

Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Quantum mechanical oscillators coupled by a cavity-mediated optical spring JONATHAN KOHLER, NICOLAS SPETHMANN, SYDNEY SCHREPPLER, LUKAS BUCHMANN, DAN STAMPER-KURN, Univ of California - Berkeley — Cavity optomechanics with a single oscillator has led to many interesting results, such as generating squeezed light, quantum limited detection, and entangling optical and mechanical modes. Adding another oscillator opens new opportunities, such as two-mode back-action-evasion measurements, correlations at the quantum level, long-range interactions, and quantum information applications. I will present our recent work, realizing phase-coherent energy exchange between independent ultracold-atomic oscillators, mediated by a cavity field. The long-range coupling force is mediated by real photons in a driven-dissipative cavity, which necessarily imparts back-action noise onto the system. I will also discuss ongoing work in multi-mode mechanics and spin systems.

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Date submitted: 30 Jan 2015

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