Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Electric-field control of magnetism in multiferroic heterostructures YONGGANG ZHAO, Tsinghua University, SEN ZHANG, Tsinghua University and National University of Defense Technology, PEISEN LI, AITIAN CHEN, Tsinghua University, DALAI LI, Beijing National Laboratory for Condensed Matter Physics, Chinese Academy of Sciences, LIFENG YANG, Tsinghua University, S. RIZWAN, Beijing National Laboratory for Condensed Matter Physics, Chinese Academy of Sciences, Y. LIU, Tsinghua University, XIA XIAO, YIZHENG WU, XIAOFENG JIN, Fudan University, XIUFENG HAN, Beijing National Laboratory for Condensed Matter Physics, Chinese Academy of Sciences, HUIYUN ZHANG, MEIHONG ZHU, Tsinghua University — We have studied electric-field control of magnetism in different multiferroic heterostructures, composed of ferromagnetic (FM) and ferroelectric (FE) materials such as Co40Fe40B20(CoFeB)/Pb(Mg1/3Nb2/3)0.7Ti0.3O3(PMN-PT) and magnetic tunnel junctions (MTJ) on PMN-PT, etc. A giant electric-field control of magnetization as well as magnetic anisotropy was observed in a CoFeB/PMN-PT structure at room temperature with a maximum relative magnetization change up to 83 percent and a 90° rotation of the easy axis. In MTJ of CoFeB/AlOx/CoFeB grown on PMN-PT, we demonstrate a reversible, continuous magnetization rotation and manipulation of tunneling magnetoresistance at room temperature by electric fields without the assistance of a magnetic field. These results show the interesting new physics and potential applications of the FM/FE multiferroic heterostructures.

Yonggang Zhao
Tsinghua University

Date submitted: 14 Nov 2014 Electronic form version 1.4