

Abstract Submitted
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Microscopic models for charge-noise-induced dephasing of solid-state qubits FÉLIX BEAUDOIN, WILLIAM A. COISH, McGill University — Several experiments have shown qubit coherence decay of the form $\exp[-(t/T_2)^\alpha]$ due to environmental charge-noise fluctuations. We present a microscopic description for temperature dependences of the parameters T_2 and α . Our description is appropriate to qubits in semiconductors coupled to spurious two-level charge fluctuators coupled to a thermal bath. We find distinct power-law dependences of T_2 and α on temperature depending on the nature of the interaction of the fluctuators with the associated bath. We consider fluctuator dynamics induced by first- and second-order tunneling with a continuum of delocalized electron states. We also study one- and two-phonon processes for fluctuators in either GaAs or Si. These results can be used to identify dominant charge-dephasing mechanisms and suppress them.

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