Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

**Emergence of Magnetism in $\mathbf{La_{1-x}Sr_xCoO_3}$** D. PHELAN, DESPINA LOUCA, S.-H. LEE, University of Virginia, Dept. of Physics, S. ROSENKRANZ, J.F. MITCHELL, Materials Science Division, Argonne National Laboratory — Orbital, spin, and charge degrees of freedom play a central role in the physics of CMR-type transition metal perovskite oxides. $La_{1-x}Sr_xCoO_3$ is a system in which a ferromagnetic, metallic state emerges when holes are doped into the parent compound, a non-magnetic, Mott insulator in the ground state. We have studied this system using elastic and inelastic neutron scattering techniques on single crystals with $0 \leq x \leq 0.2$. With hole doping the ferromagnetic correlations between Co spins become static and isotropically distributed due to the formation of ferromagnetic droplets. The correlation length and condensation temperature of these droplets increase rapidly with metallicity due to the double exchange mechanism. Diffuse spin dynamics appear as the correlation length increases. The dynamics are broad in energy indicative of a spin wave continuum.

Daniel Phelan
University of Virginia

Date submitted: 30 Nov 2005 Electronic form version 1.4