Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Heat capacity study of magneto-electronic phase separation in La1-xSrxCoO3 single crystals.[1] C. HE, University of Minnesota, S. EISENBERG, C. JAN, University of Minnesota, H. ZHENG, J.F. MITCHELL, Argonne National Laboratory, J.W. LYNN, National Institute for Standards and Technology, C. LEIGHTON, University of Minnesota — We present an investigation of the specific heat (0.35 K $< \quad T \quad <$ 270 K) and ordinary Hall effect (300 K) in $La_{1-x}Sr_xCoO_3$ single crystals ($0.00 < \quad x \quad < 0.30$). The data reveal new information on the nature of the percolation transition, the crystal and electronic structure, and the magneto-electronic phase separation. The observations include a discontinuity in Debye temperature accompanying the percolation-type insulator-metal transition and a large electron mass enhancement, likely due to strong electron correlation effects. The various contributions to the heat capacity provide a detailed picture of the evolution of the phase-separated state with doping. Most importantly, this provides strong evidence for the unanticipated result that the phase separation is restricted to a well-defined doping range, $0.04 < \quad x \quad < 0.22$, in close agreement with recent small-angle neutron scattering.

[1]Work supported by DoE and NSF.

C. He
University of Minnesota

Date submitted: 20 Nov 2008 Electronic form version 1.4