Abstract Submitted
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Influence of Non-equilibrium Noise on Quantum Superconducting Devices JEN-HAO YEH, Laboratory for Physical Sciences; Department of Physics, University of Maryland, JAY LEFEBVRE, Department of Physics, University of Maryland, BALADITYA SURI, SERGEY NOVIKOV, Laboratory for Physical Sciences; Department of Physics, University of Maryland, FREDERICK WELLSTOOD, Department of Physics, University of Maryland; Joint Quantum Institute, University of Maryland, BENJAMIN PALMER, Laboratory for Physical Sciences; Department of Physics, University of Maryland — Non-equilibrium noise from temperatures larger than T $\sim$ 20 mK coupled to quantum superconducting devices can cause energy relaxation [1], dephasing [2], and initialization errors [1]. In particular at low temperatures, any dissipated power can drive the electrons out of equilibrium with the phonons and produce thermal noise [3]. To understand thermal noise driven out of equilibrium, we have created both finite element simulations using COMSOL and some simple analytical models. Based on these thermal simulations and models as well as microwave simulations, we have designed and fabricated some devices to decrease the amount of non-equilibrium noise influencing our devices. The design of these devices as well as preliminary characterization using a transmon device will be discussed.

[1] R. J. Schoelkopf *et al.,* Quantum Noise in Mesoscopic Physics, NATO Science Series, **97**, pp 175-203 (2003).
[2] A. P. Sears *et al.*, Phys. Rev. B **86,** 180504 (2012).
[3] F. C. Wellstood, C. Urbina, and John Clarke, Phys. Rev. B **49**, 5942 (1994).

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