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Vortex Lattice Transition Dynamics in MgB_2 C. RASTOVSKI, P. DAS, K. SCHLESINGER, M.R. ESKILDSEN, W.J. GANNON, University of Notre Dame, IN, USA, C.D. DEWHURST, Institut Laue-Langevin, France, N.D. ZHIGADLO, J. KARPINSKI, ETH Zurich, Switzerland — We present small-angle neutron scattering (SANS) studies of the vortex lattice (VL) in MgB_2 with $H \parallel c$. This material has three different VL phases, all with triangular symmetry but oriented differently with respect to the crystalline axes. Furthermore, a high degree of metastability between the VL phases of MgB_2 has been observed as the sample is cooled or heated across the equilibrium phase transitions. Here we present detailed studies of how the metastable (MS) VL phases transition to the ground state (GS), either driven by small changes of the DC magnetic field or by a transverse AC field. Our results show that the MS VL is not due to vortex pinning, and results are inconsistent with predictions based on the Bean model. Instead, we speculate that a "jamming" of counter rotated VL domains is responsible for the VL metastability. This is further supported by a power law dependence of the GS VL domain population upon the number of applied AC cycles. This work was supported by the Department of Energy, Basic Energy Sciences under Award No. DE-FG02-10ER46783.

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