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Jamming of Ordered Vortex Lattice Domains[1] C. RASTOVSKI, M.R. ESKILDSEN, University of Notre Dame, C.D. DEWHURST, Institut Laue-Langevin, Grenoble, France, W.J. GANNON, Northwestern University, IL, USA, N.D. ZHIGADLO, J. KARPINSKI, ETH, Zurich, Switzerland — Jamming is mostly associated with granular materials, but is applicable in a variety of physical situations. Our results indicate that the vortex lattice (VL) in type-II superconductors can be used as a model system to study jamming. Previous small-angle neutron scattering (SANS) studies of the VL in MgB_2 with H $\parallel$ c found a triangular VL which undergoes a field-driven 30° reorientation transition, forming three distinct ground state phases. The low and high field phases have hexagonal VLs aligned with high symmetry directions in the crystal, whereas at intermediate fields the VL is marked by the presence of domains of vortices continuously rotating from one high symmetry direction to another. A high degree of metastability between the VL phases of MgB_2 has been observed [P. Das et al., Phys. Rev. Lett. 2012]. Our recent SANS measurements show that this cannot be understood based on the single domain free energy. We applied a transverse AC magnetic field to the sample and found the decrease in the metastable volume fraction depends logarithmically on the number of AC cycles, similar to some jamming scenarios. We propose that the origin for the VL metastability is a jamming of counter-rotated VL domains that prevents rotation to the equilibrium orientation.

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