Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Observation of Nanoscale Electronic Phase Separation and Charge Density Wave in Manganites JEEHOON KIM, JUNWEI HUANG, ALEX DE LOZANNE, Department of Physics, University of Texas at Austin, J. S. ZHOU, J. B. GOODENOUGH, Texas Materials Institute, University of Texas at Austin — Scanning tunneling microscopy (STM) is used to image the surface topography and local density of states (LDOS) in the bilayer colossal magnetoresistance (CMR) material LSMO below the Curie temperature. While our STM is capable of atomic resolution, on this surface the smallest features are randomly distributed islands with a lateral size of $\sim$1 nm. We obtained conductance maps to investigate the local electronic structure associated with these islands. The 2-D cross-correlation map between the gap map and the topography suggests a random distribution of three different domains which are Mn^{3+}rich, Mn^{4+} rich or mixed valence $Mn^{3/4}$. The spectroscopic data show a large gap around 600 meV. We also observed some modulations in the conductance map. The Fourier transform of the conductance map shows two major modulations with 1.6 nm and 60 nm wavelength along the crystal axis. The 1.6 nm wavelength modulation can be explained by charge density wave (CDW) model resulting from a Fermi surface instability.

Jeehoon Kim
Department of Physics, University of Texas at Austin

Date submitted: 02 Dec 2006 Electronic form version 1.4