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Evolution of the magnetic structure in (Sm,Bi)FeO₃ Thin Films

WILLIAM RATCLIFF, NIST Center for Neutron Research, National Institute of Standards and Technology, Gaithersburg, Maryland 20899, USA, AMY POOLE, Paul Scherrer Institut, CH-5232 Villigen, Switzerland, MECHTHILD ENDERLE, Institut Laue-Langevin, BP 156, 38042 Grenoble Cedex 9, France, SHINGO MARUYAMA, V. ANBUSATHAIAH, ICHIRO TAKEUCHI, Department of Materials Science and Engineering, University of Maryland, College Park, MD 20424 — BiFeO₃ is a multiferroic, which is ordered at room temperature. In this compound, the magnetic and ferroelectric domains are coupled and magnetic domains can be switched with an electric field [1]. It has recently been found that doping Sm onto the Bi site drives the system from rhombohedral to orthorhombic ordering [2]. Furthermore, near the phase boundary, application of an electric field can drive the material between the two structures. It is an open question as to whether the magnetic structure follows. In this talk, I share our recent neutron diffraction results on the magnetic structure of Sm doped BiFeO₃ thin films. [1] T. Zhao, A. Scholl, F. Zavaliche, K. Lee, M. Barry, A. Doran, M. P. Cruz, Y. H. Chu, C. Ederer, N. A. Spaldin, R. R. Das, D. M. Kim, S. H. Baek, C. B. Eom, and R. Ramesh, *Nature Materials* **5**, 823 (2006). [2] Daisuke Kan, Ching-Jung Cheng, Valanoor Nagarajan, Ichiro Takeuchi **110**, 014106 (2011) [3] Daisuke Kan, Lucia Palova, Varatharajan Anbusathaiah, Ching Jung Cheng, Shigehiro Fujino, Valanoor Nagarajan, Karin M. Rabe, Ichiro Takeuchi, *Adv. Funct. Mater.* **20**, 1108 (2010).

William Ratcliff
NIST Center for Neutron Research, National Institute of Standards
and Technology, Gaithersburg, Maryland 20899, USA

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