Abstract Submitted
for the CAL10 Meeting of
The American Physical Society

Depth-resolved electronic structure of an LSMO/STO/LSMO magnetic tunnel junction via standing-wave excited angle-resolved photoemission ALEXANDER GRAY, Department of Physics, University of California Davis, CA, USA, MARK HUIJBEN, Faculty of Science and Technology, University of Twente, Enschede, The Netherlands, SEE-HUN YANG, IBM Almaden Research Center, San Jose, CA, USA, CHARLES FADLEY, Department of Physics, University of California Davis, CA, USA — We have quantitatively determined electronic, chemical and structural profile of the LSMO/STO/LSMO magnetic tunneling junction via soft and hard x-ray standing-wave excited photoemission, x-ray absorption and x-ray reflectivity, in conjunction with x-ray optical and core-hole multiplet theory. Epitaxial multilayer samples consisting of 48 and 120 bilayers of LSMO and STO, each nominally four unit cells thick, were studied. By varying incidence angle around the Bragg condition, the standing wave is moved through the sample. Depth-resolved standing-wave excited soft x-ray ARPES shows distinctly different $\boldsymbol{k}$-space maps of Mn 3d e_g and t_{2g} states from the bulk-like and interface-like regions of the LSMO. The soft x-ray photoemission data exhibit a shift in the position of the Mn 3p peak which is not observed for the peaks in any other element; combined with core-hole multiplet theory calculations incorporating Jahn-Teller distortion, these results indicate a change in the Mn bonding state near the STO/LSMO interface.

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Date submitted: 28 Sep 2010 Electronic form version 1.4