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Microwave Frequency Loss in Aluminum Nanobridge Josephson Junctions¹ ELI LEVENSON-FALK, R. VIJAY, STEVEN WEBER, KATER MURCH, I. SIDDIQI, UC Berkeley, QNL — Dielectric loss is a major source of decoherence in many superconducting qubits. Weak link Josephson junctions have the potential advantage of eliminating any loss associated with the insulating barrier in conventional tunneling type devices. We present quality factor measurements of 6 GHz superconducting resonators realized from three dimensional aluminum nanobridges shunted by single crystal silicon overlap capacitors. We compare the measured Q values with those obtained from similar resonators with aluminum tunnel junctions, with critical currents also in the microamp range. We discuss potential relaxation mechanisms specific to weak link junctions, and describe nanobridge qubit designs.

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