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High-Temperature Cutoff Approximation of the 3D Kinetic Ising Model

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Abstract: A single-spin transition critical dynamics is used to investigate the three-dimensional kinetic Ising model on an anisotropic cubic lattice. We first derive the fundamental dynamical equations, and then linearize them by a cutoff approximation. We obtain the approximate solutions of the local magnetization and equal-time pair correlation function in zero field. In which the axial-decoupling terms $\gamma_1\gamma_2$, $\gamma_2\gamma_3$ and $\gamma_1\gamma_3$ as higher infinitesimal quantity are ignored, where $\gamma_\alpha=\tanh(2k_\alpha)=\tanh(2J_\alpha/k_\beta T)$ ($\alpha=1,2,3$. We think that it is reasonable as the temperature of the system is very high. The result of what we obtain in this paper can go back to the one-dimensional Glauber's theory as long as $k_2=k_3=0$.

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Key words: critical dynamics, 3D kinetic Ising model, high-temperature cutoff approximation

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