

Abstract Submitted
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Cold-atom Realization of the Quantum Kapitza Pendulum¹

KURT FUJIWARA, RUWAN SENARATNE, ZACH GEIGER, SHANKARI RAJAGOPAL, KEVIN SINGH, DAVID WELD, Physics Department, University of California, Santa Barbara, WELD GROUP TEAM — The Kapitza pendulum is perhaps the most famous example of dynamic stabilization in a classical single-particle system. When the pivot of a rigid pendulum is modulated in a certain range of amplitude and frequency, a new stable equilibrium appears in the upward-pointing configuration. Extensions of Kapitza stabilization to the quantum many-body regime remain completely unexplored. We report on progress towards realization of a quantum Kapitza pendulum using lithium atoms in a modulated optical lattice, and discuss prospects for mapping the dynamical phase diagram. Tunable quantum Kapitza pendula could enable a variety of exciting research directions, including investigation of the role of strong interactions, possible applications of controllable stabilization, and advances in our understanding of unconventional dynamical behavior in many-body quantum systems.

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