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Quality Factor Measurements with Improved Superconducting Stripline Resonators[1] ERIC HOLLAND, LUYAN SUN, MATTHEW REAGOR, KEVIN CHOU, LUIGI FRUNZIO, ROBERT SCHOELKOPF, Yale University — Superconducting microwave resonators can be coupled to a superconducting qubit to manipulate, read out and protect the qubit from the environment. Improvements in resonator quality factors, Q, offer a variety of benefits. One benefit of higher Qs is the possibility for longer coherence times. Alternatively, higher Q resonators could be implemented as a quantum memory. We fabricated and tested superconducting stripline resonators which are designed to minimize sensitivity to surface dielectric losses. These devices allow the possibility of sensitive testing of superconducting film quality and/or losses in the bulk substrate dielectric. By measuring these losses we can better understand possible mechanisms of decoherence in superconducting qubits. Preliminary quality factor results, taken at milliKelvin temperatures, will be given.

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