Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

A Tunable Coupling Architecture For Josephson Phase Qubits
RADOSLAW BIALCZAK, M. ANSMANN, M. HOFHEINZ, E. LUCERO, R. MCDERMOTT, M. NEELEY, A.D. O'CONNELL, H. WANG, A. CLELAND, J. MARTINIS, U.C. Santa Barbara — Previous coupled-qubit experiments with Josephson phase qubits have used a fixed coupling scheme. However, in order to create high-fidelity multi-qubit gates, a tunable coupling scheme is needed. Fixed coupling schemes cannot be used because single-qubit operations on a coupled-qubit system cannot be performed with high fidelity due to the errors induced by always-on coupling. Fixed coupling also allows for crosstalk between coupled qubits during measurement. We show how to implement a tunable-coupling architecture for Josephson phase qubits using simple linear elements. This architecture can be used to vary the interaction strength from fully-off to fully-on allowing us to get around the problems inherent with the use of a fixed coupling scheme.

Radoslaw Bialczak
U.C. Santa Barbara

Date submitted: 01 Dec 2007 Electronic form version 1.4