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Intermittent Fermi-Pasta-Ulam Dynamics at Equilibrium[1] DAVID CAMPBELL, Department of Physics, Boston University, CARLO DANIELI, SERGEJ FLACH, Center for Theoretical Physics of Complex Systems, Institute for Basic Sciences, Daejon, Korea — The equilibrium value of an observable defines a manifold in the phase space of an ergodic and equipartitioned many-body syste. A typical trajectory pierces that manifold infinitely often as time goes to infinity. We use these piercings to measure both the relaxation time of the lowest frequency eigenmode of the Fermi-Pasta-Ulam chain, as well as the fluctuations of the subsequent dynamics in equilibrium. We show that previously obtained scaling laws for equipartition times are modified at low energy density due to an unexpected slowing down of the relaxation. The dynamics in equilibrium is characterized by a power-law distribution of excursion times far off equilibrium, with diverging variance. The long excursions arise from sticky dynamics close to regular orbits in the phase space. Our method is generalizable to large classes of many-body systems.

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