Abstract Submitted
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Tunable-cavity QED with phase qubits[1] JED D. WHITTAKER, FABIO DA SILVA, MICHAEL SHANE ALLMAN, FLORENT LECOCQ, KATARINA CICAK, ADAM SIROIS, JOHN TEUFEL, JOSE AUMENTADO, RAYMOND W. SIMMONDS, NIST - Boulder — We describe a tunable-cavity QED architecture with an rf SQUID phase qubit inductively coupled to a single-mode, resonant cavity with a tunable frequency that allows for both tunneling and dispersive measurements. Dispersive measurement is well characterized by a three-level model, strongly dependent on qubit anharmonicity, qubit-cavity coupling and detuning. The tunable cavity frequency provides dynamic control over the coupling strength and qubit-cavity detuning helping to minimize Purcell losses and cavity-induced dephasing during qubit operation. The maximum decay time $T_1 = 1.5\,\mu$s is limited by dielectric losses from a design geometry similar to planar transmon qubits.

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