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Superconducting resonators with trapped vortices under direct injection of quasiparticles IBRAHIM NSANZINEZA, Syracuse University, UMESH PATEL, University of Wisconsin, K. R. DODGE, Syracuse University, R. F. MCDERMOTT, University of Wisconsin, B. L. T. PLOURDE, Syracuse University — Nonequilibrium quasiparticles and trapped magnetic flux vortices can significantly impact the performance of superconducting microwave resonant circuits and qubits at millikelvin temperatures. Quasiparticles result in excess loss, reducing resonator quality factors and qubit lifetimes. Vortices trapped near regions of large microwave currents also contribute excess loss. However, vortices located in current-free areas in the resonator or in the ground plane of a device can actually trap quasiparticles and lead to a reduction in the quasiparticle loss. We will describe experiments involving the controlled trapping of vortices in superconducting resonators with direct injection of quasiparticles using Normal metal-Insulator-Superconductor (NIS)-tunnel junctions.

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