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**Quantum model for superconducting resonator loss via a two-level system** MISHKATUL BHATTACHARYA, K. OSBORN, A. MIZEL, Laboratory for Physical Sciences, University of Maryland, College Park, MD 20740 — Clarifying the mechanisms of dissipation in superconducting resonators is crucial for advancing superconducting quantum computation. The models currently employed to study dielectric loss due to two level charge fluctuators have been based largely on a classical treatment of the problem. In contrast, we carry out a quantum mechanical investigation using a dissipative Jaynes-Cummings model in which the resonator is coupled to a two-level system that is in turn coupled to a bath. We present an analysis of the dynamics of energy decay in the system, comparing its predictions to those of well-known classical models, which agree with our results in the limit of high oscillator excitation.

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