Abstracts

A Wideband Fixed-Tuned SIS Receiver for 200-GHz Operation

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We report on the design and development of a heterodyne receiver, designed to cover the frequency range 176-256 GHz. This receiver incorporates a niobium superconductor-insulator-superconductor (SIS) tunnel junction mixer, which, chiefly for reasons of reliability and ease of operation, is a fixed-tuned waveguide design. On-chip tuning is provided to resonate out the junction's geometric capacitance and produce a good match to the waveguide circuit. Laboratory measurements on the first test receiver indicate that the required input bandwidth (about 40%) is achieved with an average receiver noise temperature of below 50 K. Mixer conversion gain is observed at some frequencies, and the lowest measured receiver noise is less than 30 K. Furthermore, the SIS mixer used in this receiver is of simple construction, is easy to assemble and is therefore a good candidate for duplication.

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