Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Two-Dimensional Magnetic Correlations and Partial Long-Range Order in Geometrically Frustrated Sr_2YRuO_6 EDUARDO GRANADO, UNICAMP - Univ. Estadual de Campinas, JEFFREY W. LYNN, NIST Center for Neutron Research, RENATO F. JARDIM, USP - Univ. de Sao Paulo, MILTON S. TORIKACHVILI, San Diego State University — Geometrically frustrated magnets are fascinating materials displaying a rich variety of physical states. The simplest three-dimensional structure leading to frustrated magnetism and the first one to be investigated is the face-centered cubic (FCC) lattice with antiferromagnetic nearest-neighbor interactions. Sr_2YRuO_6 is a particular example of this, crystallizing in the ordered double perovskite structure with the Ru^{5+} ions defining an FCC magnetic network. Neutron diffraction experiments were performed on this material, revealing planar magnetic correlations that condense into a partial long-range ordered state with coupled alternate antiferromagnetic (AFM) $YRuO_4$ square layers coexisting with the short-range correlations below $T_{N1} = 32$ K. A second transition to a fully ordered AFM state below $T_{N2} = 24$ K is observed. The reduced dimensionality of the spin correlations in an FCC lattice is arguably due to a cancellation of the magnetic coupling between consecutive AFM square layers. The interesting magnetic phenomena observed here in Sr_2YRuO_6 are entirely driven by its lattice geometry, and may also occur in other FCC antiferromagnets.

Eduardo Granado
UNICAMP - Univ. Estadual de Campinas

Date submitted: 08 Nov 2012 Electronic form version 1.4