Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

**Structural and magnetic properties of $SrMn_{1-x}Ru_xO_3$ perovskites**
B. DABROWSKI, S. KOLESNIK, O. CHMAISSEM, T. MAXWELL, Department of Physics, Northern Illinois University, DeKalb, IL — Ferromagnetism of $SrRuO_3$ is unique among 4d transition metal based perovskite oxides. On substitution of Mn its $T_C$ decreases from 163 K to 0 for x$\sim$0.5-0.6 followed by a formation of an antiferromagnetic insulating state at a quantum critical point. The other end member of the $SrMn_{1-x}Ru_xO_3$ family, a cubic perovskite $SrMnO_3$ is a G-type antiferromagnet with $T_N$=233 K. We have synthesized the complete $SrMn_{1-x}Ru_xO_3$ solid solution. The polycrystalline samples were characterized by neutron difraction, magnetic, and transport experiments. The incorporation of Ru in the $SrMnO_3$ matrix ($0.1 \leq x \leq 0.4$) results in a phase transition to a C-type antiferromagnetic state accompanied by a cubic-tetragonal transition. The intermediate substitution level induces a spin-glass behavior, due to competing ferro- and antiferromagnetic interactions. Mixed valence $Mn^{3+}/Mn^{4+}$ and $Ru^{4+}/Ru^{5+}$ pairs introduce additional frustration to the magnetic states. The glassy behavior can be observed for x up to 0.7 in the tetragonal structure. Supported by NSF (DMR-0302617) and the U.S. Department of Education

B. Dabrowski
Department of Physics, Northern Illinois University, DeKalb, IL

Date submitted: 20 Nov 2006 Electronic form version 1.4