Abstract Submitted
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Measurements of Dephasing in Superconducting Flux Qubits[1] C.-E. WU, T. HIME, B.L.T. PLOURDE, P.A. REICHARDT, T.L. ROBERTSON, JOHN CLARKE, University of California, Berkeley — The time over which a superposition of qubit states maintains phase coherence is an important figure of merit for a qubit. One technique for measuring this dephasing time is the Ramsey fringe, consisting of two $\pi/2$ pulses detuned from resonance. Varying the time between the pulses produces a damped oscillatory fringe, with the frequency equal to the detuning from resonance and the decay time given by the dephasing time. The dephasing time can also be extracted from measurements of the spectroscopic linewidths for different excitation amplitudes. We report measurements using both techniques in a superconducting flux qubit, giving dephasing times of the order of 10 ns. We present the variation of the dephasing time with various parameters, such as qubit level splitting, readout SQUID operating point, and temperature. We compare our results with expected levels of low frequency noise in the qubit environment and discuss possible methods for enhancing the coherence, including spin echo pulse sequences.

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