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Noise spectroscopy and decoherence mitigation during free and driven evolution[1]

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Gate operations in a quantum information processor are generally realized by tailoring specific periods of free and driven evolution of a quantum system. Unwanted environmental noise, which may be distinct during these two periods, acts to decohere the system and increase the gate error rate. In this talk, we review our work on noise spectroscopy of superconducting qubits (persistent-current qubits, transmons) undergoing both free and driven evolution, and we present dynamical decoupling methods that can mitigate coherent errors in both cases. We discuss these results in the context of our present work and future directions.

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