TWO-BAND FERROMAGNETIC KONDO LATTICE MODEL ON A LADDER WITH QUANTUM $S = 3/2$ CORE SPINS

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We present a numerical study of the ferromagnetic Kondo lattice model with quantum $S = 3/2$ core spins on a ladder, using the density matrix renormalization group. The model includes two e_g orbitals per site and local Coulomb interaction. We examine spin and orbital correlations for the parameters relevant for colossal magnetoresistance manganites at quarter-filling, i.e. for the filling of one e_g electron per site. We investigate the influence of the superexchange J' between core spins on the ground state and find that a small increase of J' is sufficient to induce a transition from ferromagnetic to antiferromagnetic spin order. This transition is accompanied by a change of orbital order from alternating orbital occupation to ferro-type orbital order with predominant occupation of the in-plane orbital. Furthermore, we consider the influence of doping on the spin and orbital correlations and compare these results with those found for an effective one-dimensional spin-orbital model [1], that takes the multiplet structure of the Mn ionic excited states correctly into account.

[1] M. Daghofer, A. M. Oleś, and W. von der Linden, Phys. Rev. B **70**, 184430 (2004).

9.7 cm

13.4 cm

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