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Colossal piezoresistance in manganites.[1] JACOB TOSADO, JOSYMIR LOPEZ, TARA DHAKAL, AMLAN BISWAS, Department of Physics, University of Florida, Gainesville, FL — We have studied the effect of the application of direct mechanical stress on thin films of the hole-doped manganese oxide (manganite) $(La_{1-y}Pr_y)_{1-x}Ca_xMnO_3$ (LPCMO). The two competing phases in manganites are the pseudocubic ferromagnetic metallic (FMM) phase and the orthorhombic charge-ordered insulating (COI) phase. Due to the different structures of the FMM and COI phases, manganites are susceptible to mechanical stresses. The traditional methods of applying stress on oxide thin films result in different growth modes which makes it difficult to quantify the strain in the thin film. Using a calibrated screw we applied direct mechanical stress on the substrate and measured the change in the phase diagram of the manganite as a function of strain. Our results show that the effect of strain is the largest in the fluid phase separated region of the phase diagram[2], where we observe a strain-induced change in resistance of about 5 orders of magnitude. [2] Tara Dhakal, et. al, Cond-mat/0607502.

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