Abstracts

Nb/Al-Al/sub 2/O/sub 3/Nb Junctions with Inductive Tuning Elements for a Very Low Noise 205-250 GHz Heterodyne Receiver

A.W. Lichtenberger, D.M. Lea, R.J. Mattauch and F.L. Lloyd. "Nb/Al-Al/sub 2/O/sub 3/Nb Junctions with Inductive Tuning Elements for a Very Low Noise 205-250 GHz Heterodyne Receiver." 1992 Transactions on Microwave Theory and Techniques 40.5 (May 1992 [T-MTT]): 816-819.

The superconductor-insulator-superconductor (SIS) junction is the most sensitive nonlinear element for millimeter-wave heterodyne detection. We have developed a Nb/Al-Al/sub 2/O/sub 3/Nb junction fabrication process which allows the use of planar tuning circuits integrated with the junctions. These tuning elements permit the use of junctions with relatively large areas and small current densities with excellent results. Recent measurements have yielded a double sideband receiver noise temperature less than 50K from 205 to 240 GHz and 44K at 230 GHz. We are also extending our Nb/Al-Al/sub 2/O/sub 3/Nb trilayer technology to the fabrication of sub-square-micron area planar junctions for submillimeter wavelengths.

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