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Quantum response to classical autoresonance ZHILU ZHANG, Carleton College, DE LUO, Carleton College, Rice University, ALI EHLEN, ARJENDU PATTANAYAK, Carleton College — A classical nonlinear oscillator can be driven to increasingly higher energy by chirping the driving frequency with a linear chirp rate chosen by various protocols, including one involving the behavior of the Teager-Keizer energy operator. We explore the auto-resonance response to linear chirping in a quantum mechanical system. Firstly, we report on the effect of applying this protocol to quantum system, particularly as the system size is changed so that the effective Planck's constant increases in size and the behavior becomes more quantum-mechanical. In addition, we discuss the systems behavior as we vary the linear chirp rate, and relate the optimal linear chirping frequencies and the system's size. We also comment on how the system reacts when introducing a noise term to such a nonlinear oscillator. Lastly, we show the transient behaviour from auto-resonance to quantum ladder climbing as the system gets more quantum-mechanical.

Arjendu Pattanayak
Carleton College

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