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Momentum-resolved view of mixed 2D and nonbulklike 3D electronic structure of the surface state on $SrTiO_3$ (001) N.C. PLUMB, Swiss Light Source, Paul Scherrer Institut, CH-5232 Villigen-PSI, Switzerland, M. SALLUZZO, CNR-SPIN, Complesso Universitario Monte S. Angelo, Via Cinthia I-80126, Napoli, Italy, E. RAZZOLI, Swiss Light Source, Paul Scherrer Institut, CH-5232 Villigen-PSI, Switzerland, M. MANSSON, Laboratory for Neutron Scattering, Paul Scherrer Institut, CH-5232 Villigen-PSI, Switzerland, J. KREMPASKY, C.E. MATT, T. SCHMITT, M. SHI, J. MESOT, L. PATTHEY, M. RADOVIC, Swiss Light Source, Paul Scherrer Institut, CH-5232 Villigen-PSI, Switzerland — The recent discovery of a metallic surface state on $SrTiO_3$ may open a route to simplified low-dimensional oxide-based conductors, as well as give new insights into interfacial phenomena in heterostructures such as $LaAlO_3/SrTiO_3$. Our recent angle-resolved photoemission spectroscopy (ARPES) study demonstrates that not only quasi-2D but also non-bulklike 3D Fermi surface components make up the surface state. Like their more 2D counterparts, the size and character of the 3D components are fixed with respect to a broad range of sample preparations. As seen in previous studies, the surface state can be "prepared" by photon irradiation under UHV conditions. An extremely high fraction of the surface valence states are affected by this process, especially in relation to the stability of oxygen core level intensity during the same exposure, which points to a key role of electronic/structural changes that spread over the surface as the metal emerges.

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