Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Design and Implementation of Devices for Flux Qubit Entanglement Experiments[1] PAUL REICHARDT, TRAVIS HIME, University of California, Berkeley, BRITTON PLOURDE, Syracuse University, TIMOTHY ROBERTSON, CHENG-EN WU, University of California, Berkeley, ALEXEY USTINOV, University of Erlangen-Nuremberg, JOHN CLARKE, University of California, Berkeley — We report measurements on two superconducting flux qubits coupled to a readout Superconducting QUantum Interference Device (SQUID). The chosen device parameters allow for the implementation of a fast, controllable qubit coupling scheme based on variations in the current bias of the readout SQUID in the zero-voltage state. The devices have Al-AlOx-Al tunnel junctions and were fabricated with e-beam lithography on a single substrate. Two on-chip flux bias lines allowed independent flux control of any two of the three elements. By applying microwave radiation, we observed resonant excitation of each qubit and thereby individually mapped out energy dispersions for both qubits. These dispersions displayed the expected hyperbolic dependence with tunnel splittings of 9.0 ± 0.2 GHz, which agreed well with the calculated and measured device parameters. Single qubit coherence properties including relaxation times, Rabi oscillations, Ramsey fringes, and echoes were also measured.

[1]Supported by AFOSR, ARO, ARDA, NSF, BaCaTeC

Paul Reichardt
University of California, Berkeley

Date submitted: 12 Jan 2006 Electronic form version 1.4