SES21-2021-000036

Abstract for an Invited Paper
for the SES21 Meeting of
the American Physical Society

Microscopic evidence for chiral superconductivity in UTe2

LIN JIAO, National High Magnetic Field Laboratory

Spin-triplet superconductivity is a condensate of electron pairs with spin-1 and an odd parity pair wavefunction. A particularly interesting manifestation of triplet pairing is a chiral p-wave state which is topologically non-trivial and a natural platform for realizing Majorana edge modes. Triplet pairing is however rare in solid state systems and so far, no unambiguous identification has been made in any bulk compound. Since pairing is most naturally mediated by ferromagnetic spin fluctuations, uranium based heavy fermion systems containing f-electron elements that can harbor both strong correlations and magnetism are considered ideal candidate spin-triplet superconductors. In this talk I will present scanning tunneling microscopy (STM) studies of the newly discovered heavy fermion superconductor, UTe2 with a TSC of 1.6 K. We find signatures of coexisting Kondo effect and superconductivity which show competing spatial modulations within one unit-cell. Most strikingly, STM spectroscopy at step edges show signatures of asymmetric in-gap resonance, which is understood in terms of chiral tunneling. Combined with existing data indicating triplet pairing, the presence of chiral edge states suggests that UTe2 is a chiral-triplet superconductivity.