Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Charge and Strain Control of Interface Magnetism[1] M.R. FITZSIMMONS, LANL, K. DUMESNIL, Institut Jean Lamour, N. JAOUEN, Synchrotron SOLEIL, T. MAROUTIAN, G. AGNUS, Université Paris-Sud, J.-M. TONNERRE, Université Grenoble Alpes, B. KIRBY, NIST, E. FOHTUNG, NMSU, B. HOLLADAY, E.E. FULLERTON, O. SHPYRKO, S.K. SINHA, UCSD, Q. WANG, A. CHEN, Q.X. JIA, LANL — We studied the influence of an electric field applied to an $La_{0.67}Sr_{0.33}MnO_3$ (LSMO) layer in a LSMO/$Pb(Zr_{0.2}Ti_{0.8})O_3$ (PZT)/Nb-doped $SrTiO_3$ (STO) heterostructure by measuring its magnetization depth profile using resonant x-ray magnetic reflectivity. The saturation magnetization of the ferromagnetically-ordered LSMO was not affected by the direction of the polarization of the PZT. However, the ferromagnetic thickness and magnetization of the LSMO film at remanence were reduced for hole-charge accumulation at the LSMO/PZT interface. To understand the *independent* roles of strain and hole-doping, we performed neutron scattering experiments of $La_{0.8}Sr_{0.2}MnO_3$ films grown on Nb-doped STO in which bending strain (via 4-point bending jig) *or* electric field (via parallel plate capacitor) was applied to the films. We observed that bending strain affects the saturation magnetization of the LSMO film, whereas electric field affects the remanent magnetization of the film. These observations suggest strain may be a more effective means to control magnetism than charge.

[1]This work has benefited from use of CINT(LANL), NIST Center for Neutron Research and the Synchrotron SOLEIL and funding from LANL/LDRD program, DOE-BES (UCSD) and DOD (NMSU).

M.R. Fitzsimmons
LANL

Date submitted: 11 Oct 2014 Electronic form version 1.4