Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Space-Charge Induced Pauli Blockade Effect in Tunnel Junctions with Half-Metallic Electrodes[1] A. P. LI, T.-H. KIM, X.-G. ZHANG, Oak Ridge National Laboratory, J. F. FENG, X. F. HAN, Chinese Academy of Science, Y. WANG, J. ZOU, The University of Queensland, D. B. YU, Grirem Advanced Materials Co., Ltd., H. YAN, Beijing University of Technology — A space-charge induced Pauli spin blockade effect has been observed in the magnetic tunnel junction consisting of $La_{0.7}Sr_{0.3}MnO_3$ (LSMO) electrodes and $SrTiO_3$ barrier at temperatures up to 100 K. The blockade voltage under zero magnetic field provides a direct measurement of the energy gap between the Fermi energy and the top of the minority spin valence band of the LSMO. Outside the spin blockade regime, the low temperature conductance oscillates with the bias voltage as the trap centers are charged by electrons. The spin blockade can be lifted when the trap levels are thermally activated or when a large magnetic field lowers the LSMO minority spin mobility edge to below the Fermi energy. A very large magnetoresistance up to 10000% is observed and is correlated to the blockade effect. *Email: apli@ornl.gov

[1]A portion of this research was conducted at the Center for Nanophase Materials Sciences, which is sponsored at Oak Ridge National Laboratory by the Division of Scientific User Facilities, U.S. Department of Energy.

Taehwan Kim
Oak Ridge National Laboratory

Date submitted: 27 Nov 2007 Electronic form version 1.4