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Dependence of transmon qubit relaxation rate on readout drive power[1] S.O. MUNDHADA, S. SHANKAR, A. NARLA, E. ZALYS-GELLER, S.M. GIRVIN, M.H. DEVORET, Department of Applied Physics, Yale University — In circuit QED experiments, microwave drives are applied to the readout mode for qubit measurement, control and to realize various multi-photon processes. These microwave drives have been observed to detrimentally affect the qubit mode by increasing the qubit relaxation rates for both upward and downward transitions. These transitions demolish the qubit state during a measurement, limiting the maximum measurement strength and thus the readout fidelity and speed. Here, we experimentally investigate this effect for transmon qubits coupled to different realizations of the readout mode: 3-dimensional microwave cavities, strip-line resonators and nonlinear readout modes in a waveguide.

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