Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

**Step-induced magnetic phase separation in $La_{0.67}Sr_{0.33}MnO_3/SrTiO_3$ (100) thin films.**[1] IN HAE KWAK, AMLAN BISWAS, University of Florida, Department of Physics — We investigated thickness dependent magnetic anisotropy in $La_{0.67}Sr_{0.33}MnO_3/SrTiO_3$ (100) (LSMO/STO) thin films using a combination of magnetic force microscopy (MFM) and magnetization measurements. Atomically smooth thin films of LSMO were grown on STO using pulsed laser deposition. The thin films showed step flow growth with unit cell step heights. MFM images of a 40 unit cell (u.c.)-thick film showed out-of-plane magnetic domain structure indicating bulk-like rhombohedral crystalline anisotropy. As the film thickness was decreased to 20 u.c., the MFM images showed signatures of step-induced uniaxial anisotropy. Hence, the magnetic domain structure shows that tensile strain from lattice mismatch weakens the rhombohedral crystalline anisotropy in LSMO. Magnetization vs. field, $M(H)$ measurements for the 20 u.c. thick LSMO film revealed a clear in-plane uniaxial anisotropy with the direction along the steps being the easy axis and the coercive fields along the steps were consistently smaller than across the steps for a broad temperature range. Our combination of bulk and local magnetic measurements suggest that the microscopic origin of magnetic anisotropy is step-induced phase separation in the thinner films which are under higher tensile strain.

[1]Thank you for support from NSF-DMR 1410237

In Hae Kwak
University of Florida, Department of Physics

Date submitted: 09 Nov 2015 Electronic form version 1.4