Verwey Metal-Insulator Transition in Magnetite from the Slave-Boson Approach

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We first solve the 1D Hubbard model for the spinless fermions with nearest-neighbor interaction by both Gutzwiller variational and slave-boson methods and show that these two approaches yield different results unlike in the case of the standard Hubbard model, thereby clarifying some of the discrepancies in the literature (Ref.3), then we extend the formalism to three-band Hamiltonian for magnetite. The results suggest a metal-insulator transition at a critical value for the intersite interaction.

References:
1) E.J.W. Verwey, Nature 144, 327 (1939)

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