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Investigation of Vortex Lattice in Optimally Doped ($Ba_{1-x}K_x$)Fe_2As_2 Using SANS S. DEMIRDIS, Julich Center for Neutron Science (JCNS), Forschungszentrum Julich GmbH, JCNS at MLZ, Lichtenberstr. 1, D-85747, Garching, Germany, C.J. VAN DER BEEK, Laboratoire des Solides Irradies, Ecole Polytechnique CNRS UMR 7642 & CEA-DSM-IRAMIS, F 91128 PALAISEAU/France, S. MUHLBAUER, Technische Universitat Munchen, Forschungsneutronenquelle Heinz Maier-Leibnitz (FRM II) D-85748, Garching, Germany, Y. SU, Julich Center for Neutron Science (JCNS), Forschungszentrum Julich GmbH, JCNS at MLZ, Lichtenberstr. 1, D-85747, Garching, Germany, TH. WOLF, Karlsruher Institut fur Technologie, Institut fur Festkorperphysik, 7602, Karlsruhe, Germany — Small-angle neutron scattering is used to study the vortex lattice (VL) in optimally doped (Ba1-xKx)Fe2As2 single crystal. Previous SANS studies, as well as real-space imaging methods applied to the study of the VL in single crystalline (Ba1-xKx)Fe2As2, Co-, and P-substituted BaFe2As2, have consistently reported highly disordered vortex structures. Present SANS study reveals the first time in doped pnictides, clear vortex lattice Bragg peaks. Here we show SANS data taken in a magnetic field ranging between 0.25 and 2 Tesla that reveals resolution limited sharp Bragg spots, indicating the existence of a long-range ordered Bragg glass. Field dependence of the vortex structure factor, obtained by correcting the intensity by the field-dependent vortex form factor, shows a sharp drop well below the second critical field. This vortex structural transition shows clear correlations with features observed around the so-called "second magnetization peak" present in isothermal hysteresis loops.

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