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Studies of decoherence in a large area Nb flux qubit[1] DOUGLAS BENNETT, LUIGI LONGOBARDI, VIJAY PATEL, WEI CHEN, DMITRI AVERIN, ANTONIO DI LORENZO, VLADIMIR KUZNETSOV, JAAN MANNIK, SHAWN POTTORF, KRISTIAN RABENSTEIN, JAMES LUKENS, Stony Brook University, Department of Physics and Astronomy — We report measurements using pulsed microwaves to investigate the decoherence mechanisms in a large area Nb based flux qubit. Our qubit uses an rf-SQUID in a gradiometer configuration and has independent, in situ, controls for the relative positions of levels in different fluxoid wells and the barrier height between the wells. We present measurements of decoherence times from coherent oscillations and microwave spectroscopy. These measurements are well suited to evaluate potential improvements in the materials and the fabrication process of both flux and phase qubits based on different flux states.

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