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Probing Momentum-Resolved Orbital Polarization at the Oxide Interfaces with SW-ARPES ARIAN ARAB, Department of Physics, Temple University, SLAVOMIR NEMSAK, Peter-Grunberg-Institut PGI-6, Forschungszentrum Julich, GIUSEPPINA CONTI, Department of Physics, UC Davis; Materials Sciences Division, LBNL, VLADIMIR STROCOV, Swiss Light Source, PSI, MARK HUIJBEN, University of Twente, JAN MINAR, Department Chemie, Universitat Munchen; University of West Bohemia, CHARLES FADLEY, Department of Physics, UC Davis; Materials Sciences Division, LBNL, ALEXANDER GRAY, Department of Physics, Temple University — Interface electronic structure is critical to the functional properties of strongly-correlated multilayer systems such as the $La_{0.7}Sr_{0.3}MnO_3/SrTiO_3$ heterostucture, a promising candidate for a magnetic tunnel junction. Recently it was demonstrated that for periodic superlattice samples controllable depth selectivity in angle-resolved photoemission spectroscopy (ARPES) can be accomplished by setting up an x-ray standing-wave (SW) field in the sample and translating it vertically along the surface normal by varying x-ray incidence angle. Here, by varying polarization of the incident x-rays we add orbital sensitivity to SW-ARPES, thus allowing us to distinguish momentum-resolved electronic dispersions for the electronic states of different symmetries (e.g. x^2-y^2 and $3z^2$-r^2). Distinctly different momentum-resolved orbital polarization maps are obtained for the bulk-like and interface-like Mn 3d electronic states. The results are compared to state-of-the-art first-principles calculations. Future directions and applications are discussed.

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