

NOISE TEMPERATURE RESULT FOR Nb DHEB MIXER RECEIVER FOR FAR-INFRARED SPECTROSCOPY

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We are reporting a noise temperature measured on a Diffusion-Cooled Hot Electron Bolometric (DHEB) mixer designed for a heterodyne focal plane array to study lines with frequencies of 2 THz and above. Our fabrication process utilizes selective ion milling techniques to produce Nb Diffusion-Cooled Hot Electron Bolometric mixers from a bi-layer thin film of gold/Nb deposited on a silicon substrate. A micro-bridge of 10 nm thick Nb forms the HEB device. The devices are fabricated at the leads of a broad band spiral antenna with a frequency response of up to 20 THz. An FIR laser was used as the LO source at 2.52 THz (119 μm). A Double-SideBand (DSB) receiver noise temperature of 2500 K was measured. The IF frequency determined by the cold amplifier was centered at 1 GHz. This noise temperature result is not corrected for losses and mismatches and was performed at a bath temperature of 2 K. The device has a critical temperature (T_c) of 6 K with a 0.5 K transition width. A detailed summary of the measurements performed on the device will be presented at the symposium.