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Probing tailored octahedral modulations in isovalent manganite superlattices with standing-wave-excited angle-resolved photoemission WEIBING YANG, RAVINI CHANDRASENA, Department of Physics, Temple University, Philadelphia, PA, USA, EUN JU MOON, Department of Materials Science and Engineering, Drexel University, Philadelphia, PA, USA, ARIAN ARAB, Department of Physics, Temple University, Philadelphia, PA, USA, VLADIMIR STROKOV, Swiss Light Source, Paul Scherrer Institute, Villigen, Switzerland, STEVEN MAY, Department of Materials Science and Engineering, Drexel University, Philadelphia, PA, USA, ALEXANDER GRAY, Department of Physics, Temple University, Philadelphia, PA, USA — Tailoring and spatially-confining electronic and ferroic behavior via coherent epitaxy offers a promising avenue towards engineering new functional properties in complex oxide heterostructures [1]. Here we utilize soft x-ray standing-wave photoemission spectroscopy to non-destructively probe depth-dependent electronic structure of isovalent manganite superlattices wherein the electronic and magnetic properties are modulated with depth via O octahedra rotations. Standing-wave-excited spectroscopy of the Mn 2p and O 1s core-levels confirms isovalent nature of the Mn ions in the superlattice and reveals significant depth-dependent variations in the local chemical and electronic environment around the O atoms consistent with rotational modulations of the O octahedra. Momentum-resolved standing-wave spectroscopy reveals modulations in the valence-band dispersion of the strongly-hybridized Mn and O states.
[1] E. J. Moon et al., Nature Comm. 5, 5710 (2014).

Weibing Yang
Temple Univ

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