

SANS and muSR studies of the non-centrosymmetric superconductor BiPd

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BiPd is a non-centrosymmetric superconductor with a monoclinic crystal structure, a T_c of 3.8 K, and an upper critical field $B_{c2}(T=0) \sim 0.7$ T. The initial motivation for investigating this compound was to search for signs of mixed singlet-triplet pairing, as is permitted in systems lacking inversion symmetry. However, recent measurements by TF muSR and SANS have shown that the most striking feature of BiPd seems to be extreme multi-band superconductivity. MuSR provides evidence of at least two components with very different critical fields and penetration depths. Flux lattice measurements by SANS confirm the existence of a phase with a critical field around 10 times lower than that identified by resistivity and magnetisation. We also find evidence of an intermediate mixed state, where Meissner and flux lattice phases coexist.

In addition, I will present an improved method of SANS data treatment for flux lattice diffraction patterns, using Bayes' theorem.

Primary author: Dr HOLMES, Alexander (University of Birmingham)

Co-authors: Dr HILLIER, Adrian (ISIS); AMATO, Alex (Paul Scherrer Institut); Dr THAMIZAVEL, Arumugum (TIFR); Mr JOSHI, Bhanu (Tata Institute of Fundamental Research); Mr MAZZONE, Daniel (PSI); FORGAN, Edward (University of Birmingham); Dr YELLAND, Edward (University of St Andrews); GAVILANO, Jorge (Paul Scherrer Institut); Mr LEMBERGER, Louis (Institut Laue Langevin); Prof. RAMAKRISHNAN, Srinivasan (TIFR)

Presenter: Dr HOLMES, Alexander (University of Birmingham)

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