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Abstract Submitted
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Observation of Mollow Triplets with Tunable Interactions in Double Lambda Systems of Individual Hole Spins.[1] K. G. LAGOUDAKIS, K. A. FISCHER, T. SARMIENTO, P. L. MCMAHON, M. RADULASKI, J. L. ZHANG, Y. KELAITA, C. DORY, K. M. MUELLER, J. VUCKOVIC, Stanford University — Although individual spins in quantum dots have been extensively used as qubits, their investigation under strong resonant driving in view of accessing Mollow physics is still an open question. We have grown high quality positively charged quantum dots (QD) embedded in a planar microcavity that enable enhanced light matter interactions. Applying a strong magnetic field in the Voigt configuration, individual positively charged quantum dots provide a double lambda level structure. Using a combination of above band and resonant excitation, we observe the formation of Mollow triplets. We investigate the regime where the Mollow sideband splittings are equal to the Zeeman splitting; we observe strong interactions between the Mollow sidebands of the inner transitions and the outer transitions in the form of very clear anticrossings. We investigated these anticrossings and we were able to modify the observed anticrossing splittings on demand by rotating the polarization of the resonant laser. We also developed a quantum-optical model of our system that fully captures the experimentally observed spectra and provides insight on the complicated level structure that results from the strong driving of our positively charged quantum dot.

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