Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Anomalous Transport in $Ca_{1-y}Sr_yMnO_3$ ($0 \leq y \leq 0.75$) * CORNELIU CHIORESCU, JOSHUA COHN, University of Miami, JOHN NEUMEIER, Montana State University — Electron-doped manganites such as $Ca_{1-x}La_xMnO_3$ have attracted considerable interest in recent years due to their inhomogeneous magnetic ground state, consisting of nanoscale ferromagnetic (FM) droplets and/or spin canted clusters within a G-type antiferromagnetic matrix.[1] The nominally undoped (Mn^{4+}) $Ca_{1-y}Sr_yMnO_3$ compounds [for which T_N increases from 125 K (y=0) to 200 K (y=0.75)] have a small electron concentration, $n \sim 10^{18}cm^{-3}$, associated with native defects. We report transport measurements on these materials that reveal an unusual transition at a characteristic temperature, $T^* \sim (0.5 - 0.8)T_N$. For $T < T^*$ the thermopower decreases abruptly in magnitude and the resistivity exhibits a switching phenomenon. The latter consists of current and temperature sensitive jumps between low- and high-resistance states differing by more than an order of magnitude. The phenomenon is reproducible with thermal cycling and exhibits no hysteresis. Two possible interpretations will be discussed: an intrinsic effect associated with nanoscale FM inhomogeneity, and an extrinsic surface effect.

* Supported by NSF Grant No.s DMR-0072276 (Univ. Miami) and DMR-0301166 (Montana St. Univ.)

[1] J. J. Neumeier and J. L. Cohn, Phys. Rev. B **61**, 14319 (2000); C. D. Ling *et al.*, Phys. Rev. B **68**, 134439/1-8 (2003); E. Granado *et al.*, *ibid.*, 134440/1-6 (2003).

Joshua Cohn
University of Miami

Date submitted: 01 Dec 2004 Electronic form version 1.4