

Hubbard Model with Hopping Interaction and Inter-Site Kinetic Correlations

Grzegorz Górski, Jerzy Mizia

Institute of Physics, University of Rzeszów, Rejtana 16A, 35-959 Rzeszów

We introduced the inter-site kinetic electron-electron correlation and hopping interaction to the Hubbard III approximation. Including it brings two spin dependent effects: the bandwidth correction and the bandshift correction, which both stimulate the ferromagnetic ground state. The bandshift correction factor causes an exchange splitting between the spin-up and spin-down spectrum, and its role is similar to the exchange interaction in the classic Stoner model. The spin dependent bandwidth correction enhanced strongly by the inter-site kinetic correlation lowers the kinetic energy of electrons by decreasing the majority spin bandwidth for some electron occupations with respect to the minority spin bandwidth. Both factors are stimulated by the hopping interaction, and they act together towards ferromagnetism. The ferromagnetic alignment is not reached for the symmetrical densities of states (DOS).