

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**The effect of substrate induced strain on the electronic soft matter in thin films of the manganite  $(\text{La}_{1-y}\text{Pr}_y)_{0.67}\text{Ca}_{0.33}\text{MnO}_3$  ( $y = 0.5, 0.6$ )**  
JACOB TOSADO, TARA DHAKAL, SUNGHEE YUN, AMLAN BISWAS, Department of Physics, University of Florida, Gainesville, FL — For most hole-doped manganites, the low temperature phase is either a ferromagnetic metal (FMM) or charge-ordered insulator (COI). At certain compositions the competition between the FMM and COI phases leads to a mixed phase state in which both these phases coexist. In this mixed phase state, changing the temperature, magnetic field or strain modifies the spatial arrangement and relative proportions of these two phases. This property of manganites is reminiscent of electronic soft matter. We have studied the effect of substrate-induced strain on this electronic soft matter by measuring the magneto-transport properties of  $(\text{La}_{1-y}\text{Pr}_y)_{0.67}\text{Ca}_{0.33}\text{MnO}_3$  (LPCMO,  $y = 0.5, 0.6$ ) thin films of different thicknesses. The temperature –magnetic field ( $T - H$ ) phase diagram of LPCMO shows four distinct phases *viz.*, the COI phase, the FMM phase, a static phase separated (SPS) state and a fluid phase separated (FPS) state. Our experimental results show that as the thickness of the thin film increases (i.e. the substrate induced strain decreases), the SPS state expands and covers more area in the phase diagram at the expense of the FPS state.

Amlan Biswas  
University of Florida

Date submitted: 30 Nov 2005

Electronic form version 1.4