Cyclic Heating-Annealing and Boltzmann Distribution of Free Energies in a Spin-Glass System

ZHOU Hai-Jun

Institute of Theoretical Physics, the Chinese Academy of Sciences, Beijing 100080, China
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Abstract: Ergodicity of a spin-glass is broken at low temperatures; the system is trapped in one of many ergodic configurational domains. Transitions between different ergodic domains are achievable through a heating-annealing procedure. If this experiment is repeated infinite times, all ergodic configurational domains will be visited with frequences that decreasing exponentially with their free energies. The mean free energy density of a spin-glass system on a random graph is calculated based on this free energy Boltzmann distribution in the present work, by means of the cavity approach.

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