

Abstract Submitted  
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**Superconducting Proximity Effect in the 3D Dirac Semimetal Cd<sub>3</sub>As<sub>2</sub>** JUN XIONG, QUINN GIBSON, TIAN LIANG, ROBERT J. CAVA, NAI PHUAN ONG, Princeton Univ — Cd<sub>3</sub>As<sub>2</sub> is a semimetal that is a candidate for a 3D Dirac semimetal. Angle-resolved photoemission has observed bulk, massless Dirac nodes whose Fermi velocity is in good agreement with the value determined by quantum oscillation measurements. A number of novel transport features have been identified. The system is protected from 2kF backscattering despite a short quantum lifetime. Theory predicts the existence of surface states with Fermi arcs. We search for evidence for the arcs using Nb pads to proximitize the surface electrons. We have fabricated a Nb-Cd<sub>3</sub>As<sub>2</sub>-Nb hybrid structure to study the Josephson effect. Given the long electronic mean-free-path in Cd<sub>3</sub>As<sub>2</sub>, we have made Josephson junctions with different lengths to study the coherent transport of cooper pairs in 3D Dirac semimetal. To reveal the exotic nature of 3D Dirac electrons, we have measured the dc I-V curves of the junction, in the presence of a weak magnetic field. Supported by NSF-MRSEC (DMR 0819860), Army Research Office (ARO W911NF-11- 1-0379) and DARPA under SPAWAR program (Grant N66001-11-1-4110).

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