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Generalized Gibbs distribution and energy localization in the semiclassical FPU problem RAFAEL HIPOLITO, CUNY-College of Staten Island, IPPEI DANSHITA, Tokyo University of Science, VADIM OGANESYAN, CUNY-College of Staten Island, ANATOLI POLKOVNIKOV, Boston University
— We investigate dynamics of the weakly interacting quantum mechanical Fermi-Pasta-Ulam (qFPU) model in the semiclassical limit below the stochasticity threshold. Within this limit we find that initial quantum fluctuations lead to the damping of FPU oscillations and relaxation of the system to a slowly evolving steady state with energy localized within few momentum modes. We find that in large systems this state can be described by the generalized Gibbs ensemble (GGE), with the Lagrange multipliers being very weak functions of time. This ensembles gives accurate description of the instantaneous correlation functions, both quadratic and quartic. Based on these results we conjecture that GGE generically appears as a prethermalized state in weakly non-integrable systems.

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