Contribution ID : **78** Type : **Oral**

Self-consistent surface superconductivity in time-reversal symmetric Weyl semimetals

Weyl semimetals host topologically protected surface states, the so-called Fermi arcs, that have a penetration depth into the bulk that depends on surface-momentum, and diverges at the Weyl points. It has recently been observed in PtBi2 that such Fermi arc states can become superconducting, with a critical temperature larger than that of the bulk. Here we introduce a general variational method that captures the interplay between surface and bulk superconductivity, for any bulk Hamiltonian that harbors (topological) surface states with varying penetration depth. From the self-consistent solutions we establish that the surface state localization length of Weyl semimetals leads to characteristic features in the surface superconductivity, with a gap depending on surface momentum and a penetration length for the order parameter that is temperature-dependent due to competition with the bulk superconductivity.

Primary author(s) : Dr. TRAMA, Mattia (IFW - Dresden)

Co-author(s) : Dr. KÖNYE, Viktor (University of Amsterdam); Dr. FULGA, Ion Cosma (IFW - Dresden); Prof. VAN DEN BRINK, Jeroen (IFW - Dresden)

Presenter(s) : Dr. TRAMA, Mattia (IFW - Dresden)

Session Classification : Condensed Matter

Track Classification : Condensed Matter