

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Coupling of the magnetic structure to crystal phase transition in $\text{La}_{1-x}\text{Ba}_x\text{CoO}_3$ PENG TONG, JUAN YU, DESPINA LOUCA, Dept. of Physics, University of Virginia, QINGZHEN HUANG, National Institute of Standards and Technology — The addition of charge carriers into the perovskite LaCoO_3 leads to a ferromagnetic (FM) state that becomes metallic via the double-exchange interaction mechanism. Neutron scattering showed that in $\text{La}_{1-x}\text{Ba}_x\text{CoO}_3$, the FM order coexists with an antiferromagnetic (AFM) order that is initially incommensurate and becomes commensurate when $x > 0.15$. We investigated the magnetic structures of $x = 0.17 - 0.22$ by performing powder neutron diffraction at 10 K. For $x = 0.17$, only the AFM phase is present and can be indexed with a propagation vector of $(0, -0.5, 0.5)$. The Co moments lie in the ab plane of the rhombohedral ($R\bar{3}c$) lattice in the hexagonal setting. With increasing x , the FM phase appears with the Co moments pointing along $(001)_{\text{rhom}}$ and becomes dominant. At $x = 0.22$, the AFM order vanishes while the crystal structure transforms from rhombohedral to orthorhombic (Pnma) with the moments pointing along the $(001)_{\text{ortho}}$ direction.

Peng Tong
Dept. of Physics, University of Virginia

Date submitted: 04 Jan 2010

Electronic form version 1.4