

Abstract Submitted
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Electromagnetic fluctuations as a source of decoherence for double quantum dot charge-based qubits¹ DIEGO VALENTE, Department of Physics, University of Central Florida, FRANK WILHELM, Institute for Quantum Computing, University of Waterloo, EDUARDO MUCCILOLO, Department of Physics, University of Central Florida — Solid-state quantum dots are strong candidates for the physical realization of qubits. They present the ubiquitous advantage of easier scalability, but also couple rather effectively to external degrees of freedom which lead to decoherence phenomena. One such source of decoherence lays in the electromagnetic fluctuations occurring in the circuits utilized for preparation and measurement of these qubits. Here we investigate these sources of decoherence in double quantum dot charge-based qubit systems. We use effective circuit models and estimates of time correlations of such fluctuations to calculate the energy (T_1) and phase (T_2) relaxation times introduced into the qubit system. We also present ideas on how to suppress some of the destructive effects of these fluctuations and increase the quality factor for quantum oscillations.

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