Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Coherence preservation of a qubit inflicted by classical non-Gaussian charge noise[1] GUY RAMON, Santa Clara University — The efficiency of decoupling pulse sequences in removing noise due to several charge fluctuators is studied. Both numerical simulations and analytics are used to explore the qubit's dephasing and dissipative dynamics. Special emphasis is placed on qubit dynamics at the optimal point, where it is found that fluctuators that are strongly coupled to the qubit induce a non-Gaussian noise. Exact analytical results for this limit reveal a nontrivial scaling of the noise with the number of fluctuators. Furthermore, a crossover between distinct qubit dynamics is demonstrated by increasing the number of control pulses and/or varying the qubit's working position. While we consider as a test case exchange-coupled spin qubits in gate-defined GaAs double dots, our results are relevant to other systems such as superconducting Josephson qubits, and Si/SiGe quantum dots.

[1]Supported by NSF grant DMR-1207298

Guy Ramon
Santa Clara University

Date submitted: 13 Nov 2014 Electronic form version 1.4