

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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