Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Ferroelectric control of magnetism in $BaTiO_3$/Fe heterostructures[1] SARBESWAR SAHOO, University of Nebraska-Lincoln, SRINIVAS POLISETTY, CHUN GANG DUAN, SITARAM JASWAL, EVGENY TSYMBAL, CHRISTIAN BINEK — Multiferroics can offer the possibility to manipulate the cross coupled order parameters by conjugate electric and magnetic fields. Switching off ferromagnetic order by an electric field for instance promises significant impact in the design of novel spintronic devices. Here we report on the reversible control of magnetism for a Fe thin film in proximity of a $BaTiO_3$ single-crystal. Large magnetization changes emerge in response to ferroelectric switching and structural transitions of $BaTiO_3$ controlled by applied electric fields and temperature, respectively.[†] Interface strain coupling is the primary mechanism altering the induced magnetic anisotropy. As a result, coercivity changes up to 120% occur between the various structural states of $BaTiO_3$. Up to 20% coercivity change is achieved via electrical control at room temperature. Our all solid state ferroelectric-ferromagnetic heterostructures open viable possibilities for new technological applications. [†]S. Sahoo, S. Polisetty, C.-G. Duan, S. S. Jaswal, E. Y. Tsymbal, and Ch. Binek, Phys. Rev. B **76**, 092108 (2007).

[1]Work supported by NSF through career DMR-0547887, the Nebraska Research Initiative (NRI), and by NSF MRSEC DMR-0213808.

Sarbeswar Sahoo
University of Nebraska-Lincoln

Date submitted: 21 Nov 2007 Electronic form version 1.4