

Abstract Submitted
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Superconducting microwave resonators in magnetic fields¹ C. SONG, Syracuse University, M.P. DEFEO, K. YU, B. XIAO, P. BHUPATHI, B.L.T. PLOURDE, SYRACUSE UNIVERSITY TEAM — Microwave resonators with high quality factors have enabled many recent breakthroughs with superconducting qubits and photon detectors. Vortices trapped in a superconducting resonator due to insufficient shielding or pulsed control fields constitute one potential loss mechanism that can lead to reduced quality factors. We have developed a straightforward method for enhancing the pinning, and thus reducing the excess loss from vortices trapped by field-cooling by over an order of magnitude, in Al resonators using nanofabricated surface pinning. We have also studied resonators in the absence of field-cooling, where magnetic fields applied below the transition temperature of the superconductor can still influence the behavior, by producing reversible shifts in the resonance frequency for small fields and by injecting vortices into the films at larger fields.

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