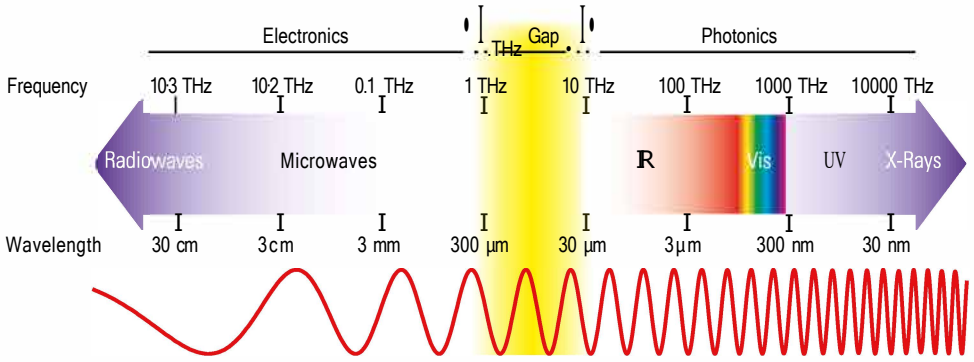
TERAHERTZ DETECTORS

Overview of the different models

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 GHz (3x10ll Hz), and the long-wavelength edge of far-infrared light, 3000 GHz (3x1072 Hz or 3 THz). In wavelengths, this range corresponds to 0.1 mm (or 100 µm) infrared to l.O 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).



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 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
- Microbolometers
- Electronic antennas

Newer THz detection methods include:

- Pyroelectric detectors
- Schottky diode detectors
- Photoacoustic detectors

WHY ARE GENTEC-EO PRODUCTS BETTER?

Golay cells are large, fragile, costly and have a limited measurement range.

Pyroelectric detectors (like the ones used in our THZ detectors) are small, sensitive, durable and less costly. Some of their advantages are:

- High performance in a small package
- Broad spectral response (from 0.25 to 3000 µm)
- Wide dynamic range (from nW to mW)
- Rugged and durable
- Very cost-effective

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