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**Controlling the magnetic phase of a hole-doped manganite with an out-of-plane electric field.** SUNG HEE YUN, RAJIV MISRA, A. F. HEBARD, AMLAN BISWAS, Department of Physics, University of Florida, Gainesville, FL — We have measured the effect of an electric field applied perpendicular to the plane of a  $(\text{La}_{1-y}\text{Pr}_y)_{0.67}\text{Ca}_{0.33}\text{MnO}_3$  (LPCMO) manganite thin film. Since the thickness of the film is 30 nm, the electric field across the manganite is about an order of magnitude greater than when the voltage is applied in the plane of the film. The films are grown on an insulating substrate  $\text{NdGaO}_3$  (NGO). Hence, we deposited a 30 nm LPCMO film on top of a 60 nm  $\text{La}_{0.67}\text{Ca}_{0.33}\text{MnO}_3$  (LCMO) film on an NGO substrate using pulsed laser deposition (PLD). The LCMO film is metallic below 250 K and is used as the bottom electrode to apply the voltage perpendicular to the plane of the LPCMO film. We deposited gold contacts on the LPCMO film as the top electrode. We then etched the LPCMO film, using ion plasma etching or chemical etching, leaving only a small LPCMO pillar beneath the gold contact. An indium contact was pressed on the exposed LCMO film. We then measured current-voltage (I-V) characteristics of this structure. Due to the small interelectrode distance of 30 nm the resultant electric field is high and we were able to measure the effect of an electric field on LPCMO at temperatures well above the insulator to metal transition temperature, for voltages less than 10 V.

Sung Hee Yun  
Department of Physics, University of Florida

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