Abstract Submitted
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Vortex Lattice Anisotropy and Pauli Limiting in KFe_2As_2[1] S.J. KUHN, M.R. ESKILDSEN, University of Notre Dame, H. KAWANO-FURUKAWA, M. ONO, Ochanomizu University, Japan, E.M. FORGAN, E. JELLYMAN, R. RIYAT, University of Birmingham, United Kingdom, C.H. LEE, K. KIHOU, AIST, Japan, J. GAVILANO, Paul Scherrer Institute, Switzerland — In superconducting KFe_2As_2 (KFA), H_{c2} (in Tesla) parallel to the basal plane is much larger than T_c (in Kelvin) suggesting Pauli limiting. We have used small-angle neutron scattering (SANS) with H applied close to the basal plane to study the vortex lattice (VL) anisotropy and scattered intensity in KFA. The VL anisotropy reflects the intrinsic anisotropy of the superconducting state (Γ_{ac}), and may differ significantly from the H_{c2} anisotropy ($\Gamma_{H_{c2}}$) as recently seen in Sr_2RuO_4 [C. Rastovski *et al.*, Phys. Rev. Lett. **111**, 087003 (2013)]. Our data indicates a field dependent VL anisotropy in KFA, increasing with H, possibly caused by multi-band effects. At high fields $\Gamma_{ac} > \Gamma_{H_{c2}}$, supporting Pauli limiting. Due to the moderately high anisotropy, both the longitudinal and transverse VL field modulation may contribute to the SANS signal, occurring as non-spin flip and spin flip scattering respectively. This allow an independent determination of possible Pauli paramagnetic effects (spin polarization of un-paired quasiparticles in the vortex cores) along the two different directions.

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