Spin-wave theory analytic solution of a Heisenberg model with RKKY interactions on a Bethe lattice

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Abstract

An analytic solution for the Heisenberg Hamiltonian with long-range RKKY interactions on a Bethe lattice is obtained in the semi-classical approximation ($S \rightarrow \infty$). The main difficulty that has to be overcome is the exponential growth of the number of neighbors in a Bethe lattice. We suggest a way of handling this problem and derive physically meaningful results.