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Properties of epitaxial $LaMnO_3/SrTiO_3$ interfaces. HANS M. CHRISTEN, DAE HO KIM, HO NYUNG LEE, MARIA VARELA, LEON PETIT, THOMAS SCHULTHESS, Oak Ridge National Laboratory — Electronic effects at interfaces between dissimilar oxides are known to have fundamental consequences on their transport and magnetic properties. Interfaces between the band insulator $SrTiO_3$ and the antiferromagnetic charge-transfer insulator $LaMnO_3$ provide a particularly interesting platform to test such effects. Both perovskites are grown epitaxially by pulsed-laser deposition, and electron energy loss spectra (EELS) collected in a scanning transmission electron microscope (STEM) show interfacial valence changes on the Mn-sites, while Ti remains in a 4+ state even in direct contact with the LaO layer of the $LaMnO_3$. This observation is fully consistent with computational results obtained for such structures using the self-interaction corrected (SIC) local spin density (LSD) method. In this presentation, we discuss the physical origin and consequences of these valence changes in single interfaces as well as $LaMnO_3/SrTiO_3$ superlattices. This research was sponsored by the Office of Basic Energy Sciences, Division of Materials Sciences and Engineering, U.S. Department of Energy, under contract DE-AC05-00OR22725 with Oak Ridge National Laboratory (ORNL), managed and operated by UT-Battelle, LLC, and ORNL's Laboratory Directed Research and Development Program.

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