

Waveguide Coupled Bolometers

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Bolometers offer much greater detection bandwidths than are available with heterodyne receiver technology, so bolometers will continue to be used for photometry of continuum radiation from astrophysical sources such as galactic and extragalactic dust emission and the cosmic background radiation. A new bolometer design is presented which couples to waveguide, but which dissipates the Terahertz frequency power in a load resistor that is just a few tens of microns in size. This load resistor is located on a microlithographed silicon nitride beam which serves to isolate the load resistor, along with a superconducting transition thermometer, from the 0.3 K cold stage.

Tests of antenna structures, lithographed filters, transition edge thermometers, and silicon nitride beams will be presented.

Because of the very low heat capacity of the load resistor and thermometer these bolometers will provide sensitivity in the 10^{-17} NEP range and time constants of 7 ms without requiring 0.1 K cold stage temperatures, making this technology useful for NASA and ESA missions such as SOFIA and COBRAS/SAMBA.