

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Coupling of strain and magnetism in LPCMO films¹ SURENDRA SINGH, M. FITZSIMMONS, Los Alamos National Laboratory, HYOUNGJEEN JEEN, AMLAN BISWAS, University of Florida — Complex oxides show extraordinary structural, magnetic and magneto-transport properties and these properties are closely coupled with atomic structure and strain. The temperature- magnetic field phase diagram and transport studies of $\text{La}_{0.27}\text{Pr}_{0.40}\text{Ca}_{0.33}\text{MnO}_3$ (LPCMO) films suggest the existence of two phases at low temperatures, i.e. ferromagnetic metallic (FMM) phase and charge order insulating (COI) phase. We report the magneto transport properties of LPCMO films on application of external strain using mechanical jig. The study shows the shift in metal to insulator transition (MIT) temperature on application of external strain. To understand the effect of strain as well as kinematics of formation of FMM phase from COI phase of LPCMO films and vice versa, we have performed detailed in situ transport and specular polarized neutron reflectivity measurements across the MIT as functions of temperature, magnetic field and applied strain. The study reveals a variation of magnetic scattering length density along the depth of the film, which may be attributed to chemical inhomogeneity of the film as a function of depth.

¹This work is supported by Department of Energy and National Science Foundation.

Surendra Singh
Los Alamos National Lab

Date submitted: 13 Dec 2010

Electronic form version 1.4