MAR11-2010-003181

Abstract for an Invited Paper
for the MAR11 Meeting of
the American Physical Society

Possible link of a structurally driven spin flip transition and the insulator-metal transition in the perovskite $La_{1-x}Ba_xCoO_3$

DESPINA LOUCA, University of Virginia

The intricate nature of the magnetic ground state near the insulator-metal transition (IMT) in $La_{1-x}Ba_xCoO3$ was investigated via neutron scattering. For x less than the critical concentration, x_c $\sim$0.22, a commensurate antiferromagnetic (AFM) phase initially appears. As x approaches x_c, the AFM component continuously weakens while ferromagnetic (FM) order sets in the rhombohedral lattice. The two magnetic phases appear to be growing in different domains and have different ordering temperatures, with the FM order parameter setting in first at higher temperatures while the AFM order parameter occurs at lower temperatures. At x_c, a spin flip to a new FM state occurs while the crystal transforms to an orthorhombic (Pnma) symmetry. The magnetic Pnma phase coincides with the minimum saturation reached in the resistivity. It is proposed that the orbital overlap in the Pnma phase is the most conducive to charge hopping.