Abstract Submitted
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Normal-metal nano-devices for sensing in superconducting quantum circuits[1] RUSSELL LAKE, JOONAS GOVENIUS, ROOPE KOKKONIEMI, KUAN YEN TAN, MATTI PARTANEN, PAULI VIRTANEN, MIKKO MÖTTÖNEN, Department of Applied Physics, Aalto University, Finland — Recently we reported an advance in thermal detector technology that aims at resolving single energy quanta in the microwave regime [1]. Our device is comprised of a normal-metal nanowire with proximity-induced superconductivity. We exploit the nanowire's temperature-dependent admittance for thermal detection of microwave energy packets as small as 1 zJ in a single-shot measurement [2]. To investigate further applications of proximized normal-metal nanowires in superconducting microwave circuits, we have performed quantitative electrical admittance measurements of gold-palladium wires arranged into a chain of SQUIDs. The chain is coupled strongly to a multimode microwave resonator with a mode spacing of 0.6 GHz. By measuring the frequencies and quality factors of the resonator modes, we extract the dissipative and reactive parts of the admittance of the chain at millikelvin temperatures. We compare the phase- and temperature-dependent results near 1 GHz to theory based on the time-dependent Usadel equations and identify important discrepancies that are not resolved by including inelastic scattering or elastic spin-flip scattering in the theory [3]. [1] M. Schirber Physics **9**, 81 (2016) [2] J. Govenius et al. PRL **117**, 030802 (2016) [3] R. E. Lake et al. arXiv 1607.08900

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