Blackbody Calibrator

Abstract

- This calibrator operates across the frequency range 30 GHz – 1000 GHz, and exhibits emissivity of 0.999 and coherent return loss of better than -50 dB. It can be used for the calibration of radiometers, spectrometers and other detectors in the submillimeter frequency range, where an absolute amplitude and spectral calibration is essential.

Description

- The design of the calibrator is based on a folded cone geometry which allows to achieve superior electromagnetic and thermal performance and realize the device in a relatively compact mechanical envelop.
- The inner (main) absorber is a 12° half-angle cone with a three different grades of Eccosorb absorber material multilayer structure which was optimized for good matching to free space and at the same time minimize the absorber thickness. The secondary absorber cavity is formed by a conical reflector and a thin Al cylinder which is also coated with a multilayer absorber structure. The mechanical envelope of the calibrator is 290 mm in length and 200 mm in diameter. Absorbers and reflectors of the calibrator are equipped with foil heaters and surface mounted temperature sensors to ensure efficient thermal control in the range between room temperature and 100°C. The design has been optimized to reduce thermal gradients across the absorbers and to assure stability of the effective temperature, independent on the calibrator orientation in the range of 0-90° tilt.
- The coherent backscatter of the calibrator is mostly below −60 dB in the frequency range 80-700 GHz, and averages −55dB between 30-80 GHz.

Blackbody Calibrator

Technology filed

- Diagnostics and detectors, sensors, optics and instruments

Original use

- Astronomical research

Potential fields of application

- Telecommunications and many other fields

IPR status

- Patent (EP2565609)
- In progress in CAN, USA, JAP

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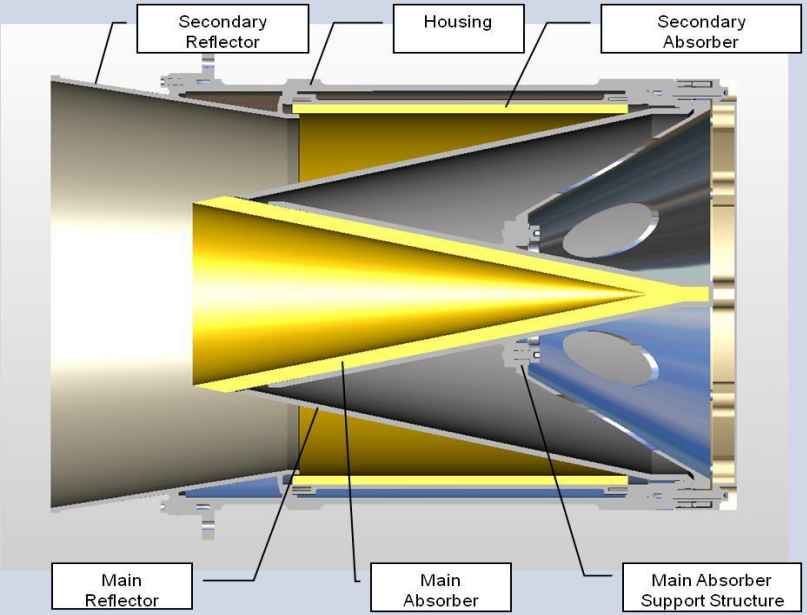

Technology Transfer proposal BSBF 2022