

Bandwidth Measurements on HEB Mixers at Terahertz Frequencies Using Sideband Generators as well as Two Lasers

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ABSTRACT

Accurate characterization of the mixer conversion gain bandwidth in NbN Hot Electron Bolometer (HEB) mixers requires the use of at least one tunable source in the terahertz frequency range.

In this paper we present recent results obtained from such characterization. The measurements are performed using two types of tunable sources. In one case a variable microwave source is mixed with a fixed laser source to produce tunable sidebands, whereas two cavity-tuned FIR gas lasers are used in the second case.

The bandwidth characterization with the sideband generator is carried out over a 1-8 GHz IF band using quasi-optical coupling for the terahertz radiation and a single wide-band MMIC chip as the IF amplifier. Figure 1 shows some preliminary experimental results from measurements performed in this fashion.

On the other hand, the conversion gain at low IF frequencies up to about 10 MHz is measured using the two-laser approach.

The experimental results of both sets of measurements are used for comparison with those obtained from the standard model.

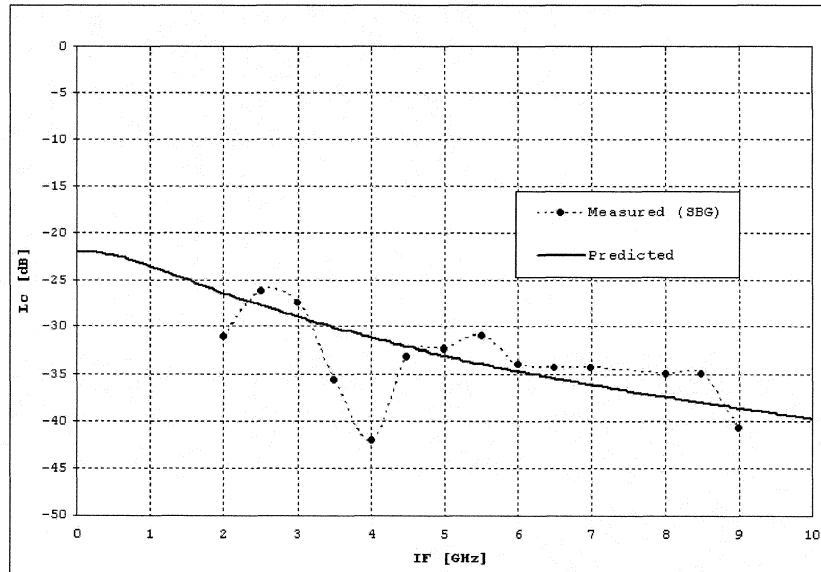


Figure 1. Measured and predicted mixer conversion gain vs. IF frequency