

Transitions to Equilibrium State in Classical ϕ^4 Lattice

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Abstract: Statistical behavior of a classical ϕ^4 Hamiltonian lattice is investigated from microscopic dynamics. The largest Lyapunov exponent and entropies are considered for manifesting chaos and equipartition behaviors of the system. It is found, for the first time, that for any large while finite system size there exist two critical couplings for the transitions to equipartitions, and the scaling behaviors of these lower and upper critical couplings vs. the system size are numerically obtained.

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Key words: Hamiltonian system, measure synchronization, equilibrium, equipartition

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