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**Magnetic Interactions in Strained Multiferroic  $\text{EuTiO}_3$  Thin Films** J.W. FREELAND, Advanced Photon Source, Argonne National Laboratory, X. KE, Department of Physics and Materials Research Institute, Pennsylvania State University, J.H. LEE, Department of Materials Science and Engineering, Pennsylvania State University, P. RYAN, J.W. KIM, Advanced Photon Source, Argonne National Laboratory, C.J. FENNIE, School of Applied and Engineering Physics, Cornell University, P. SCHIFFER, Department of Physics and Materials Research Institute, Pennsylvania State University, D.G. SCHLOM, School of Applied and Engineering Physics, Cornell University — Bulk  $\text{EuTiO}_3$  possesses a paraelectric and antiferromagnetic ground but it has been predicted that under tensile strain the system would show spontaneous ferromagnetic and ferroelectric order[1]. Here we present a study of the magnetic interactions in thin films of  $\text{EuTiO}_3$  grown on  $\text{SrTiO}_3(001)$  and  $\text{DyScO}_3(110)$  substrates by reactive molecular-beam epitaxy (MBE). Using magnetometry, x-ray magnetic circular dichroism, and magneto-capacitance, there clear evidence of ferromagnetic order under tensile strain while the unstrained films are anti-ferromagnetic. These results will be discussed in the context of the predicted behavior. Work at Argonne, including the Advanced Photon, is supported by the U.S. Department of Energy, Office of Science, and Office of Basic Energy Sciences, under Contract No. DE-AC02-06CH11357. [1] C.J. Fennie and K.M. Rabe, Phys. Rev. Lett. 97, 267602 (2006)].

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