Vortex structures in the layered superconductors YBCO, Strontium Ruthenate and BSCCO

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Abstract

We report on current progress by our collaboration (Universities of Birmingham, St. Andrews and Warwick, U.K., University of Zurich, Switzerland, University of Kyoto, Japan) in a number of topics in layered superconductors. In YBCO, we have made use of polarised neutron techniques to investigate the transverse components of magnetic field which are present when a field is applied at an angle to the layers. These measurements will allow much more detailed tests of the applicability of anisotropic London theory to layered superconductors. We have observed a square flux line lattice in the non-cuprate perovskite Sr_2RuO_4; detailed interpretation of the results strongly suggests that this material is a "single-band" p-wave superconductor. Neutron and muon measurements on BSCCO suggest a two-dimensional melting of pancakes at high fields.