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**Regular magnetic domain pattern in $TbNi_2B_2C$ due to strong magneto-elastic coupling** A. KREYSSIG, J.-W. KIM, L. TAN, A. I. GOLDMAN, Ames Laboratory USDOE, Department of Physics and Astronomy, Iowa State University, Ames, IA 50011, C. DETLEFS, ESRF Grenoble, 38043 Grenoble, France, B. GRENIER, ILL Grenoble, 38042 Grenoble, France, M. LOEWENHAUPT, Technische Universitaet Dresden, IFP, D-01062, Germany — $R$Ni$_2$B$_2$C compounds are of strong interest due to the competition between superconductivity and magnetism. The crystal electric field effects yield strong magnetoelastic effects. The strongest tetragonal-to-orthorhombic distortion is observed for $TbNi_2B_2C$ with a relative distortion of 0.6 % in the antiferromagnetic state at 1.5 K. The lowering of the symmetry forces the development of domains of two forms, in which the magnetic moment direction are align along the a or b axis, respectively. For both kind of domains, the lattice distortion is opposite in the ab plane. We investigated the resulting domain using scattering techniques. Temperature-dependent topographic x-ray images show that the domains are very large in (110) directions where as they are very narrow in the direction perpendicular in the ab plane. In X-ray and neutron diffraction sattelite reflections are found, which are produced by the regular pattern of domains with dimensions of 10 nm. A model describing this pattern and consequences for magnetic and superconducting properties will be discussed.

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