Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Electron Doping by Charge Transfer at $LaFeO_3/Sm_2CuO_4$ Epitaxial Interfaces JACOBO SANTAMARIA, F.Y. BRUNO, GFMC. Dpt. Applied Physics. U. Complutense, M. VARELA, Materials science and Technology Div. Oak Ridge National Laboratory. Tn 37831-6071, J. GARCIA-BARRIOCANAL, A. RIVERA, R. SCHMIDT, C. LEON, GFMC. Dpt. Applied Physics. U. Complutense, P. THAKUR, J.C. CEZAR, N.B. BROOKES, European Synchrotron Radiation Facility (ESRF)B.P. 220 Grenoble Cedex 38043 France, M. GARCIA HERNANDEZ, Instituto de Ciencia de Materiales ICMM CSIC 28049 Madrid, E.R. DAGOTTO, S.J. PENNYCOOK, Materials science and Technology Div. Oak Ridge National Laboratory. Tn 37831-6071 — We examine the interfacial charge transfer in epitaxial heterostructures formed between Mott insulating Sm_2CuO_4 (SCO) and charge transfer insulator $LaFeO_3$ (LFO) in LFO/SCO superlattices. High resolution EELS measurements at the O-K edge have provided evidence for 0.09+/-0.01 extra electrons in the SCO d- band as revealed by a reduction of the Cu oxidation state. The transfer of electrons from LFO to SCO is further supported by the spectroscopic signature of Cu^{1+} as obtained from XAS measurements. Transport measurements have evidenced a metallic state at the interface between two nominally insulating materials. Dielectric spectroscopy measurements have allowed ascribing the metallic state to the LFO/SCO interfaces, consistent with DC measurements. When lowering the temperature a metal to insulator transition occurs at 120 K, indicating, in accordance with the phase diagram, an insufficient doping level to enter a superconducting state.

Jacobo Santamaria
GFMC. Dpt. Applied Physics. U. Complutense

Date submitted: 13 Nov 2012 Electronic form version 1.4