Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Advanced electron microscopy characterization of tri-layer rare-earth oxide superlattices PATRICK PHILLIPS, University of Illinois - Chicago, ANKIT DISA, SOHRAB ISMAIL-BEIGI, Yale University, ROBERT KLIE, University of Illinois - Chicago, UNIVERSITY OF ILLINOIS - CHICAGO TEAM, YALE UNIVERSITY TEAM — Rare-earth nickelates are known to display complex electronic and magnetic behaviors owed to a very localized and sensitive Ni-site atomic and electronic structure. Toward realizing the goal of manipulating of the energetic ordering of Ni d orbitals and 2D conduction, the present work focuses on the experimental characterization of thin film superlattice structures consisting of alternating layers of $LaTiO_3$ and $LaNiO_3$ sandwiched between a dull insulator, $LaAlO_3$. Using advanced scanning transmission electron microscopy (STEM)-based methods, properties such as interfacial sharpness, electron transfer, O presence, and local electronic structure can be probed at the atomic scale, and will be discussed at length. By combining both energy dispersive X-ray (EDX) and electronic energy loss (EEL) spectroscopies in an aberration-corrected STEM, it is possible to attain energy and spatial resolutions of 0.35 eV and 100 pm, respectively. Focus of the talk will remain not only on the aforementioned properties, but will also include details and parameters of the acquisitions to facilitate future characterization at this level.

Patrick Phillips
University of Illinois - Chicago

Date submitted: 14 Nov 2014 Electronic form version 1.4