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Thermodynamical Properties of Spin-3/2 Ising Model in a Longitudinal Random Field with Crystal Field

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Abstract: A theoretical study of a spin-3/2 Ising model in a longitudinal random field with crystal field is studied by using of the effective-field theory with correlations. The phase diagrams and the behavior of the tricritical point are investigated numerically for the honeycomb lattice when the random field is bimodal. In particular, the specific heat and the internal energy are examined in detail for the system with a crystal-field constant in the critical region where the ground-state configuration may change from the spin-3/2 state to the spin-1/2 state. We find many interesting phenomena in the system.

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