ENERGY SPECTRUM AND CRITICAL BEHAVIOR OF TWO XY CHAINS WITH A POINT CONTACT

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We investigate the exactly solvable model system formed by two semi-infinite XY spin-1/2 chains with different exchange interaction constants and with different magnetons in longitudinal external magnetic field interacting as a point contact. The one-particle spectrum consists of two energy bands typical for each chain. The presence of a "phase boundary" leads to the scattering of exitations and to the appearance of local energy levels in certain regions of model parameters. Thus, the contact may exibit the properties of potential wall or potential well. The appearance of local level below the continuous spectrum can cause a singularities of local thermodynamic parameters such as a jump in the average magnetic moments of chain sites and in transverse pair correlator of the contact accompanied by δ-function singularity of local susceptibility at sites and (or)jumps in the local susceptibility in the applied field depending on the relation between the parameters of the chains and contact at zero temperature.

9.7 cm

13.4 cm

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