

Abstract Submitted  
for the MAR10 Meeting of  
The American Physical Society

**Mapping the magneto-structural phases of magnetodielectric  $\text{Mn}_3\text{O}_4$** <sup>1</sup> MINJUNG KIM, X.M. CHEN, P. ABBAMONTE, S.L. COOPER, Department of Physics and Frederick Seitz Materials Research Laboratory, University of Illinois, Urbana, Illinois, 61801, USA — We report temperature-dependent x-ray diffraction and temperature- and field-dependent Raman scattering studies of single crystal samples of  $\text{Mn}_3\text{O}_4$ , which allow us to elucidate the microscopic origins of the magneto-dielectric and -elastic behaviors of this material. Among the key results: we find that the  $T_{2g}$  Raman mode exhibits a clear splitting below  $T \sim 33\text{K}$ , indicating a tetragonal-to-monoclinic structural change that coincides with the commensurate magnetic transition at  $T_2 = 33\text{K}$ ; we also show evidence for the magnetic-field induced monoclinic distortions sensitive to magnetic field direction as well as magnitude, and provide evidence for a novel field-induced phase in the intermediate field regime of  $H \parallel [1\bar{1}0]$ .

<sup>1</sup>Work supported by the U.S. Department of Energy under Award No. DE-FG02-07ER46453 and by the National Science Foundation under Grant NSF DMR 08-56321.

Minjung Kim  
Dept of Physics and Frederick Seitz Materials Research Laboratory,  
University of Illinois, Urbana, Illinois, 61801, USA

Date submitted: 23 Nov 2009

Electronic form version 1.4