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Robustness of superconducting high-Q resonators against direct quasiparticle injection U. PATEL, Department of Physics, University of Wisconsin, Madison, Wisconsin 53706, I. NSANZINEZA, B. L. T. PLOURDE, Department of Physics, Syracuse University, Syracuse, New York 13244, R. MCDERMOTT, Department of Physics, University of Wisconsin, Madison, Wisconsin 53706
— A longstanding goal of the superconducting qubit community is to integrate a superconducting quantum circuit with classical cryogenic digital logic based on the Single Flux Quantum (SFQ) logic family. Since the SFQ circuit transitions to the finite voltage state, care must be taken to protect the quantum circuit against quasiparticle-induced decoherence. Here we describe experiments to characterize the robustness of high-Q superconducting linear resonators against direct quasiparticle injection. We use NIS junctions to controllably inject quasiparticles into the groundplane of a superconducting resonator chip. We monitor resonator Q and frequency shift versus injection current for different device geometries. Finally, we discuss strategies to protect the resonator circuit from quasiparticle poisoning.

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