



OZ Optics

shop.ozoptics.com
www.ozoptics.com

Distributor
amSTECHNOLOGIES
where technologies meet solutions

info@amstechnologies.com
www.amstechnologies-webshop.com

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TERAHERTZ TIME DOMAIN SPECTROMETER (THz-TDS)

PRELIMINARY

Features

- More THz bandwidth for the cost
- Peak dynamic range of >50 dB at 3.5 THz
- Usable bandwidth: 0.2—6 THz
- Compact

Applications

- Optical spectroscopy
- Extract material refractive index and absorption
- Detection of viruses and bacteria
- Non-invasive testing and quality assurance
- Thickness measurement of optically opaque films

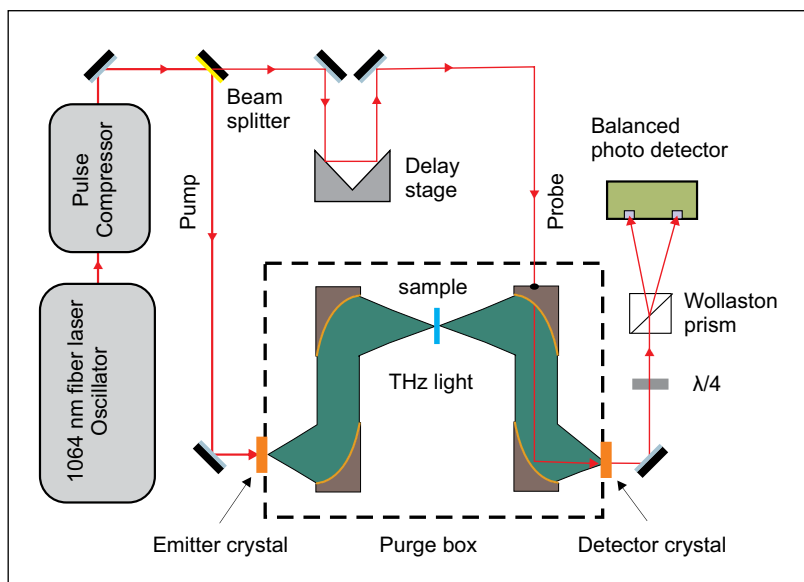


Fig:1 THz-TDS setup schematic

Product Description

Unlike most time-resolved THz spectrometers in the market employing photoconductive antennas, OZ Optics' system utilizes nonlinear propagation in electro-optic crystals together with proprietary phase matching techniques to generate and detect phase-locked THz pulses. The system utilizes a compact femtosecond laser (1064 nm wavelength, 40 MHz repetition rate) integrated with our pulse compressor to obtain a much higher THz bandwidth than other commercially available THz spectrometers for a competitive price. While most THz systems can only resolve frequencies >3 THz by averaging over numerous waveforms, we achieve this bandwidth in a single trace when performing electro-optic sampling with the system's stepper mode. Better spectral performances can be obtained with the fast continuous scanning option.

This compact spectrometer allows for reliable material characterization in the THz range that is generally only accessible using expensive and bulky ultrafast lasers, and thin electro-optic crystals. An enclosure allows a purge gas to remove water vapour and prevent absorption lines in the THz spectrum while also improving overall signal-to-noise ratio. The software provided with this device allows easy change of measurement parameters and scanning methods based on experiment requirements.

Performance Specifications

Part number: THzTDS-1000	
Parameter	Typical value
Spectral bandwidth	0.2—6 THz
Peak dynamic range	>50 dB at 3.5 THz
Dynamic range at 6 THz	20 dB
Temporal scan duration without echo ¹	30 ps
Total scan duration (including echos) ²	>100 ps
THz frequency resolution without echo	<35 GHz
THz frequency resolution (including echos) ²	<10 GHz
Dimensions L×W×H ^{3,4}	760 mm x 610 mm x 150 mm
Purge Box Size ^{3,4}	300 mm x 300 mm x 150 mm

Note:

- 1 Can be extended upon request.
- 2 Depends on delay stage.
- 3 Estimated values after packaging.
- 4 Parameter is being optimized.

Optical Specifications

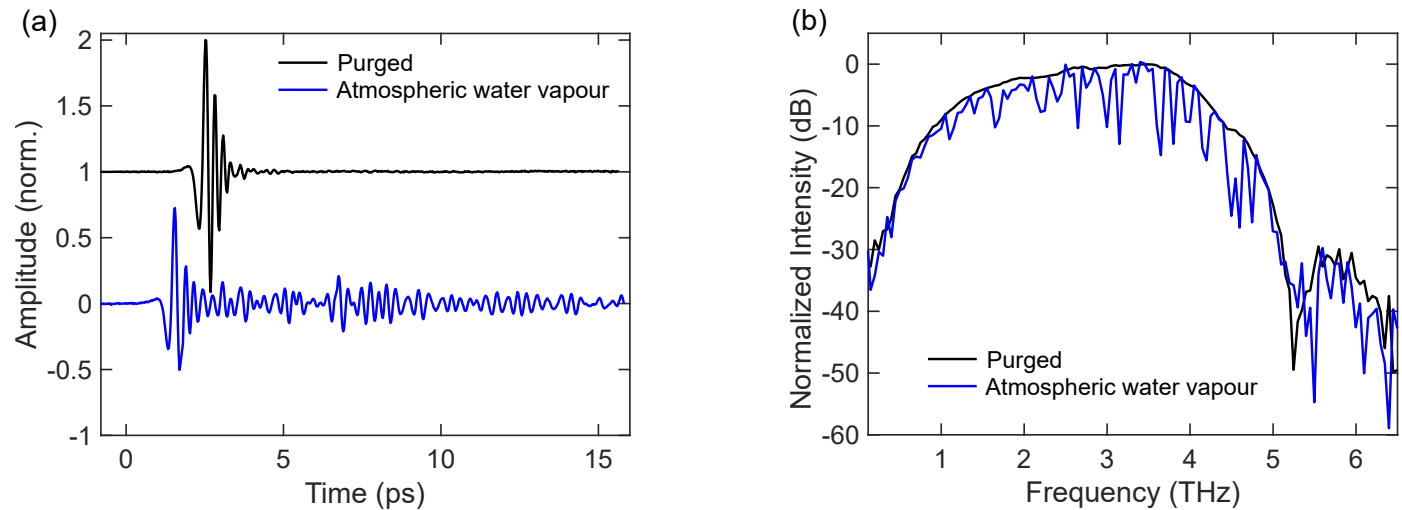


Fig:2 (a) Time domain signal before and after purging water vapour. Waveforms are offset along both directions for clarity.
(b) Respective intensity spectrum of the time trace.

Operating And Storage Conditions

Parameter	Min.	Max.
Operating temperature	18°C	25°C
Operating relative humidity	30 %RH	40 %RH
Storage temperature	18°C	25°C
Storage relative humidity	30 %RH	40 %RH

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