

CONTINUOUS WAVE TERAHERTZ DETECTOR MODULES



AT A GLANCE

Ultra-broadband photomixing terahertz receivers for 1.5 μm optical wavelength, emitted THz power confirmed by PTB (Physikalisch Technische Bundesanstalt)



Features

- Up to 5.5 THz bandwidth
- >130 dB dynamic range at 120 GHz
- 0.1 fW/Hz NEP
- Robust housing and fiber coupling

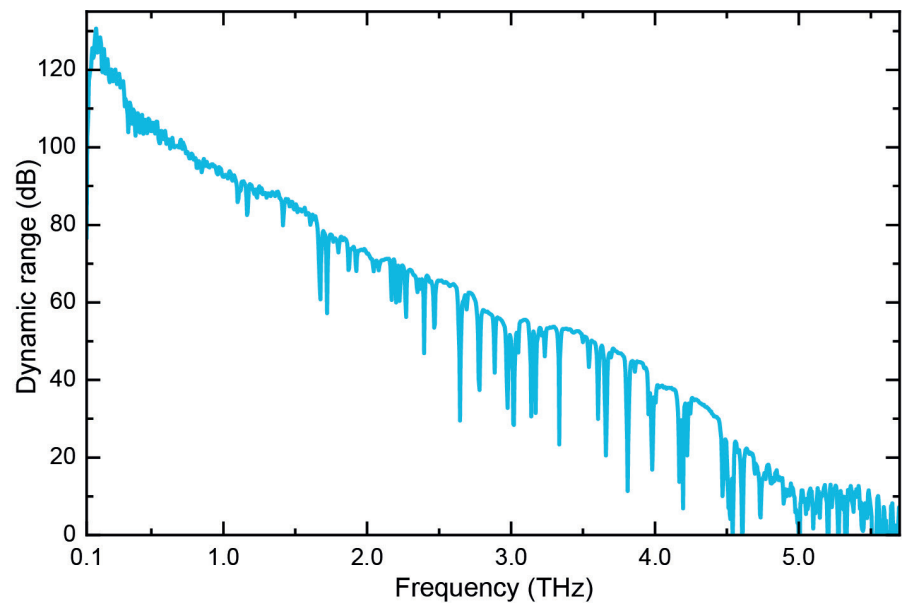
Applications

- High-bandwidth terahertz spectroscopy
- Industrial process control
- Non-contact coating film thickness measurement
- High-speed measurements

Technical background

Our photoconductive continuous wave (cw) terahertz receivers detect an incoming THz signal by mixing it with an optical local oscillator signal given by the beating signal of two lasers. The frequency resolution of cw THz systems is only limited by the linewidth of the lasers. Preferred applications for continuous wave THz radiation are high resolution spectroscopy and imaging as well as precise monitoring of particular spectral lines.

HHI's THz modules utilize mature telecom technology and thus allow benefiting from THz technologies within industrial applications and environments.



Performance of HHI's cw THz detector modules for operation conditions as given in the specifications [Deumer et al., *Opt. Express* 32 (2024)]. Absorption lines are due to water vapor absorption at ambient conditions.

Specifications

- Optical wavelength: 1.5 μm
- Optical power: 30 mW
- Spectral range: 0.1 - 5.5 THz
- Dynamic range:
 - >130 dB @ 120 GHz
 - >90 dB @ 1 THz
 - >70 dB @ 2 THz
- Diameter of module: 25 mm

M. Deumer, et al. "Continuous wave THz receivers with rhodium-doped InGaAs enabling 132 dB dynamic range," *Opt. Express* 32, 29855-29867 (2024).



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