equilibrium Noise." Abstract Submitted

for the MAR16 Meeting of
The American Physical Society

Design and Simulation of Microwave Attenuators for Superconducting Quantum Devices JAY LEFEBVRE, Department of Physics, University of Maryland, College Park, JEN-HAO YEH, Laboratory for Physical Sciences, College Park, MD and Department of Physics, University of Maryland, College Park, MD, FREDERICK WELLSTOOD, Department of Physics, University of Maryland, College Park, MD and Joint Quantum Institute, University of Maryland, College Park, BENJAMIN PALMER, Laboratory for Physical Sciences, College Park, MD and Department of Physics, University of Maryland, College Park, MD — We have found that dephasing times for quantum superconducting transmons operating nominally at T = 20 mK can be limited by thermal photons in the read-out cavity due to non-equilibrium noise on our input microwave line. In an effort to reduce this noise, we have used finite-element simulations to design attenuators that provide better thermalization of the input microwave signals being delivered to our devices. Our thermal simulations incorporate both electron-phonon decoupling effects due to dissipated power in each element of the attenuator as well as phonon thermal conduction and Kapitza boundary effects. We combine the resulting thermal map with a thermal noise model of each dissipative element of the filter to estimate the effective noise temperature of our filter design.

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Date submitted: 24 Nov 2015 Electronic form version 1.4