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Strain and Curent Induced Multiphase Coexistence in $(La_{0.5}Pr_{0.5})_{0.67}Ca_{0.33}MnO_3$ Probed by Magnetic Force Microscopy[1] FRANK RUZICKA, CHANGBAE HYUN, JUNWEI HUANG, ALFRED LEE, ALEX DE LOZANNE, Department of Physics, The University of Texas at Austin, Austin, Texas 78712, TARA DHAKAL, JACOB TOSADO, AMLAN BISWAS, Department of Physics, University of Florida, Gainesville, Florida 32611 — The ferromagnetic (FM) domain structure of a thin film $(La_{0.5}Pr_{0.5})_{0.67}Ca_{0.33}MnO_3$ sample grown on a (110) $NdGaO_3$ (NGO) substrate was investigated using low-temperature magnetic force microscopy with temperature control, an external magnetic field and an electric field across the sample. We observed that the FM domains form stable patterns with in-plane magnetization at 78K. At higher temperatures the system enters a fluid phase separated (FPS) state. The FM domains change as the voltage across the sample increases. We believe that competition between a charge-ordered insulating (COI) phase and a ferromagnetic metallic (FMM) phase exists in this FPS state and the COI phase may be driven to an FMM phase by an electric field.

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