

Abstract Submitted  
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**Imaging Magnetic Order in Magnetostructural Phases of Mn<sub>3</sub>O<sub>4</sub>**<sup>1</sup> XU WANG, MINJUNG KIM, S.L. COOPER, RAFFI BUDAKIAN, Department of Physics and Frederick Seitz Materials Research Laboratory University of Illinois at Urbana-Champaign, Urbana, IL 61801 — Frustration in A-site spinels due to the competition between complex structure and strong interactions has been the focus of many theoretical and experimental studies recently. Mn<sub>3</sub>O<sub>4</sub> is one such material with a three way interplay between complex lattice geometry, strong spin-lattice coupling and magnetic interactions. Mn<sub>3</sub>O<sub>4</sub> is known to have two distinct phases below the Neel temperature that differ in both structure and magnetic order, including a tetragonal phase with disordered spins, and at lower temperatures, an orthorhombic phase exhibiting long-range commensurate magnetic order. In this talk, we present a nanometer-scale imaging investigation of the transition between these two phases. With cryogenic magnetic force microscopy (MFM), we observe novel magnetic stripe patterns accompanying this phase transition. Complementary electron backscatter diffraction (EBSD) measurements indicate that the magnetic patterns are closely related to local crystalline orientation. The onset and spatial periodicity of the magnetic patterns show variations with temperature and external magnetic field. We will also discuss possible causes of this phenomenon and their implications.

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Xu Wang  
Dept of Physics and Frederick Seitz Materials Research Laboratory  
University of Illinois at Urbana-Champaign, Urbana, IL 61801

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