Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Ferroelectric field effect modulation of the magnetic properties of colossal magnetoresistive $\mathbf{La_{1-x}Sr_xMnO_3}$ JASON HOFFMAN, Department of Applied Physics and Center for Research on Interface Structures and Phenomena, Yale University, HAJO MOLEGRAAF, DPMC, University of Geneva, XIA HONG, Department of Physics, Pennsylvania State University, JEAN-MARC TRISCONE, DPMC, University of Geneva, C.H. AHN, Department of Applied Physics and Center for Research on Interface Structures and Phenomena, Yale University — In this work, we have tuned the magnetic properties of the colossal magnetoresistive oxide $La_{1-x}Sr_xMnO_3$ (LSMO) using a ferroelectric field effect approach. Epitaxial LSMO thin films and ferroelectric $Pb(Zr,Ti)O_3$ (PZT) / LSMO heterostructures were fabricated using off-axis RF magnetron sputtering. LSMO films with high crystalline quality and atomically smooth surfaces have been achieved. Using the magneto-optical Kerr effect (MOKE), we measured a shift in the Curie temperature (T_c) of LSMO upon switching the polarization direction of PZT, in agreement with the modulation of T_c found from magnetotransport measurements. Unlike the traditional chemical doping approach, the ferroelectric field effect approach allows one to control the magnetism in the system reversibly, without introducing additional lattice disorder/distortion.

Jason Hoffman
Department of Applied Physics and Center for Research on Interface
Structures and Phenomena, Yale University

Date submitted: 30 Nov 2007 Electronic form version 1.4