

Abstract Submitted
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Transmon qubits coupled to compact resonators¹ S. SHANKAR, K. GEERLINGS, E. EDWARDS, L. FRUNZIO, R.J. SCHOELKOPF, M.H. DEVORET, Applied Physics Dept., Yale University — Compact resonators comprising of a meander inductor and an interdigitated capacitor are desirable building blocks for a multi-qubit processor due to their small size. We present an experiment on a superconducting transmon qubit coupled capacitively to such a compact resonator. We have fabricated low-loss Nb based compact resonators with an area within 1 mm^2 on a sapphire substrate to operate between 5 and 8 GHz. The resonator geometry was optimized to achieve an intrinsic quality factor above 300,000 at single-photon microwave powers and temperatures below 100 mK. Transmon qubits were made using Al/AlOx/Al Josephson junctions shunted by an Al interdigitated capacitor with an identical width and gap as the resonator. We will present our experimental progress towards measuring relaxation times of these qubits.

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