38th MSS-Seminar
Wednesday, Sept. 12th, 15:30, Nägelsbachstr. 49b

Self-Organized Escape of Oscillator Chains in Nonlinear Potentials

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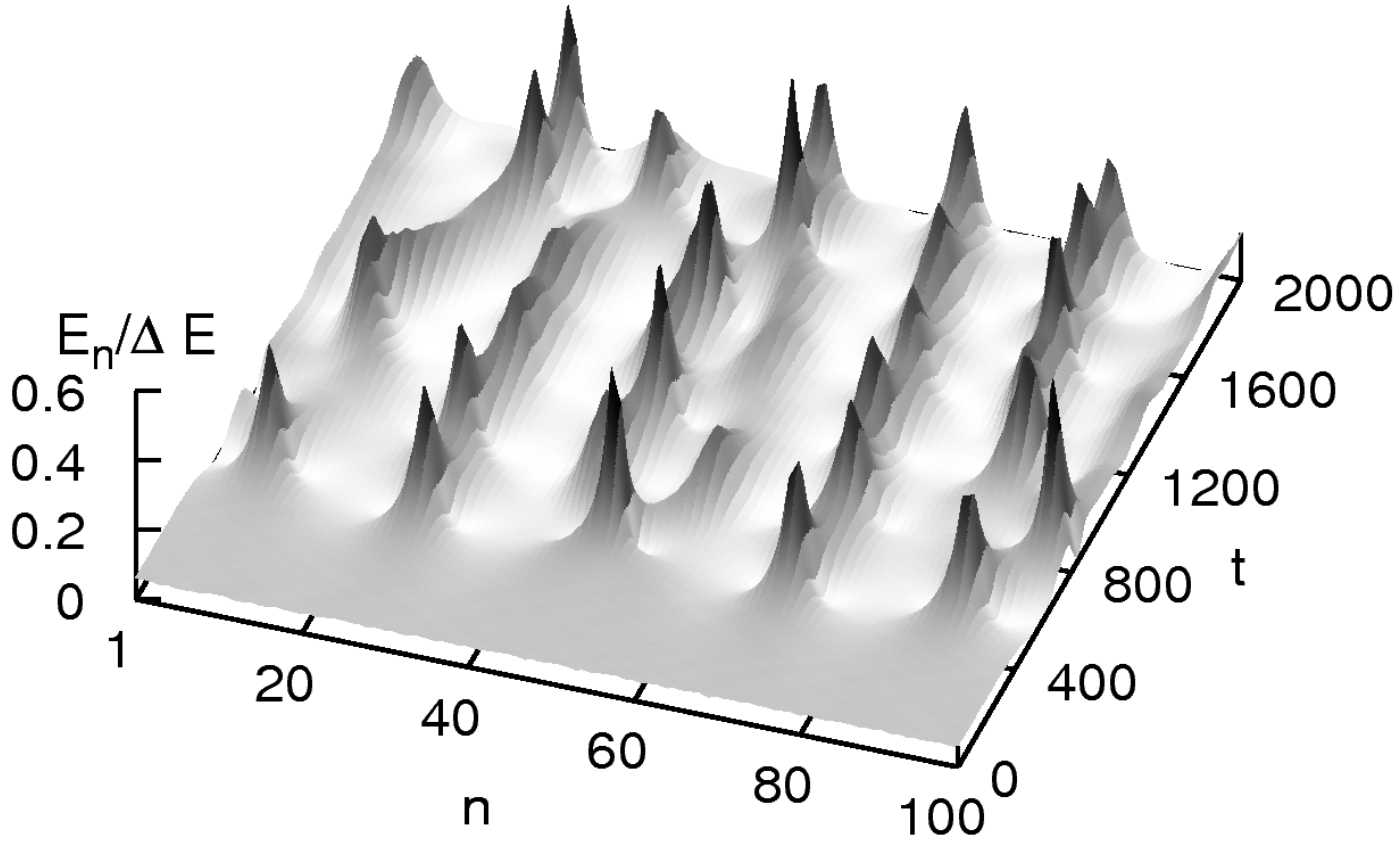

We present the noise free escape of a chain of linearly interacting units from a metastable state over a cubic on-site potential barrier. The underlying dynamics is conservative and purely deterministic. The mutual interplay between nonlinearity and harmonic interaction causes that an initially uniform lattice state becomes unstable, leading to energy redistribution with strong localisation.
As a result a spontaneously emerging localised mode grows into a critical nucleus. By surpassing this transition state, the nonlinear chain manages a self-organised, deterministic barrier crossing. Most strikingly, these noise-free, collective nonlinear escape events proceed generally by far faster than the transitions assisted by thermal noise when the ratio between the average energy supplied per unit in the chain and the potential barrier energy assumes small values.