Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Four resistance states in $La_{0.7}Sr_{0.3}MnO_3$/(Ba, Sr)TiO_3/$La_{0.7}Sr_{0.3}MnO_3$ multiferroic tunnel junction at room temperature PENG XU, YUEWEI YIN, WEIJIN HU, MURALIKRISHNA RAJU, QI LI, Department of physics, The Pennsylvania State University, University Park, PA 16802, USA, XIAOGUANG LI, Hefei National Laboratory for Physical Sciences at Microscale, Department of Physics, University of Science and Technology of China, 230026, China — Multiferroic tunnel junction (MFTJ), composed of two ferromagnetic electrodes separated by a thin ferroelectric barrier, has been predicted to serve as a four-state device as a result of the coexistence of tunneling magnetoresistance and tunneling electroresistance effects. Our previous results have demonstrated such devices, but only at low temperatures. Here, we report a MFTJ composed of $La_{0.7}Sr_{0.3}MnO_3$/(Ba, Sr)TiO_3/$La_{0.7}Sr_{0.3}MnO_3$ fabricated by pulsed-laser deposition. A typical R-H loop with a sharp-switched resistance states (magnetic parallel and antiparallel) similar to that of magnetic tunnel junctions has been observed up to room temperature. Upon polarization reversal of the barrier, both the parallel and antiparallel resistances will switch to a different value. Clear tunneling magnetoresistance and tunneling electroresistance, hence the four-resistance states, have been observed at room temperature. The resistance states can be switched between them by electric and magnetic fields and the manipulation of the states will be discussed.

Peng Xu
Dept of physics, The Pennsylvania State University,
University Park, PA 16802, USA

Date submitted: 28 Nov 2010 Electronic form version 1.4