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Giant electroresistance in strained ultrathin $La_{0.67}Sr_{0.33}MnO_3$ films[1] IN HAE KWAK, AMBIKA SHAKYA, ASHKAN PAYKAR, HECTOR LACERA OTALORA, AMLAN BISWAS, Department of Physics, University of Florida, Gainesville, FL 32611 — We investigated the effect of an electric current on the transport properties of microstructured $La_{0.67}Sr_{0.33}MnO_3$ (LSMO) thin films. Pulsed laser deposition was used to grow atomically smooth thin films of LSMO on singly terminated $SrTiO_3$ (STO) substrates. The microstructure pattern was designed to restrict conduction either in the direction or across the unit cell steps on the atomically smooth surfaces. Previous experiments on these thin films had suggested possible phase separation due to charge ordering near the step edges. We will present evidence that this charge ordered state can be modified by an electric current leading to large electroresistance of upto 95% for a 1 A current which is comparable to magnetoresistance values at 4 T. Interestingly, the electoresistance was large (about 65 %) even at room temperature when the current was applied along the step directions. Our results suggest possible use of ultrathin LSMO films as resistance switching devices at room temperature.

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