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Autler-Townes Spectroscopy and Electromagnetically Induced Transparency in a Superconducting Qubit J.E. ROBINSON, Laboratory of Physical Sciences, College Park, MD, S. NOVIKOV, Z.K. KEANE, B. SURI, Laboratory of Physical Sciences and University of Maryland, College Park, MD, F.C. WELLSTOOD, University of Maryland, College Park, MD, B.S. PALMER, Laboratory of Physical Sciences, College Park, MD — We examine the results from a multi-tone microwave measurement in a transmon qubit, which consists of a capacitively shunted Al/AlOx/Al Josephson junction, coupled to a 3D cavity. The system exhibits an Autler-Townes (AT) splitting, as expected from the dressed atom picture, similar to previous results.[1,2] The system shows a clean AT spectrum, in which we can show the effect of detuning on the generalized Rabi frequency of the system. We also investigate the requirements for a crossover from an AT doublet to an electromagnetically induced transparency (EIT) signal, as they relate to the limitations of our device. The coherence of our device suggests that we might be able to see a definitive EIT signature. We propose a measurement of EIT in variables that are more natural to superconducting systems, and discuss the implications of realizing EIT in superconducting qubits.

[1]M. Baur, et al. *Phys. Rev. Lett.* **102**, 243602 (2009).
[2]Mika A. Sillanpää, et al. *Phys. Rev. Lett.* **103**, 193601 (2009).

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