The position and characters of the nodal Fermi surfaces and associated boundard states will be discussed. The stark low symmetry of monoclinic CaAs_3 (with only inversion symmetry) makes it the "hydrogen atom" of NLSs; unlike all other classes, space group symmetry does not provide any "protection" of its loop of accidental degeneracies.

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Warren E. Pickett
UC Davis

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