

Abstracts

Optimum Source Conductance for High Frequency Superconducting Quasiparticle Receivers

Q. Ke and M.J. Feldman. "Optimum Source Conductance for High Frequency Superconducting Quasiparticle Receivers." 1993 Transactions on Microwave Theory and Techniques 41.4 (Apr. 1993 [T-MTT]): 600-604.

We have used the quantum theory of mixing for extensive numerical calculations to determine the mixer source conductance $G_{\text{sub } s/}$, required to optimize a superconductor-insulator-superconductor (SIS) quasiparticle heterodyne receiver. The optimum $G_{\text{sub } s/}$ matches an empirical formula which can be understood by a simple derivation. Previous work indicated that $G_{\text{sub } s/}$ should vary inversely with frequency, and this implies that the critical current density of SIS junctions used for mixing should increase as frequency squared, a stringent constraint on the design of submillimeter SIS mixers. On the contrary, we find that $G_{\text{sub } s/}$ is more weakly dependent upon frequency, and we discuss the implications for the design of submillimeter SIS mixers.

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