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Effect of strain on the magnetic domain transition in $(La_{1-y}Pr_y)_{0.67}Ca_{0.33}(MnO_3)$ thin films grown on tetragonal (001) $SrLaGaO_4$ substrates.[1] JOHN TIMMERWILKE, HYOUNG JEEN JEEN, RAFIYA JAVED, ARTHUR IANUZZI, AMLAN BISWAS, Department of Physics, University of Florida, Gainesville, FL 32611 — The perovskite manganese oxide $(La_{1-y}Pr_y)_{0.67}Ca_{0.33}(MnO_3)$ (LPCMO) exhibits a coexistence of a ferromagnetic metallic phase and a charge ordered insulating phase in certain temperature ranges. In LPCMO thin films, substrate induced strain modifies this phase coexistence. An $SrLaGaO_4$(SLGO)substrate has negligible strain effects on LPCMO due to similar lattice spacing. In addition SLGO is non-magnetic, which allows clear magnetization measurements unlike LPCMO films grown on paramagnetic $NdGaO_3$ substrates . The films were grown using Pulsed Laser Deposition allowing for control of composition and thickness. X-ray diffraction measurements verify epitaxial growth and the chemical composition. Atomic force microscopy shows that the LPCMO forms an atomically smooth surface. The metal to insulator transition is clearly observed near 130K. SQUID measurements show that the magnetization does not saturate at 10 K in a magnetic field of 2000 Oe, and that the ferromagnetic to paramagnetic transition occurs at around 150K.

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