Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Magnetic state switching controlled by a voltage in $La_{0.7}Ca_{0.3}MnO_3$/(Ba, Sr)TiO_3/$La_{0.7}Ca_{0.3}MnO_3$ tunneling junctions WEIJIN HU, Department of Physics, Pennsylvania State University, University Park, PA 16802, KE CHEN, XIAOXING XI, Department of Physics, Pennsylvania State University, University Park, PA 16802 and Department of Physics, Temple University, Philadelphia, PA 19122, QI LI, Department of Physics, Pennsylvania State University, University Park, PA 16802, ZHIDONG ZHANG, Shenyang National Laboratory for Materials Science, Institute of Metal Research, CAS, Shenyang 110016, China — We report the switching of the two magnetic states (parallel and antiparallel states) in $La_{0.7}Ca_{0.3}MnO_3$/(Ba, Sr)TiO_3/$La_{0.7}Ca_{0.3}MnO_3$ magnetic tunneling junctions by measuring the tunneling magnetoresistance after applying a voltage pulse. The junction size ranges between 5x5 to 20x20 μm^2 with the barrier thickness in the range of 1-3 nm. We have found that magnetic state of the junction can be switched both from the antiparallel to parallel state and from the parallel to antiparallel state in certain and different field ranges, respectively. The switching does not depend on the polarity of the electrical field direction and the magnetic field direction. The critical voltage for the switching depends on the magnetic field with higher voltage needed for lower magnetic field. The critical voltage depends almost linearly on the bias magnetic field when the switch occurs.

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Date submitted: 28 Nov 2010 Electronic form version 1.4