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Critical Behavior of Ising Model with Long Range Correlated Quenched Impurities

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Abstract: The theoretic renormalization-group approach is applied to the study of the critical behavior of the d-dimensional Ising model with long-range correlated quenched impurities, which has a power-like correlations $r^{-(d-\rho)}$. The asymptotic scaling law is studied in the framework of the expansion in $\varepsilon=4-d$. In $d<4$, the dynamic exponent z is calculated up to the second order in ρ with $\rho=O(\varepsilon^{1/2})$. The shape function is obtained in one-loop calculation. When $d=4$, the logarithmic corrections to the critical behavior are found. The finite size effect on the order parameter relaxation rate is also studied.

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Key words: Ising model, critical behavior, quenched impurities

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