Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Enhanced Tunneling Electroresistance by Interfacial Phase Transitions in Ultrathin Oxide Heterojunctions LU JIANG, University of Tennessee, WOO SEOK CHOI, HYOUNGJEEN JEEN, Oak Ridge National Lab, SHUAI DONG, Southeast University, YUNSEOK KIM, Oak Ridge National Lab, TAKESHI EGAMI, University of Tennessee, HO NYUNG LEE, SERGEI V. KALININ, Oak Ridge National Lab, ELBIO DAGOTTO, University of Tennessee — The ferroelectric (FE) control of electronic transport is one of the emerging technologies. Many previous studies in FE tunnel junctions (FTJs) exploited solely the differences in the electrostatic potential across the FTJs that are induced by changes in the FE polarization direction. In this work, by using ultrathin $PbZr_{0.2}Ti_{0.8}O_3$/(La,Sr)MnO_3 heterojunctions, we present that in practice the junction current ratio between the two polarization states can be further enhanced when correlated electron oxides are used as electrodes, and that FTJs with nanometer thin layers can effectively produce a considerably large electroresistance ratio at room temperature. To understand these surprising results, we employed an additional control parameter, which is related to the crossing of electronic and magnetic phase boundaries of the correlated electron oxide. Our study highlights that the strong coupling between degrees of freedom across heterointerfaces could yield versatile and novel applications in oxide electronics. *The work was supported by the U.S. Department of Energy, Basic Energy Sciences, Materials Sciences and Engineering Division.

Lu Jiang
University of Tennessee

Date submitted: 15 Nov 2013 Electronic form version 1.4