

Abstract Submitted  
for the MAR07 Meeting of  
The American Physical Society

**Spin band gap and emerging low energy excitations in a doped cobaltate perovskite** ANDREI SAVICI, IGOR ZALIZNYAK, GENDA GU, Brookhaven National Laboratory, YING CHEN, NIST, VASILE GARLEA, Oak Ridge National Laboratory — We investigated spin dynamics in half doped cobaltate  $\text{La}_{1.5}\text{Sr}_{0.5}\text{CoO}_4$ , using inelastic neutron scattering. At high temperatures we observe a broad band of continuum antiferromagnetic dynamic spin correlations, extending to energies above 20 meV. As temperature decreases below spin ordering transition ( $T_{SO} = 30\text{K}$ ), a single coherent magnon mode emerges at low energies (bandwidth  $\sim 15$  meV), separated by an energy band gap from a broad continuum scattering residing at high energies  $20 \leq E \leq 30$  meV. This points to an emerging 2D-XY behavior of spins, consistent with the strong planar anisotropy of this material.

Andrei Savici  
Brookhaven National Laboratory

Date submitted: 17 Nov 2006

Electronic form version 1.4