

Abstract Submitted
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Improving the Quality Factor of Microwave Compact Resonators K. GEERLINGS, S. SHANKAR, E. EDWARDS, L. FRUNZIO, R.J. SCHOELKOPF, M.H. DEVORET, Applied Physics Dept., Yale University — Superconducting microwave resonators are now widely used for coupling to superconducting qubit systems. Compact resonators [1] consisting of an interdigitated capacitance and a meander inductance take up much less space than a typical coplanar waveguide resonator. Since the design of compact resonators and qubits share common features, qubit decoherence mechanisms can be studied through the measurement of resonator loss. We measured of order 100 resonators and have achieved internal quality factors in excess of 300,000. Results indicate loss appears to be due to spurious two level systems. Loss increases when the participation of surfaces in the energy density is increased. Thus a large separation of electrodes is preferred, in agreement with the findings of other groups. Work in progress involves the combination of these resonators with transmon qubits. Work supported by IARPA, ARO and the NSF.

[1] M.S. Khalil, F.C. Wellstood, and K.D. Osborn, arXiv:1008.2929

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