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Phase transitions and critical phenomena in the antiferromagnetic Ising model on a layered triangular lattice

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The phase transitions in antiferromagnetic Ising model on a triangular lattice with taking into account of the interactions of next-nearest neighbors are studied using the exact and efficient replica Monte Carlo algorithm.

A behavior of phase transitions for different correlations of r of nearest neighbors and next-nearest neighbors is analyzed by the histogram methods.

The phase diagram of critical temperature dependences on the interaction value of next-nearest neighbors is plotted.

It is shown that the second order transition occurs in this model. The second nearest neighbor interactions are shown to fail to change the universality class of the critical behavior in the 3D Ising model on a layered triangular lattice.

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