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The metal to insulator transition in manganites - evidence for changes in the kinetic energy up to 24 eV I. MAHNS, A. RUSIDY, G. NEUBER, M. BASTJAN, S. MUELLER, P. SAICHU, B. SCHULZ, M. RUEBHAUSEN, IAP, University of Hamburg, Germany, R. RAUER, Dept. of Applied Physics, Chalmers University of Technology, Goeteborg, Sweden, G. STRYGANYUK, Insti. f. Exp.Physik, University of Hamburg, Germany, K. DOERR, IFW Dresden, Germany, G. A. SAWATZKY, Dept. of Physics & Astronomy, University of British Columbia, Vancouver, Canada — The electronic response of doped manganites at the transition from the paramagnetic insulating to the ferromagnetic metallic state in $La_{0.7}Ca_{0.3}MnO_3$ and $La_{0.8}Ca_{0.2}MnO_3$ was investigated by a combination of dc conductivity, ellipsometry, and VUV-reflectance measurements covering an energy range from 0 to 24 eV. By performing a stabilized Kramer-Kronig transformation, we obtain the optical conductivity as a function of temperature around the metal to insulator transition. Our main findings are that changes in the kinetic energy exceed energies of more than 22 eV. In the spectral range between 0 and 24 eV the spectral weight is conserved within a fraction of 3/1000. The pronounced redistribution of the spectral weight between low and high energies has important ramifications for the construction and down-folding of effective low-energy Hamiltonians. We discuss the importance of local interactions to the electronic bandstructure such as the Coulomb onsite and Jahn-Teller effects.

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