Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Robust entanglement via optomechanical dark mode: adiabatic scheme[1] LIN TIAN, School of Natural Sciences, University of California, Merced, YING-DAN WANG, Department of Physics, McGill University, SUMEI HUANG, School of Natural Sciences, University of California, Merced, AASHISH CLERK, Department of Physics, McGill University — Entanglement is a powerful resource for studying quantum effects in macroscopic objects and for quantum information processing. Here, we show that robust entanglement between cavity modes with distinct frequencies can be generated via a mechanical dark mode in an optomechanical quantum interface. Due to quantum interference, the effect of the mechanical noise is cancelled in a way that is similar to the electromagnetically induced transparency. We derive the entanglement in the strong coupling regime by solving the quantum Langevin equation using a perturbation theory approach. The entanglement in the adiabatic scheme is then compared with the entanglement in the stationary state scheme. Given the robust entanglement schemes and our previous schemes on quantum wave length conversion, the optomechanical interface hence forms an effective building block for a quantum network.

[1]This work is supported by DARPA-ORCHID program, NSF-DMR-0956064, NSF-CCF-0916303, and NSF-COINS.

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Date submitted: 09 Nov 2012 Electronic form version 1.4