Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Long Range Ordering in Oxygen Doped $SrCoO_x$[1] F.J. RUECKERT, University of Connecticut, F.Z. HE, Canadian Light Source, H. MOHOTTALA, University of Hartford, J.I. BUDNICK, W.A. HINES, University of Connecticut, B. DABROWSKI, Northern Illinois University, B.O. WELLS, University of Connecticut — Recent investigations have shown magnetic phase separation in polycrystalline samples of $SrCoO_x (2.5 \leq x \leq 3.0)$.[2] As the samples are oxidized electrochemically, distinct ferromagnetic phases are formed at $SrCoO_{2.75}$ (T_C = 165 K), $SrCoO_{2.88}$ (T_C = 220 K), and $SrCoO_3$ (T_C = 280 K). In the polycrystalline bulk samples, two magnetic phases are seen at oxygen concentrations between 2.875 and 3.0, always occurring in only a single structural phase. The distinct phases are also evident in epitaxial 100 nm films, but the mixed magnetic phase at intermediate concentrations is suppressed. The occurrence of separate magnetic phases at concentrations of 2.75 [3-1/4], 2.88 [3-1/8], and 3.0 imply an electronic ordering commensurate with the lattice. Using resonant x-ray diffraction in thin film samples, we have discovered the existence of a superlattice peak at (1/4, 1/4, 1/4), revealing a previously hidden order with a periodicity four times the basic perovskite cell in all directions.

[1]This work is supported by the NSF through contract # DMR-0907197 (UConn) and DMR-0706610 (NIU).
[2]Xie et al. Appl. Phys. Lett 99, 052503 (2011)

F. J. Rueckert
University of Connecticut

Date submitted: 22 Nov 2011 Electronic form version 1.4