Abstract Submitted
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Charge noise and dynamical decoupling in singlet-triplet spin qubits[1] GUY RAMON, Santa Clara University — We consider theoretically the effects of an ensemble of fluctuating charges on the coherence of a singlet-triplet qubit in gate-defined double quantum dots. We predict a crossover behavior of the system between non-Gaussian noise and 1/f spectrum, going from mesoscopic single-qubit devices to multi-qubit larger devices. With increasing size of the fluctuator ensemble we find a narrowed distribution of qubit dephasing times that result from random sets of fluctuators. At the same time the noise becomes Markovian with a characteristic Gaussian spectrum and it is dominated by a large collection of weakly-coupled fluctuators. The efficiency of dynamical decoupling pulse sequences in restoring coherence is examined as a function of the qubit's working position and the fluctuator ensemble size. Analytical solutions for qubit dephasing in the limits of weak and strong qubit-fluctuator coupling shed light on the distinct dynamics at different parameter regimes.

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