

Abstract Submitted
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Quantum optomechanics with Cold atoms ZHAOYUAN MA, KATER MURCH, DAN STAMPER-KURN, UC Berkeley — Cavity QEDs with cold atoms have shown the potentials in realizing quantum simulation and quantum computing. As a new application of a system like it, we demonstrate the cold atoms transported into a high-finesse cavity is also a realization of quantum optomechanics where the collective motion of an atomic ensemble serves the role of a moveable optical element in an optical resonator. Experimental investigations of optomechanical effects, such as the bistability of collective atomic motion, the quantification of quantum backaction and the approach to the standard quantum limit measurement, will be presented, along with the comparison of our system to other optomechanical systems, such as those incorporating nanofabricated cantilevers or the large cavity mirrors of gravitational observatories.

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