Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

**Optical bistability in cold atom cavity systems** PRASANNA VENKATESH BALASUBRAMANIAN, DUNCAN O'DELL, McMaster University, JONAS LARSON, NORDITA — Coupled cold atom-cavity/BEC-cavity systems have attracted significant attention owing to their appeal as optomechanical systems [1] and as probes of atomic many body quantum effects in a novel setting [2]. We investigate the non-linear nature of the effective Hamiltonian that describes the cavity-atom system. We analyse the energy dispersion derived from the effective Hamiltonian in regions where the atom-cavity system exhibits bistability.

[1] F. Brennecke et.al., Science **322**, 235 (2008)
[2] J.Larson et.al., Phys. Rev. Lett. **100**, 050401 (2008)

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Date submitted: 04 Feb 2010 Electronic form version 1.4