Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Suppression of charge stripes in highly strained, epitaxial $La_{5/3}Sr_{1/3}NiO_4$ films CHANGKUN XIE, BARRETT WELLS, Department of Physics, University of Connecticut, CT 06269-3046, FEIZHOU HE, Canadian Light Source, University of Saskatchewan,Saskatoon, Canada, ARNOLD MOODENBAUGH, Materials Science Department, Brookhaven National Laboratory, Upton, NY 11973 — We have successfully grown epitaxial $La_{5/3}Sr_{1/3}NiO_4$ films with a small crystalline mosaic using pulsed laser deposition. Using synchrotron radiation, the x-ray diffraction peaks associated with charge stripes have been successfully observed for relatively thick films with little strain. Anomalies due to the charge-ordering transition have been examined using four-point probe resistivity measurement. We also have produced highly strained films with the same total thickness through the use of multilayers of $La_{5/3}Sr_{1/3}NiO_4$ alternating with $SrTiO_3$. These films remain under in-plane tension. A thorough search for the charge stripe peaks in the strained multilayers has been negative; the stripes appear to be suppressed under these conditions. This suggests that electron-lattice interactions are critical for the formation of stripe phases. This work is supported through NSF DMR-0239667. Some data was taken at the National Synchrotron Light Source, Brookhaven National Laboratory, which is supported by the U.S. Department of Energy, Division of Materials Sciences and Division of Chemical Sciences.

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Date submitted: 03 Dec 2006 Electronic form version 1.4