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Stochastic light shifts of ground-state quantum beats[1] ANDRES CIMMARUSTI, DAVID NORRIS, LUIS OROZCO, JQI, Dept. of Physics, UMD and NIST, USA, PABLO BARBERIS-BLOSTEIN, IIMAS, UNAM, Mexico, HOWARD CARMICHAEL, Dept. of Physics, University of Auckland, New Zealand — We present evidence of light shifts opposite in sign to the AC Stark shift that influence the evolution of atomic ground-state superpositions. We drive ^{85}Rb atoms, near resonance, with a mode of an optical cavity in the presence of a weak magnetic field and monitor fluctuations in spontaneous emission into an orthogonal mode. Beats appear from a coherent ground-state superposition that evolves in time between photon emissions. Analysis of intensity autocorrelations reveals oscillations at twice the ground-state Larmor frequency. The beats depend on magnetic field magnitude, laser detuning and intensity. We find that small phase shifts coming from successive spontaneous emissions cumulatively and stochastically give rise to frequency shifts, of the order of hundreds of kilohertz per photon, along with dephasing of the superpositions due to the phase diffusion process.

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