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Control of conditional quantum beats in cavity QED[1] ANDRES CIMMARUSTI, JQI, Dept. of Physics, UMD and NIST, USA, WANDERSON PIMENTA, JQI, Dept. of Physics, UMD and NIST, USA; Universidade Federal de Minas Gerais, Brazil, BURKLEY PATTERSON, LUIS OROZCO, JQI, Dept. of Physics, UMD and NIST, USA, PABLO BARBERIS-BLOSTEIN, IIMAS, Universidad Nacional Autonoma de Mexico, HOWARD CARMICHAEL, Dept. of Physics, University of Auckland, New Zealand — We present a feedback mechanism to preserve the Zeeman coherence of a conditional ground state superposition. We monitor the state by looking at quantum beats generated on the second order correlation function of the output of a driven two-mode cavity QED system. The decoherence is produced by phase diffusion due to Rayleigh scattering. We show how to prevent a shift in the Larmor frequency associated with this scattering. The protocol consists of turning off the drive of the system after the detection of a first photon and letting it evolve in the dark. Restoring the drive after a set time shows phase accumulation only from Larmor precession, and the amplitude of the quantum beat can increase by more than a factor of two with respect to continuous drive. We are exploring other protocols that rely on postselection.

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