

## Thermodynamic Properties of Random Transverse Field Mixed Spin System in the Presence of Single-Ion Anisotropy

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**Abstract:** We study the thermodynamic properties of random transverse field mixed spin system in the presence of single-ion anisotropy on a square lattice. By making use of the effective field theory and a cutting approximation, the detailed phase diagrams are described and some interesting results are found under trimodal random transverse field distribution. A small single-ion anisotropy can magnify magnetic ordering region at low temperatures and existence of a large transverse field can assist the occurrence of reentrant phenomena. With increasing disorder, second-order phase transitions are shown to change into first-order phase transitions. The trajectory of the tricritical point in the phase space as a function of disorder is presented. These indicate a strong correlation with the corresponding to trimodal transverse field distribution.

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Key words: thermodynamic properties, mixed spin system, random transverse field, single-ion anisotropy, effective field theory

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