Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Spin-split Surface States and Superconductivity at Twin Boundaries of Non-centrosymmetric BiPd CHI MING YIM, CHRISTOPHER TRAINER, ANA MALDONADO, SUPA, School of Physics and Astronomy, University of St Andrews, UK, DARREN C. PEETS, Max-Planck-Institut fr Festkrperforschung, Stuttgart, Germany, PETER WAHL, SUPA, School of Physics and Astronomy, University of St Andrews, UK — In non-magnetic bulk materials lacking a center of inversion symmetry, spin-orbit interactions can lift the spin degeneracy, resulting in Rashba metals whose Fermi surfaces exhibit an intricate spin texture. Combined with superconductivity, this can lead to an admixture of both singlet and triplet components of the superconducting pairing. Using scanning tunneling spectroscopy we study the surface electronic structure in the superconducting state of BiPd, which has previously been reported to exhibit a Dirac-like surface state with a non-trivial spin texture. Topographic images reveal domains of $[0\bar{1}0]$ and [010] terminations corresponding to opposing faces of the crystal structure, separated by twin boundaries. From differential conductance spectra obtained on the two terminations we can characterize the surface electronic structure of the two non-equivalent surfaces. The signature of the surface state within domains of the two terminations are located at $\sim$0.4 eV above the Fermi level with only small differences. Intriguingly, we find an additional bound state localized at the twin boundary, the precise energy of which depends on the orientation of the twin boundary. Superconductivity between the two surface terminations and at the twin boundaries is discussed.

Chi Ming Yim
SUPA, School of Physics and Astronomy, University of St Andrews, UK

Date submitted: 11 Nov 2016 Electronic form version 1.4