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Relaxation of a Cooper-Pair Box Coupled to Discrete Charge Fluctuators

B.S. PALMER, Laboratory for Physical Sciences, Z. KIM, F.C. WELLSTOOD, JQI, CNAM, Department of Physics, University of Maryland — Recently, Kim *et al.* have reported that the interaction of a Cooper-pair box (CPB) with discrete charge fluctuators can decrease the relaxation time (T_1) of the first excited state of a CPB when operating the CPB near the transition frequency of a charged two-level system (TLS).¹ Using a density matrix approach and a 4-level Hilbert space, we have simulated the T_1 of a CPB coupled to a TLS and a dissipative bath. We model the TLS with asymmetry and tunneling parameters which we obtain along with the CPB parameters from fits to microwave spectroscopic measurements.^{2,3} To model the bath, the CPB is coupled to a source of charge noise which causes relaxation and dephasing while the TLS is coupled to its own dissipative source of energy. Results of the simulation are presented and compared to the experimental measurements.

¹Z. Kim *et al.*, Physical Review B, **78** 144506 (2008).

²Ibid.

³F. C. Wellstood, Z. Kim, and B. S. Palmer, arXiv:0805.4429.

Prefer Oral Session
 Prefer Poster Session

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