

Abstract Submitted  
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**Electrically-induced magnetic reconstruction at the manganite/ferroelectric interface** J.D. BURTON, EVGENY TSYMBAL, University of Nebraska - Lincoln — The control of magnetization via the application of an electric field, known as magnetoelectric coupling, is among the most fascinating and active research areas today. In addition to fundamental scientific interest, magnetoelectric effects may lead to new device concepts for data storage and processing. Here we explore a different type of magnetoelectric effect at a ferromagnetic-ferroelectric interface: magnetic reconstruction induced by switching of electric polarization.[1] We demonstrate this effect using first-principles calculations of a  $\text{La}_{1-x}\text{A}_x\text{MnO}_3/\text{BaTiO}_3$  (001) interface, where  $A$  is a divalent cation. By choosing the doping level  $x$  to be near a transition between magnetic phases we show that the reversal of the ferroelectric polarization of  $\text{BaTiO}_3$  leads to a change in the magnetic order at the interface from ferromagnetic to antiferromagnetic. This predicted electrically induced magnetic reconstruction at the interface represents a substantial interfacial magnetoelectric effect. [1] J. D. Burton and E. Y. Tsymbal, Phys. Rev. B **80**, 174406 (2009).

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