Orbital-Resolved Soft X-ray Spectroscopy Measurements of \(\text{Sr}_2\text{RuO}_4\) Electronic Structure. TIM SCHULER, MPT Polymers, J. HOOPER, Tulane University, ZHIQIANG MAO, Tulane University, DAVID EDERER, Tulane University, GUO-PING ZHANG, Indiana State University, TOM CALL-COTT, University of Tennessee — Strontium ruthenate (Sr\(_2\)RuO\(_4\)) is a spin-triplet superconductor\(^1\) of the Ruddlesden-Popper (RP) series with \(n=1\). We have studied the electronic structure of single crystals of this system by density functional theory (DFT) calculations and soft x-ray emission and absorption measurements at the oxygen K edge (530 eV) and find that DFT calculations provide an excellent model to characterize the molecular orbitals corresponding to the inequivalent O sites in this perovskite compound. The linearly polarized radiation excites primarily O[1] (planar) sites at almost normal incidence and O[2] (apical) sites at grazing incidence. Our results suggest a larger level of hybridization between the Ru d and the O p states in the RuO\(_2\) planes than between the Ru and apical O atoms, which also implies more localized bonding along the apical direction than the planar direction. This work was supported by DOE grant No. DE-FG02-05ER-46183. 1)Y. Maeno, et al, Nature 372, 532 (1994).

David Ederer
Tulane University

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