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**Local Electronic Structure at Oxide-Oxide Interfaces Probed by Atomic Resolution Electron Energy Loss Spectroscopy**[1] AMISH SHAH, Dept. of Mat. Sci. Eng., Univ. of Illinois, Urbana-Champaign, Q. M. RAMASSE, National Center for Electron Microscopy, Lawrence-Berkeley National Laboratory, S.J. MAY, Materials Science Division, Argonne National Laboratory, J.G. WEN, Materials Res. Lab., Univ. of Illinois, Urbana-Champaign, J.N. ECKSTEIN, Dept. of Physics, Univ. of Illinois, Urbana-Champaign, A. BHATTACHARYA, Materials Science Division, Argonne National Laboratory, J.M. ZUO, Dept. of Mat. Sci. Eng., Univ. of Illinois, Urbana-Champaign — We report an atomic resolution study of the electronic structure of 12 x 4 $LaMnO_3$-$SrMnO_3$ and 2 x 2 $LaMnO_3$-$SrTiO_3$ superlattices and their interfaces grown on $SrTiO_3$ by EELS. We correlated the interfacial electronic structure with the interfacial atomic structure using atomic resolution Z-contrast STEM using an electron probes of <0.1 nm. The oxide superlattices were synthesized using molecular beam epitaxy. We measured the site-specific unoccupied states of oxygen atoms and transition metals. In the LMO-SMO system we found extra states (holes) near the Fermi level and their dependence on abruptness of interface. In LMO-STO, we will present evidence of site-dependent electronic structure of oxygen and the Mn valence based on the L-edge ratios.

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Jian-Min Zuo
Dept. of Mat. Sci. Eng., Univ. of Illinois, Urbana-Champaign

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