Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Dynamic and Structural Studies of Metastable Vortex Lattice Domains in MgB_2[1] E.R. DE WAARD, S.J. KUHN, C. RASTOVSKI, M.R. ESKILDSEN, University of Notre Dame, A. LEISHMAN, Kent State University, C.D. DEWHURST, Institut Laue-Langevin, France, L. DEBEER-SCHMITT, K. LITTRELL, Oak Ridge National Laboratory, J. KARPINSKI, EPFL, Switzerland, N.D. ZHIGADLO, ETH, Switzerland — Small-angle neutron scattering (SANS) studies of the vortex lattice (VL) in the type-II superconductor MgB_2 have revealed an unprecedented degree of metastability that is demonstrably not due to vortex pinning, [C. Rastovski *et al.*, Phys. Rev. Lett. **111**, 107002 (2013)]. The VL can be driven to the GS through successive application of an AC magnetic field. Here we report on detailed studies of the transition kinetics and structure of the VL domains. Stroboscopic studies of the transition revealed a stretched exponential decrease of the metastable volume fraction as a function of the number of applied AC cycles, with subtle differences depending on whether the AC field is oriented parallel or perpendicular to the DC field used to create the VL. We speculate the slower transition kinetics for the transverse AC field may be due to vortex cutting. Spatial studies include scanning SANS measurements showing the VL domain distribution within the MgB_2 single crystal as well as measurements of VL correlation lengths.

[1]This work is supported by the U.S. Department of Energy, Office of Basic Energy Sciences under Award DE-FG02-10ER46783.

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Date submitted: 06 Nov 2015 Electronic form version 1.4