

Comparison Study of Critical Properties of the Bond-Diluted Blume-Capel Model under the Condition of Two Different Random Crystal Fields

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Abstract: Critical properties of the bond diluted Blume-Capel model with random crystal field are considered in the framework of the effective field theory. Special emphasis is placed on the comparison study of critical properties under the condition of two different random crystal fields on square lattice. Calculated results show that the random crystal field plays an important role in the determination of the order of phase transition. The distributions of different random crystal fields, such as symmetrical and dilution crystal field, lead to apparent characteristic behaviors. We not only give the description of a detailed phase diagram but also compare the difference between the critical properties of two different random crystal field distributions. This comparison study has not been revealed in previous reports.

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Key words: critical properties, bond diluted, Blume-Capel model, random crystal field

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