

Abstract Submitted
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Neutron Diffraction Investigations of BiFeO₃ Films W. RATCLIFF II, NIST Center for Neutron Research, Gaithersburg, MD 20886, USA, DAISUKE KAN, Department of Materials Science and Engineering and Center for Superconductivity Research, University of Maryland, College Park, MD 20742, SILVIA CAPELLI, GARY MCINTYRE, Institute Laue-Langevin, 156X, 38042 Grenoble Cedex, France, ICHIRO TAKEUCHI, Department of Materials Science and Engineering and Center for Superconductivity Research, University of Maryland, College Park, MD 20742 — The study of the magnetic structure of bulk BiFeO₃ started with powders and evolved to single crystals when large ones became available. Single crystal studies definitively showed that the magnetic structure in the bulk was a long wavelength “cycloid” [4]. However, there have not been similarly detailed studies of the magnetic structure in thin films. Thus, to investigate how the thin film geometry affects the multiferroicity of BiFeO₃, we pursued a study of the magnetic structure of BiFeO₃ films as a function of film thickness and substrate orientation. BiFeO₃ thin films with thicknesses up to 1 micron were epitaxially grown on (100), (110), and (001) oriented SrTiO₃ substrates by PLD. We used D10 at the ILL to measure the 1 micron thick BiFeO₃ film for magnetic structure determination. Polarized and unpolarized neutron diffraction experiments were performed on BT9 and BT7 at the NCNR. We will discuss the change in the magnetic structure as a function of film thickness and orientation of the substrate.

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