Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Magnetic State of $La_{1.36}Sr_{1.64}Mn_2O_7$Probed by Magnetic Force Microscopy[1] JUNWEI HUANG, CHANGBAE HYUN, TIEN-MING CHUANG, JEEHOON KIM, ALEX DE LOZANNE, J.B. GOODENOUGH, J.S. ZHOU, U Texas at Austin, JOHN MITCHELL, LANL — We have investigated the evolution of the ferromagnetic (FM) domain structure of a single-crystal $La_{1.36}Sr_{1.64}Mn_2O_7$ with temperature and external magnetic field by using low-temperature magnetic force microscopy. We observed that the FM domains form stable treelike patterns with out-of-plane magnetization below 65 K. As the temperature increases, the FM domains begin to change gradually. Around 88 K, the magnetization changes from the out-of-plane to an in-plane direction. The in-plane FM domains almost completely disappear near the Curie temperature of this sample ($T_C \approx 110K$). Interestingly, the evolution of the FM domain patterns with temperature was seen to coincide with the change in resistivity. We also observed large changes in the magnetic structures upon thermal cycling. We concluded that the formation of FM domains is determined by the competition between the magnetostatic energy and domain-wall energy and is also associated with the 2D character of the system.

[1]Supported by NSF DMR-0308575 (AdL).

Alejandro de Lozanne
U Texas at Austin

Date submitted: 30 Nov 2007 Electronic form version 1.4