

Abstract Submitted
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Lifetime and decay of seeded breathers in the FPU system¹

MATTHEW WESTLEY, NICHOLAS DEMEGLIO, SURAJIT SEN, Dept. of Physics, SUNY Buffalo, T.R. KRISHNA MOHAN, CSIR-4PI, Bangalore, India — The Fermi-Pasta-Ulam problem [1] consists of a chain of N oscillators with linear and nonlinear nearest neighbor interactions. Using velocity-Verlet integration, we study the evolution of the system after a perturbation that consists of a single stretched bond at the center of the chain [2-4]. This perturbation results in the localization of most of the system's energy in the center particles in the form of a “breather” up to reasonably long times, which leaks energy at a rate depending on the potential parameters and the perturbation amplitude. The breather eventually undergoes a catastrophic breakdown, releasing all of its energy into acoustic noise and solitary waves. We explore the conditions on the amplitude and the parameters α , β for which a seeded breather will be most or least stable. Also we show how the overlap or lack thereof between the breather's primary frequencies and the acoustic frequencies influences its long-time stability.

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