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Relaxation process and non-equilibrium effects in three dimensional Ising model

The research of critical point has been one of the goals of heavy ion collision. We use the Metropolis algorithm to simulate the three-dimensional Ising system and study its evolution process from non-equilibrium to equilibrium in the zero magnetic field. Due to different evolution processes have different relaxation times, the definition of average relaxation time is given, and we draw the dependence of the average relaxation time on system size, temperature, and initial configuration. In order to further explore the influence of the non-equilibrium effect on finding the critical point signal, we calculate the value of higher order cumulants at different times and find that the statistical results are affected differently by non-equilibrium in different temperature ranges.

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