Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

The Vortex Lattice of KFe_2As_2 CHARLOTTE BOWELL, University of Cambridge, HAZUKI FURUKAWA, Ochanomizu University, EDWARD FORGAN, ALASTAIR CAMERON, RICHARD HESLOP, University of Birmingham, KUNIHIRO KIHOU, C.H. LEE, HIROSHI EISAKI, AIST, Tokyo, TAKU SAITO, HIDETO FUKAZAWA, YOH KOHORI, Chiba University, ROBERT CUBITT, Institut Laue Langevin — Small angle neutron scattering (SANS) studies of the vortex lattice in the FeAs-based superconductors are currently being hindered by the strong vortex pinning that seems almost omnipresent in these materials. An investigation of $Ba(Fe_{0.93}Co_{0.07})_2As_2$ [1] gave only a ring of diffraction intensity, not well-defined Bragg peaks, showing a disordered vortex structure. It is likely that local inhomogeneities in these doped compounds are responsible for the significant vortex pinning. KFe_2As_2 belongs to the 122 class of pnictide superconductors and is intrinsically superconducting (with a T_c of 3.8 K), allowing high quality crystals to be grown that exhibit extremely low vortex lattice pinning. Our SANS measurements of KFe_2As_2 are the first to observe sharp Bragg peaks from a well-ordered vortex lattice. It is now the underlying physics, not pinning, that controls the vortex structure. We present the vortex lattice structure observed as a function of temperature and field, and discuss what the temperature dependence of the diffracted intensity implies for the superconducting order parameter. [1] M.R. Eskildsen et al. Phys. Rev. B 79, 100501(R) (2009)

Charlotte Bowell
University of Cambridge

Date submitted: 08 Dec 2009 Electronic form version 1.4