

Abstract Submitted
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Multiplexed dispersive readout for the superconducting phase qubit DANIEL SANK, R. BARENDS, J. BOCHMANN, B. CHIARO, Y. CHEN, J. KELLY, M. LENANDER, E. LUCERO, M. MARIANTONI, A. MEGRANT, C. NEILL, P. O'MALLEY, P. ROUSHAN, A. VAINSENCER, J. WENNER, T. WHITE, Y. YIN, ANDREW CLELAND, JOHN M. MARTINIS, UC Santa Barbara — Scaling to multiple qubit circuits requires state readout with maximum reliability and the minimum number of readout lines. Here, we introduce a multiplexed readout scheme for superconducting phase qubits. We replace our standard readout SQUIDs with inductively coupled resonators so that the measured state of the qubit (left or right side of the potential well) is read out as a shift of the resonator frequency. We connected several readout resonators to a single feedline and use a multi-tone microwave reflection measurement to simultaneously read out the states of multiple qubits using a single cable. Together with the compact lumped LC resonator design, the efficiency of chip space usage is greatly improved.

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