

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Increasing dynamic range in microwave parametric amplifiers J. MUTUS, R. BARENDS, J. BOCHMANN, B. CAMPBELL, Y. CHEN, B. CHIARO, E. JEFFREY, J. KELLY, M. MARIANTONI, A. MEGRANT, C. NEILL, P. O'MALLEY, S. OHYA, P. ROUSHAN, D. SANK, A. VAINSENER, J. WENNER, T. WHITE, A.N. CLELAND, J.M. MARTINIS, UC Santa Barbara — Parametric amplifiers have long been of interest in quantum information due to their high gain and near quantum limited performance. In collaboration with UC Berkeley, we are improving upon their proven parametric amplifier design, which consists of a lumped element LC resonator, with a SQUID providing a tunable nonlinear inductance. In order to improve the dynamic range of these amplifiers, multiple SQUIDS are used in series in order to distribute the non-linearity across many junctions. We report on the design of a single-ended amplifier using our 7-layer fabrication process, combining photo and electron beam lithography. We explore the experimental optimization of such a design, specifically the impact of adding additional SQUIDS on overall device performance.

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Date submitted: 07 Nov 2012

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