

Microscopic Model Study of the Role of Second Nearest Neighbour Spin-Spin Interaction in CMR Manganites

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Received: 2.11.2016 ; Revised : 30.11.2016 ; Accepted :31.12.2016

Abstract: We report here a model study showing the effect of second nearest neighbour Heisenberg interaction on the interplay of the transverse spin fluctuation and band Jahn-Teller (JT) distortion. We have considered a double exchange (DE) model for an antiferromagnetically ordered manganite in the presence of JT interaction as an extra mechanism. The Hamiltonian is solved using Zubarev's Green's function technique to calculate the magnetic order parameters and lattice strain. The gap equations are solved numerically and self-consistently and the effect of first and second nearest neighbour Heisenberg interaction on the interplay of these order parameters is studied. Further conduction band electron density of states near Fermi level is studied. The results are in good agreement with experimental results.

Keywords: Colossal magneto-resistance; Jahn-Teller effect; Magnetization

PACS: 75.47.Gk; 71.70.Ej; 75.25.Dk

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