

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Phonon Decoherence of a Double Quantum Dot Charge Qubit¹

EDUARDO R. MUCCILOLO, University of Central Florida, SERGUEI VOROJTSOV, HAROLD U. BARANGER, Duke University — The decoherence of a lateral double quantum dot charge qubit due to coupling to piezoelectric acoustic phonons has been investigated within the Born-Markov approximation. After including appropriate form factors, we have found that phonon decoherence rates are one to two orders of magnitude weaker than earlier predictions based on the spin-boson model. We have calculated the dependence of the Q-factor on lattice temperature, quantum dot size, and interdot coupling. Our results suggest that mechanisms other than phonon decoherence play a more significant role in current experimental setups.

¹This work was supported in part by the National Security Agency and the Advanced Research and Development Activity under ARO contract DAAD19-02-1-0079.

Eduardo Mucciolo
University of Central Florida

Date submitted: 20 Mar 2013

Electronic form version 1.4