Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Interplay between magnetism and octahedra distortion in the hybrid improper multiferroic $Ca_3Mn_{1.9}Ti_{0.1}O_7$[1] FENG YE, Oak Ridge National Lab, JINCHEN WANG, Renmin University of China, JAIME FERNANDEZ-BACA, ANTONIO DOS SANTOS, Oak Ridge National Lab, BIN GAO, SANG-WOOK CHEONG, Rutger University — A novel microscopic mechanism has been proposed to search for ferroelectric material for realistic application. The instability of the polar phonon mode is driven by the simultaneous condensation of two nonpolar lattice modes associated with oxygen octahedron rotation and tilt modes, and is responsible for the polar symmetry observed in the Ruddlesden-Popper compounds. We have used single crystal neutron diffraction to investigate the temperature and pressure dependence of these oxygen octahedron distortions in $Ca_3Mn_{1.9}Ti_{0.1}O_7$ which has a structural transition at 365 K and antiferromagnetic order at 120 K. We observed a strong interplay between magnetism and the local oxygen distortion near the magnetic transition. The control of the magnetism through octahedron rotation is also discussed.

[1]Research at ORNL was sponsored by the Scientific User Facilities Division, Office of Basic Energy Sciences, U.S. Department of Energy.

Feng Ye
Oak Ridge National Lab

Date submitted: 06 Nov 2015 Electronic form version 1.4