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Stochastic path integral approach to continuous quadrature measurement of a single fluorescing qubit[1] ANDREW N. JORDAN, AREEYA CHANTASRI, University of Rochester, BENJAMIN HUARD, École Normale Supérieure-PSL Research University — I will present a theory of continuous quantum measurement for a superconducting qubit undergoing fluorescent energy relaxation. The fluorescence of the qubit is detected via a phase-preserving heterodyne measurement, giving the cavity mode quadrature signals as two continuous qubit readout results. By using the stochastic path integral approach to the measurement physics, we obtain the most likely fluorescence paths between chosen boundary conditions on the state, and compute approximate correlation functions between all stochastic variables via diagrammatic perturbation theory. Of particular interest are most-likely paths describing increasing energy during the florescence. Comparison to Monte Carlo numerical simulation and experiment will be discussed.

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