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Dynamical Mean Field Approach to Charge Excitations in manganites

ANDREW MILLIS, Columbia University

The physics of the “colossal” magnetoresistance manganites is reviewed with particular attention given to atomic-scale physics related to charge dynamics. Issues covered include whether the materials should be viewed as strongly correlated (is the “U” or charge transfer energy large enough), whether the Hund’s coupling is large enough for “double exchange” physics to be relevant, and whether “polaron physics” is important. The origin of the observed isotope effect is discussed. The implications of the observed large transfer of spectral weight as temperature is varied through the magnetic transition is outlined. Open issues are summarized. The talk is based in part on Phys Rev B68, 115111 (2003) (written with B. Michaelis); in part on Phys Rev B65 224301 (2002) (written with A. Deppeler) and in part on unpublished work. The research reported here was supported by NSF through the MRSEC program.