

Abstract Submitted
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Quantum effects on Fermi-Pasta-Ulam recurrence in ultracold lattice bosons¹ IPPEI DANSHITA, RIKEN, RAFAEL HIPOLITO, Boston University, VADIM OGANESYAN, City University of New York, ANATOLI POLKOVNIKOV, Boston University — We propose an experimental scheme for studying the Fermi-Pasta-Ulam (FPU) problem in a quantum mechanical regime with use of ultracold one-dimensional Bose gases in an optical lattice. In the classical limit, we identify parameter regions in which FPU recurrence can occur in this system. The strength of quantum fluctuations can be widely controlled by tuning the number of atoms per lattice sites (filling factor). To investigate the effects of quantum fluctuations on the FPU recurrence, we simulate the real time dynamics of the Bose-Hubbard model by means of the exact numerical method of time-evolving block decimation. We show that strong quantum fluctuations cause significant damping of the FPU oscillation.

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