

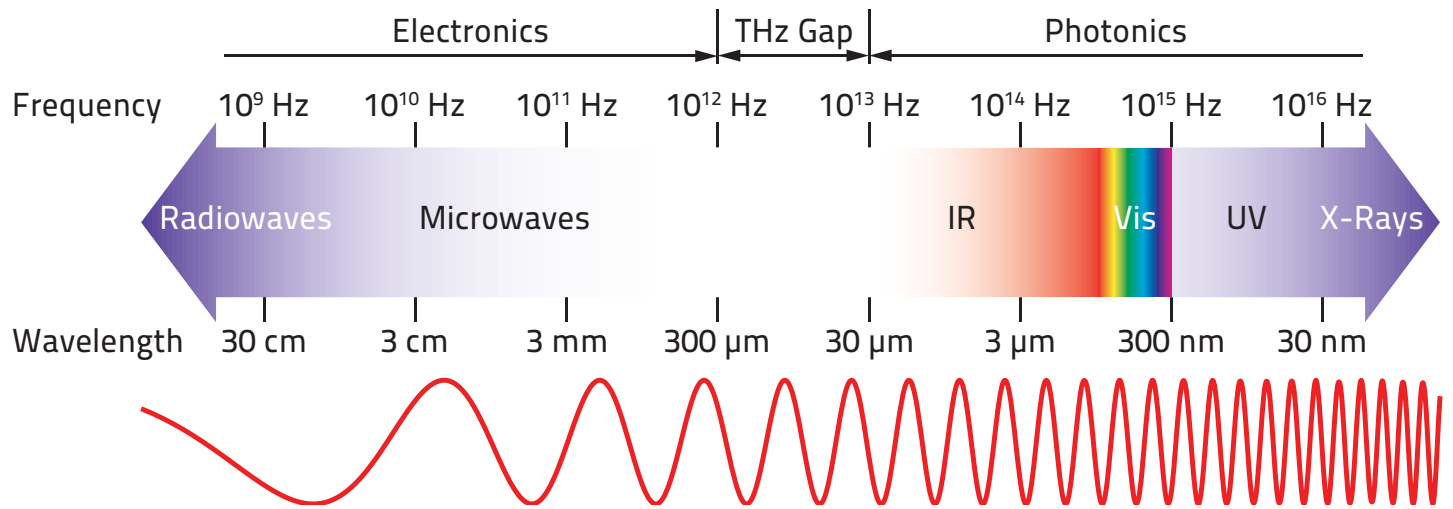
PRESENTATION

WHAT IS TERAHERTZ RADIATION?

The THz portion of the electromagnetic spectrum fills the gap between the far infrared and the microwaves. More precisely, it is nestled between the high-frequency edge of the microwave band, 300 gigahertz (3×10^{11} Hz), and the long-wavelength edge of far-infrared light, 3000 GHz (3×10^{12} Hz or 3 THz). In wavelengths, this range corresponds to 0.1 mm (or 100 μm) infrared to 1.0 mm microwave. The THz band is set in the region where electromagnetic physics can best be described by its wave-like characteristics (microwave) and its particle-like characteristics (infrared).^a

^a Source: Wikipedia

Figure 1. The electromagnetic spectrum showing the THz gap from 100 μm to 1000 μm or 3 THz to 0.3 THz



WHAT IS IT USED FOR?

THz radiation is interesting because of the way it interacts with matter:

- It can penetrate things like wood, plastics, clothing, and other materials.
- It is also absorbed by water, or a material that contains water, like human skin.
- It is non-ionizing and therefore not harmful to humans like X-rays can be.

One of the first uses is the "full body scan" used at airports. It also has uses in medical applications for early detection of cancer cells.

HOW IS IT MEASURED?

THz sources come in many varieties, including those with CW or Pulsed outputs. They range in power from nW to mW and in energy from nJ to mJ. Like most electromagnetic sources, they must be characterized for performance and/or control.

Older THz detection methods include:

- Golay Cells
- Micro-bolometers
- Pyroelectric detector and electrical devices like photo-acoustic and Schottky diode detectors

WHY ARE GENTEC-EO PRODUCTS BETTER?

- **Golay Cells** used to be the detector of choice, but they are costly and often very large.
- **Pyroelectric Detectors** (like the ones used in our THz Detectors) used to have lower performances, but recent advances placed them on the same technical level as Golay Cells, and even higher. Pyroelectric Detectors in THz measuring show several benefits to the user:
 - Broadband thermal response from 0.1 to 3000 μm
 - Can be used at room temperature with high sensitivity (measure nW of power and nJ of energy)
 - Wider power range (from nW to mW)
 - Lower cost

PRESENTATION

OVERVIEW OF THE DIFFERENT MODELS

We have a unique line of sensors and meters for the terahertz region. You can choose either a standalone device with on-board electronics or go with our T-Rad meter and a separate sensor. We also have small terahertz detectors that come as discrete pyroelectric units for integration.



See pages 130 and 132

THZ-I-USB / THZ-I-BNC

- THZ Detectors with Integrated Digital (USB) or Analog (BNC) Modules (no need for a monitor)
- Wide Dynamic Range from nW to mW
- USB: Powered by your PC
LabView Software included
- BNC: Battery or AC Powered (for use with an oscilloscope)
Very Low Noise Level (0.4 nW for THZ2I-BL-BNC)

INTEGRATED USB OR BNC MODULES



See page 134

THZ-B SENSORS WITH T-RAD-USB OR APM MODULES

- Large Choice of Apertures:
1.5 mm, 5 mm and 9 mm \varnothing
- High Voltage responsivity:
Up to 500 kV/W with the THZ9B-MT-BNC
- High Average Powers:
Up to 200 mW with the 5 and 9 mm probes
- Choice between Digital or Analog Modules:
Digital (T-Rad-USB), Analog (APM). See below.

T-RAD-USB

The T-Rad-USB Lock-In Amplifier Module is a small shielded box that houses a microprocessor, 12-bit ADC and USB connector. It is powered by the USB connection and also includes an analog output and trigger input BNC to sync it to the chopper frequency. It comes with our incredibly powerful Software and LabView Drivers.

APM

The APM provides battery or AC power to our THZ-B sensors. It includes a power On/Off switch and a BNC output connector. To get accurate and fast readings, just plug the THZ-B probe into the APM, and the APM BNC output into your oscilloscope.



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QS-THZ

- Hybrid Pyroelectric Detectors
- Small TO5/TO8 Packages
- Available in 5 Sizes: 1.5, 2, 3, 5 and 9 mm \varnothing Apertures
- Wide Dynamic Range from nW to mW
- QS-I-TEST Test Box Available

DISCRETE PYROELECTRIC DETECTORS SMALL TO5/TO8 PACKAGES