Abstract

Three dimensional (3D) Dirac semi-metals(DSs), a recently proposed state of quantum matter and bulk analogue of graphene exist close to topological phase- boundaries and there exists possibility of driving them into exotic phases (such as topological superconductors, Weyl semi-metals, axion insulators) by breaking certain symmetries. Cd3As2 is a model 3D DS, ideal for the realization of such exotic phases. However, a practical realization of this idea was lacking. Here by implementing the Point Contact Spectroscopy we show that the mesoscopic point- contacts between pure silver (Ag) and the 3D DS Cd3As2 exhibit unconventional superconductivity with a critical temperature (on- set) more than 6 K. The phe- nomenon reported here is unique since none of Cd3As2 or Ag is a superconductor. A gap amplitude of 6.5 meV is measured spectroscopically in this phase that varies weakly with temperature and survives up to a remarkably high temperature of 13 K indicating the presence of a robust normal-state pseudogap. The observations indicate the emergence of a new unconventional superconducting phase that exists in a quantum mechanically con ned region under a point-contact between a Dirac semi-metal and a normal metal.