Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Single-photon light shifts of ground-state quantum beats[1] D.G. NORRIS, L.A. OROZCO, JQI, Dept. Physics, University of Maryland and NIST, College Park, MD, P. BARBERIS, IIMAS, Universidad Nacional Autonoma de Mexico, Mexico DF, Mexico, H.J. CARMICHAEL, Dept. Physics, University of Auckland, Auckland, New Zealand — We present measurements of optical correlations from a high-finesse cavity in the intermediate coupling regime, which supports two modes of orthogonal linear polarization. The combination of the two modes with the magnetic structure of 85 Rb atoms allows us to separate photons originating from spontaneous emission from those that come from the driving laser. The second-order intensity correlation function reveals quantum beats at twice the ground-state Larmor frequency for a small applied magnetic field. The beats arise from a coherent ground-state superposition that evolves in time between photon emissions. The frequency of oscillation is sensitive to different parameters of the system; in this talk we show evidence of power-dependent shifts in the oscillation frequencies, visible even at driving intensities of less than one photon on average in the cavity. We discuss a theoretical model that quantitatively includes many of the characteristics of the experiment and shows the frequency shifts.

[1]Work supported by NSF, CONACYT, and the Marsden Fund of RSNZ of New Zealand.

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Date submitted: 25 Jan 2010 Electronic form version 1.4