Abstract Submitted
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Microwave response of vortices in Al and Re superconducting thin films[1] C. SONG, T.W. HEITMANN, M.P. DEFEO, K. YU, B.L.T. PLOURDE , Syracuse University, R. MCDERMOTT , University of Wisconsin, M. NEELEY, J.M. MARTINIS , UC Santa Barbara — Vortices trapped in superconducting microwave resonant circuits contribute excess loss and can result in substantial reductions in the quality factor. Thus, characterizing the microwave vortex response in superconducting thin films is important for the design of superconducting qubits, which are typically operated in small, but non-zero, magnetic fields. By cooling in fields of the order of 1 Gauss and below, we have characterized the magnetic field and frequency dependence of the microwave response of a small density of vortices in resonators fabricated from thin films of Re and Al. Above a certain threshold cooling field, vortices become trapped in the resonators and vortices in the Al resonators contribute greater loss and are influenced more strongly by flux creep effects than in the Re resonators. This different behavior can be described in the framework of a general vortex dynamics model related to the interplay between the vortex pinning in the films and the flux-flow viscosity.

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