

**180-500 GHz LOW NOISE SIS WAVEGUIDE RECEIVERS
EMPLOYING TUNED Nb/AIO_x/Nb TUNNEL JUNCTIONS**

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Abstract

We report recent results on two full height waveguide receivers that cover the 180-300 GHz and 380-510 GHz atmospheric windows. The receivers are part of the facility instrumentation at the Caltech Submillimeter Observatory on Mauna Kea in Hawaii. Receiver noise temperatures range from 30K-50K DSB for the 180-325 GHz band, and 80-100K DSB for the 380-510 GHz atmospheric band.

A 50% operating bandwidth is achieved by using a RF compensated junction mounted in a two-tuner full height waveguide mixer block. The 0.49 μm^2 Nb/AIO_x/Nb tunnel junctions use an "end-loaded" tuning stub with two quarter-wave transformer sections to tune out the large junction capacitance.

Fourier Transform Spectrometer (FTS) video measurements of the 230- and 492 GHz tuned junctions (designed for waveguide mixers) mounted in a quasi-optical system show good agreement with the measured heterodyne waveguide response. This method has proved to give quick and accurate information on the frequency response of the waveguide mixers.