

Abstract Submitted
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Pre- and post-selected averaging of continuous weak measurement of a superconducting qubit NEDA FOROUZANI, DIAN TAN, KATER MURCH, Physics Department, Washington University, St. Louis — A superconducting qubit undergoing driven unitary evolution is continuously monitored to observe the time evolution of its quantum state. The continuous measurement signals are dominated by noise, but averaging many measurement signals can reveal information about the ensemble evolution. We use a projective measurement to herald an initial state. The average of many measurements conditioned on the herald yields damped Rabi oscillations. However, if we average the measurement signals conditioned on a final projective measurement, we observe Rabi oscillations that grow in amplitude to approach the final state. These oscillations are the time reverse of the average that is conditioned on the initial state. We can also use the measurement signal to track the individual quantum trajectories of the qubit as it evolves in competition between measurement dynamics and the unitary drive. We use these trajectories to examine the time symmetry of the pre- and post-selected averaged signals.

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