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Switching Phenomena in Bifurcation Amplifiers WILLIAM SOO, ANDREW DOHERTY, School of Physics, University of Sydney, NSW 2006 — Recent experiments have seen high fidelity single shot measurement of superconducting qubits using the latching readout of a bifurcation amplifier. In these measurements, the coupling of the qubit to a nonlinear resonator correlates the qubit state with bistable states of the resonator. So qubit state discrimination, and hence readout quality, is ultimately governed by the dynamics of switching between the resonator states. In order to investigate how the quality of the measurement depends on system parameters, we study the physical mechanism of this probabilistic switching between the bistable resonator states. Recent simulations have shown that the switching rate can be very accurately obtained from a quantum trajectory model of the dynamics. We study Arrhenius formulae to model the switching rate and look to a Gaussian variational solution to the trajectory equations in order to gain an improved qualitative picture of the dynamics of these switching events.

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