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Direct experimental characterization of photoemission charge-transfer satellites. CONAN WEILAND, National Institute of Standards and Technology, ABDUL RUMAIZ, National Synchrotron Light Source II, Brookhaven National Laboratory, JOSEPH WOICIK, National Institute of Standards and Technology — Energy-loss satellites in photoelectron spectroscopy often arise due to different charge-transfer states in condensed matter systems. The specific characterization of these satellites, however, has been controversial, and different theoretical approaches may lead to contradictory characterizations. Here we demonstrate the ability of high energy resonant photoelectron spectroscopy to provide direct experimental evidence of the nature of charge transfer satellites. Analysis of the Ti $1s$ core line in SrTiO_3 reveals two satellites, located approximately 5 eV and 13 eV lower kinetic energy than the main line. High energy resonant photoelectron spectroscopy reveals that these two peaks originate from ligand $2p$ t_{2g} to metal $3d$ t_{2g} and ligand $2p$ e_g to metal $3d$ e_g charge-transfer excitations.

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