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Quantum Parameter Estimation in Continuous Measurement-Based Quantum Control LUIS CORTEZ-GONZALEZ, Universidad Autonoma de Nuevo Leon, ANDREW N. JORDAN, University of Rochester — We consider continuous measurement as a quantum tracking and control method for superconducting quantum systems. In experiments with superconducting qubits information about the quantum state of the system is extracted in the form of a noisy analog voltage signal reflected from a coupled readout resonator. Every element of the measurement sequence describes a weak measurement that provides uncertain information about the quantum state of the qubit. In this talk we describe how the information contained in the continuous readout signal is used to estimate unknown parameters of the system as well as the most probable state evolution to produce the observed measurement record. We will theoretically compare a variety of estimation techniques including Maximum Likelihood methods and Bayesian hypothesis testing among others.

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