Abstract Submitted
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An atomic resolution view at oxidation states in transition metal oxide heterostructures[1] M. VARELA[2], S.J. PENNYCOOK, Oak Ridge National Laboratory, T.J. PENNYCOOK, W. LUO, S.T. PANTELIDES, Vanderbilt University, J. GARCIA-BARRIOCANAL, F.Y. BRUNO, C. LEON, J. SANTAMARIA, Universidad Complutense — In $LaMnO_3/SrTiO_3$ (LMO/STO) superlattices the LMO/STO relative layer thickness ratio changes the degree of epitaxial strain within the layers and dramatically affects the physical properties of the system, which can be tuned from insulating, mild ferromagnetic, to metallic ferromagnets. Such behaviors are ultimately related to the oxygen - 3d metal bonds and hence to the occupancies of the partially filled 3d bands, which define their oxidation state. In this talk we will review procedures to measure oxidation states in manganites from electron energy loss spectra obtained in the aberration corrected scanning transmission electron microscope, and apply these techniques to imaging subtle O displacements and measure their effects on the electronic properties of LMO/STO interfaces. These results will be discussed and combined with density functional theory, in connection with the magnetotransport properties.

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