Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Dispersive Readout of a Superconducting Flux Qubit Using a Microstrip SQUID Amplifier[1] J.E. JOHNSON, UC Berkeley, E.M. HOSKINSON, C. MACKLIN, I. SIDDIQI, QNL, UC Berkeley, JOHN CLARKE, UC Berkeley — Dispersive techniques for the readout of superconducting qubits offer the possibility of high repetition-rate, quantum non-demolition measurement by avoiding dissipation close to the qubit. To achieve dispersive readout, we couple our three-junction aluminum flux qubit inductively to a 1-2 GHz non-linear oscillator formed by a capacitively shunted DC SQUID. The frequency of this resonator is modulated by the state of the qubit via the flux-dependent inductance of the SQUID. Readout is performed by probing the resonator in the linear (weak drive) regime with a microwave tone and monitoring the phase of the reflected signal. A microstrip SQUID amplifier (MSA) is used to increase the sensitivity of the measurement over that of a HEMT (high electron mobility transistor) amplifier. We report measurements of the performance of our amplification chain. Increased fidelity and reduced measurement backaction resulting from the implementation of the MSA will also be discussed.

[1]This work was funded in part by the U.S. Government and by BBN Technologies.

Jedediah Johnson
UC Berkeley

Date submitted: 23 Nov 2010 Electronic form version 1.4