

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Magnetic Force Microcopy of the Magnetostructural Phases of Mn₃O₄ XU WANG, MINJUNG KIM, RAFFI BUDAKIAN, S. L. COOPER, University of Illinois at Urbana-Champaign — In this talk, we report temperature- and field- dependent magnetic force microscopy (MFM) studies of Mn₃O₄. The spinel Mn₃O₄ has novel phase structure at low temperatures due to a three-way competition between spin-orbital coupling, geometric frustration and external magnetic field. This competition could lead to complex magnetic pattern formations. A particularly interesting phase exists where the crystal lattice undergoes a transition to resolve the spin frustration due to internal and external magnetic fields. In this phase the spins were expected to be in a disordered state, but local magnetic ordering has not been explored in previous studies. We present results from our investigation of Mn₃O₄ phase space using a variable temperature MFM. Measurements were made at temperatures between 4K and 75K and in magnetic fields up to 5 tesla.

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Date submitted: 19 Nov 2010

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