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On the Mott Transition in $Ca_{2-x}Sr_xRuO_4$ ANSGAR LIEBSCH, Institute for Solid State Research, Research Center Juelich, 52425 Juelich, Germany — The Mott transition in multi-band materials like $Ca_{2-x}Sr_xRuO_4$ involving subbands of different widths is studied within the dynamical mean field theory [1]. Using the multi-orbital Quantum Monte Carlo method and iterated perturbation theory for the quantum impurity problem it is shown that at low temperatures inter-orbital Coulomb interactions give rise to a single first-order transition rather than a sequence of orbital selective transitions. Recent photoemission data [2] seem to confirm these results. Nevertheless, at finite temperatures, the degree of metallic or insulating behavior of the subbands differs greatly. Thus, on the metallic side of the transition, the narrow band can exhibit quasi-insulating features, whereas on the insulating side the wide band exhibits pronounced bad-metal behavior. The transition is therefore partially incomplete for individual subbands. This complexity of the quasi-particle spectra, and the difficulty of clearly identifying metallic and insulating properties at finite temperatures, presumably is the origin of contradictions between several previous works. The role of Hund's rule exchange interactions will also be discussed.
[1] A. Liebsch, Phys. Rev. B **70**, 165103 (2004); Phys. Rev. Lett. **91**, 226401 (2003).
[2] S.-C. Wang *et al.*, Phys. Rev Lett. **93**, 117007 (2004).

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