Abstract Submitted for the MAR14 Meeting of The American Physical Society

Vortex Lattice Metastability and Power Law Dynamics in MgB_2^1 CATHERINE RASTOVSKI, S.J. KUHN, K. SMITH, M.R. ESKILDSEN, University of Notre Dame, L. DEBEER-SCHMITT, Oak Ridge National Laboratory, C.D. DEWHURST, Institut Laue-Langevin, W.J. GANNON, Northwestern University, N.D. ZHIGADLO, J. KARPINSKI, ETH — Previous small-angle neutron scattering (SANS) studies of the vortex lattice (VL) of MgB₂ with H \parallel c found a triangular VL which undergoes a field-driven 30° reorientation transition, forming three distinct ground state phases. A high degree of metastability exists between the VL phases of MgB_2 that cannot be attributed to vortex pinning and may be a result of the jamming of VL domains [C. Rastovski et al., Phys. Rev. Lett. 111, 107002 (2013)]. To further investigate the effect of vortex motion on the metastable to ground state VL transition, we applied a small AC magnetic field parallel or perpendicular to the vortices to "shake" the lattice. The metastable VL volume fraction decreased with a two-step power law dependence on the number of applied AC cycles. The slow and then fast power law decay of the metastable state may indicate first nucleation and then growth of ground state VL domains.

¹This work was supported by the Department of Energy, Basic Energy Sciences under Award No. DE-FG02-10ER46783.

Catherine Rastovski University of Notre Dame

Date submitted: 13 Nov 2013

Electronic form version 1.4