

Theory of spin-phonon interaction effect on the Raman active peaks in manganite system

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Abstract. We report here a microscopic theoretical model showing the influence of spin-phonon interaction on Raman active peaks in the CMR manganite systems. This model Hamiltonian for the system consists of J-T distortion in e_g band, the double-exchange interaction and the Heisenberg spin-spin interaction among the core electrons. Further the phonons are coupled to e_g band electrons, J-T distorted e_g band as well as the double exchange interaction. The phonon Green's function is calculated by Zubarev's double time Green's function technique. The Raman spectral intensity is calculated from the imaginary part of the phonon Green's function. The intensity exhibits three Raman active peaks. The influence of spin-phonon coupling on these peaks will be discussed.

Keywords. Colossal magnetoresistance, Jahn-Teller distortion, Spin-phonon interaction

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