

Abstract Submitted
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Traces of Integrability in Relaxation of One-Dimensional Two-Mass Mixtures¹ ZAIJONG HWANG, Univ of Mass - Boston, FRANK CAO, Univ of Conn - Storrs, MAXIM OLSHANII, Univ of Mass - Boston — We study relaxation in a one-dimensional two-mass mixture of hard-core particles. Special attention is paid to the region of light-to-heavy mass ratios around $m/M = \sqrt{5} - 2 = 0.236\dots$. At this mass ratio, each heavy-light-heavy subsystem constitutes a little known non-equal-mass generalization of Newton’s Cradle, and an anomalous slow-down of relaxation is expected as a result. We further list and classify all other instances of integrability in the one-dimensional three-body hard-core systems, where integrability is especially prominent at the quantum level and leads to the famous “scattering without diffraction” phenomenon. The principal experimental application of our results is with two-specie mixtures in optical lattices, in which the effective masses—that can be controlled at will—are assumed to replace the real ones.

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