

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

A phase qubit coupled to an RF-SQUID resonator JED WHITTAKER, SHANE ALLMAN, University of Colorado at Boulder, KATARINA CIČAK, FRANCOIS NGUYEN, NIST, ADAM SIROIS, University of Colorado at Boulder, JOHN TEUFEL, EVA ZAKKA-BAJJANI, RAYMOND SIMMONDS, NIST — We have coupled a tunable cavity (an RF-SQUID resonator) to a phase qubit. The resonator can be used both for state transfer experiments as well as a measurement/readout device for the qubit. Specifically, it can be used in three different ways to help interrogate the state of the qubit. First, changes in the resonator frequency can be monitored in order to read out the qubit state after a conventional fast measure pulse is applied to the qubit bias flux. Second, we can perform a linear dispersive measurement of the qubit state using the coupled interaction between the qubit and the resonator. Here, the resonator will have a qubit-state dependent frequency shift. Finally, we can exploit the nonlinearity of the resonator by driving it into the bifurcated regime and performing a single-shot measurement of the state of the qubit. I will discuss the design, fabrication, and operation of this system.

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Date submitted: 19 Nov 2010

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