Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Direct neutron scattering-based observation of spin excitons in $LaCoO_3$[1] S. EL-KHATIB, American University of Sharjah, D. PHELAN, University of Minnesota, J.A. BORCHERS, J. BARKER, P. BUTLER, NIST Center for Neutron Research, H. ZHENG, J.F. MITCHELL, Argonne National Laboratory, C. LEIGHTON, University of Minnesota — We report temperature-dependent small angle neutron scattering (SANS) results on undoped $LaCoO_3$ single crystals. The data reveal two main scattering components; a high q signal increasing with T above 50 K, and a low q component that turns on sharply below 60 K. The former is shown to be due to inelastic scattering quantitatively consistent with the excitations associated with the spin-state transition. Of greater interest, the low q scattering is shown to be of Guinier form, revealing scattering from a dilute assembly of magnetic objects of size approximately 15-20 nm. The abrupt onset of this scattering at 60 K, i.e. very close to the point at which prior work provided evidence of formation of interacting magnetic excitons, suggests that this represents the first direct scattering-based observation of magnetic excitons forming around O defects in $LaCoO_3$.

[1]Work supported by DOE (neutron scattering) and NSF

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Date submitted: 13 Dec 2011 Electronic form version 1.4