

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Effect of an Ohmic environment on an optimally controlled flux-biased phase qubit** AMRIT POUDEL, MAXIM VAVILOV, University of Wisconsin-Madison — We analyze the effect of environment on the gate operation of flux-biased phase qubits. We employ the master equation for a reduced density matrix of the qubit system coupled to an Ohmic environment, described by the Caldeira-Leggett model. Numerically solving this equation, we evaluate the gate error as a function of gate time, temperature and environmental coupling strength for experimentally determined qubit parameters. Here we present the analysis for single-quadrature microwave (control) pulses as well as for two-quadrature pulses, which lower the gate error significantly for idealized systems in the absence of environment. Our results indicate that two-quadrature pulses with fixed and variable driving frequency have similar performance, which outweighs the performance of single-quadrature pulses, in the presence of environment.

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Date submitted: 18 Nov 2010

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