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Magnetic Anisotropy in UMn_2Ge_2[1] MORGANN BERG, University of Texas at Austin, ALEX DE LOZANNE, RYAN BAUMBACH, JEEHOON KIM, ERIC BAUER, JOE THOMPSON, FILIP RONNING, Los Alamos National Laboratory — UMn_2Ge_2, a permanent magnet, is a ternary intermetallic compound with a tetragonal crystal structure of type $ThCr_2Si_2$ and with space group I4/mmm. Local U and Mn moments in UMn_2Ge_2 order on their respective sublattices at temperatures near 100 and 380 K, respectively. Previous x-ray diffraction, Kerr rotation angle, and SQUID magnetometry data support the commonly accepted notion that U moments order at low temperature and align Mn moments along the c-axis, introducing anisotropy. Previous results obtained using a multi-mode atomic force microscope in magnetic force microscopy (MFM) mode indeed confirmed that UMn_2Ge_2 displays uniaxial anisotropy with an easy axis coinciding with the c-axis of the material. However, the branching domains in UMn_2Ge_2 consistent with uniaxial anisotropy were observed all the way up to room temperature by MFM. This indicates that the effect of uranium moments on the magnetic microstructure of UMn_2Ge_2 is not limited to low temperatures near the ordering temperature of the uranium sublattice. We further investigate closure domains in the surface of UMn_2Ge_2 and report on characteristics and signatures of anisotropy revealed by the orientation and periodic structures of closure domains.

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