Subdiffusive spin transport in disordered classical Heisenberg chains

Abstract: “We present a non-perturbative, mean-field theory for the Fermi-Pasta-Ulam-Tsingou model with quartic interaction, capturing the salient features of the system at all energies in the thermodynamic limit. Starting from the true Hamiltonian of the system with N degrees of freedom, we introduce a mean-field Hamiltonian. The difference (per particle) of the two, considered as a random variable with respect to the Gibbs measure, vanishes in the large N limit, in probabilistic sense. The dynamics of the mean-field Hamiltonian consists of N independent oscillation modes with renormalized frequencies. Analytical predictions drawn from the effective Langevin equations ruling the dynamics of such oscillation modes are successfully compared with the numerical data from the original Hamiltonian dynamics.”

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