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Finite-temperature spin dynamics near the quantum critical point of transverse field Ising chain with a small longitudinal field
MÁRTON KORMOS, dell'Università di Pisa and INFN (Italy), JIANDA WU, QIMIAO SI, Rice University — When the transverse-field Ising chain at its quantum critical point is subjected to a small longitudinal field, the perturbed conformal field theory led to a field theory with an exotic E8 symmetry [1]. Recent neutron scattering experiments have provided evidence for the lightest two particles in this E8 model in the quasi-1D Ising ferromagnet CoNb_2O_6 [2]. While the zero temperature dynamic of the model is well known, its finite-temperature counterpart has not yet been systematically studied. We study the low-frequency dynamical spin structure factor at finite temperatures using the form-factor method. We show that the dominant contribution to the spin dynamics comes from the channel between two lightest particles, and demonstrate how the spin dynamics differ from a diffusion form. Using these results, we determine the temperature dependence of the NMR relaxation rate. We suggest that, for CoNb_2O_6 , measurements of the NMR relaxation rate provide a means to further test the applicability of the E8 model.

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