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AC measurements of the superconducting proximity effect in metal nanowires RUSSELL LAKE, JOONAS GOVENIUS, KUAN YEN TAN, MIKKO MÖTTÖNEN, QCD Labs, COMP Centre of Excellence, Department of Applied Physics, Aalto University School of Science, PO Box 13500, FI-00076 Aalto, Finland — We quantitatively probe the admittance of diffusive superconductor/normal-metal/superconductor (SNS) weak links. Measurements are performed from 0.4 GHz to 12.8 GHz which includes regimes above and below the predicted characteristic energy scale for the superconducting proximity effect. Each device consists of a flux-biased SNS SQUID chain where N is a gold-palladium nanowire. The chain has strong capacitive coupling to a multimode microwave resonator. Measurements of the resonance frequency and quality factor for each resonator mode reveal the dissipative and reactive parts of the admittance of the SNS SQUID chain. The measurement results are valuable because they provide a direct test for theories of non-equilibrium superconductivity in SNS weak links [1,2] and because AC measurements have only recently been reported in the literature [3]. The data presented is also crucial for understanding losses in microwave circuits that employ SNS weak links, including nanobolometers [4]. *References:* [1] P. Virtanen et al. Phys. Rev. B **83**, 144514 (2011), [2] F. Kos et al. Phys. Rev. B **87**, 174521 (2013), [3] B. Dassonneville et al. Phys. Rev. Lett. **110**, 217001 (2013). [4] J. Govenius et al. Phys. Rev. B **90**, 064505 (2014)

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