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Sources of Decoherence in the Transmon Qubit. JOSEPH SCHREIER, STEVE GIRVIN, ROB SCHOELKOPF, Yale, THE YALE CIRCUIT QED TEAM — Here we discuss a new type of superconduting qubit known as the transmon, a Cooper Pair Box in the high E_j/E_c limit. This qubit offers insensivity to 1/f noise in charge while maintaining sufficient anharmonicity to be treated as a two level system. In this talk we consider other experimentally important sources of dephasing and relaxation including: substrate/dielectric loss, flux coupling through the SQUID loop, radiation to parasitic modes, vortices, phonons, and quasiparticles. Order of magnitude estimates for these sources of decoherence indicate that $T_1$and T_2 coherence times of at least 10 μs should be attainable.

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