

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Measurements of Decoherence in rf SQUID Qubits¹ DOUGLAS BENNETT, LUIGI LONGOBARDI, VIJAY PATEL, DMITRI AVERIN, JAMES LUKENS, Stony Brook University, Department of Physics and Astronomy — We report measurements of coherence times of an rf SQUID qubit using pulsed microwaves and rapid flux pulses. The modified rf SQUID has independent, in situ, controls for the relative positions of levels in different fluxoid wells and the barrier height between the wells. The decay of coherent oscillations is dominated by the lifetime of the excited state and low frequency flux noise. The low frequency flux noise is observed using microwave spectroscopy and resonant tunneling between fluxoid states in addition to the decay of coherent oscillations. These measurements are useful for evaluating the various insulating layers which are believed to be an important source of $1/f$ noise in many superconducting qubits.

¹This work has been supported in part by NSF and by AFOSR and NSA through a DURINT program.

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Date submitted: 27 Nov 2007

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