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Steady state of two-mode cavity QED beyond the low intensity[1]
REBECCA OLSON KNELL, DAVID NORRIS, JIETAI JING, LUIS A. OROZCO, JQI-University of Maryland — Cavity QED with two orthogonal polarization modes with multilevel atoms permits the identification of spontaneous emission through the light escaping in the undriven mode. We present our experimental investigations of the steady state behavior of this system when the resonant drive of one of the cavity modes is strong. This driving regime also has entanglement that does not suffer from the intrinsic problem of a large vacuum component for the low intensity cavity QED. Our apparatus includes laser cooled Rb atoms that traverse a high finesse optical cavity. The coupling rate of the cavity mode to the atom g, the cavity decay rate κ, and the atomic fluorescence rate γ are all similar and much larger than the inverse of the single atom transit time across the mode, so that multiple interactions between the light and the atom are possible. The parameters of the experiment place it in the intermediate regime of cavity QED. We look at the transmitted light out of the cavity in the two orthogonal modes. We compare our results to a model that includes three levels, two ground states and one excited state as a function of number of atoms and drive intensity.

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Rebecca Olson Knell
University of Maryland-JQI

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