inspIRe™

Nanosecond Mid-IR TA Spectrometer

BE *MORE* DISRUPTIVE WITH *LESS* NOISE

Hardcore noise suppression technology that enables spectroscopic measurements that exponentially increase your understanding of functional devices, photocatalytic mechanisms, enzymatic reactions, and more—faster and easier than ever before.

It's the first broadband nanosecond mid-IR TA spectrometer in a true one-box platform—one that includes the pump laser, optical components, and all electronics. Safety, versatility, performance and ease of use in one compact unit.

The inspIRe™ utilizes our patented noise suppression technology to deliver **an unprecedented 100 ΔnanoO.D. detection limit with full 2D data collection of absorption versus time and wavelength**—changing the tune for the emerging science of mid-IR TA spectroscopy. Chemists, physicists, biochemists, engineers, materials scientists, and more can employ and utilize electronic and vibrational spectroscopy in the mid-IR like never before.

All from a **self-contained, compact instrument that enables fast data collection and unprecedented signal-to-noise**—without the intense training and maintenance required for traditional laser systems. No dedicated optics lab. No maintenance of complex lasers. Ready when the sample is.

State-of-the-art
TA Spectrometers.
Safe. Versatile.
User-friendly. Exceptional.

MAGNITUDE INSTRUMENTS™

Measurably Different.
TRANSIENT ABSORPTION SPECTROSCOPY

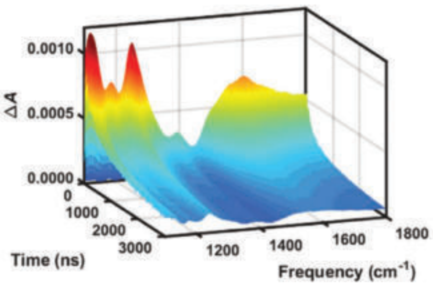
An exponential leap forward for nanosecond mid-IR Transient Absorption (TA) spectroscopy.

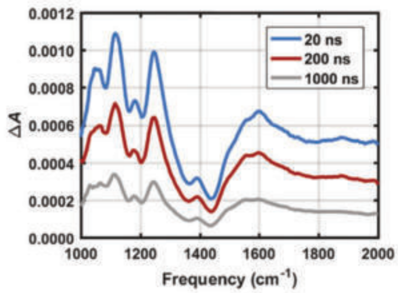
inspIRe™
Nanosecond Mid-IR TA Spectrometer

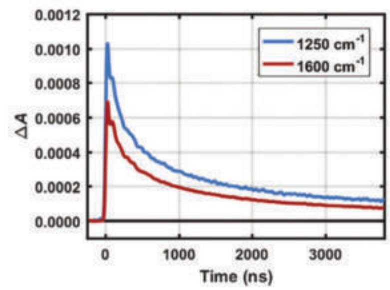
The first mid-IR transient absorption spectrometer sensitive enough to use excitation energies identical to operating conditions of photovoltaic and photocatalytic devices, eliminate thermal and nonlinear artifacts, and compatible with fragile biochemical systems.

State-of-the-art TA spectroscopy measurements can now be performed with little training, making the system ideal for user facilities, multi-disciplinary research groups, undergraduate labs as well as advanced users seeking adaptable performance.

For better solar cells. Batteries. Semiconductors. Catalysts. Enzymes.... inspIRe was named for its potential to inspire the future of transient absorption spectroscopy by enabling spectroscopic measurements that exponentially increase our understanding of functional devices, photocatalytic mechanisms, enzymatic reactions—faster and easier than ever before.







Our fully integrated, one-box system includes everything for dynamic results:

- ✓ Probe light source
- ✓ Excitation laser
- ✓ All optical components
- ✓ Large, modular sample compartment
- ✓ All electronics
- ✓ Detection system
- ✓ On-board computer
- ✓ Analysis & automation software

SPECIFICATIONS

Wow!

Detection Limits (single frequency)	**10^{-7} ΔO.D. (1 hr); 10^{-6} ΔO.D. (<1 min)**
Time Resolution	≥35 ns Spectoral Detector / ≥5 ns Broadband Detector
Time Range	Up to 130 ms *Depending on laser rep-rate.*
Spectral Resolution	2.5 – 20 cm^{-1}, Automated Control
Spectral Range	**2 – 11.7 µm** (850 – 5000 cm^-1)
Repetition Rate	8 Hz – 19 kHz (Automated Control, Internal Lasers)
Excitation Wavelength	266 nm, 355 nm, 532 nm, 1064 nm, or dual 355/532 nm (Internal Laser)
Sampling Rate	Up to 2 ns per sample
Size (inches)	**28 x 46 x 12**

Inspired by our new TA technology?
Call (717) 301-4300 to schedule an in-person or virtual demo today to discover how we can help you rock some world-changing science.

APPLICATIONS

- Charge trapping and recombination in electronic materials
- Dynamics of biological materials
- Chemical reactions...and so much more

HIGHLIGHTS

- One-box broadband mid-IR nanosecond-to-millisecond transient absorption spectrometer
- Unprecedented 100 ΔnanoOD detection limit enabling measurement of small vibrational signals
- Turn-key, user-friendly system with integrated pump laser with capability to accept additional external excitation sources
- No special laboratory requirements–operate on any lab bench or table
- Supports transmission and reflection probe light geometries
- Full time axis recorded with a single laser shot enables rapid signal acquisition; automated or user-defined frequency sampling for full 2D frequency-time data
- Time-resolved absorption spectroscopy with ≥5 ns time response and up to milliseconds of delay time
- Steady-state absorption spectrometry (e.g. measure vibrational spectra as in FTIR spectrometry)
- Time-resolved emission spectroscopy

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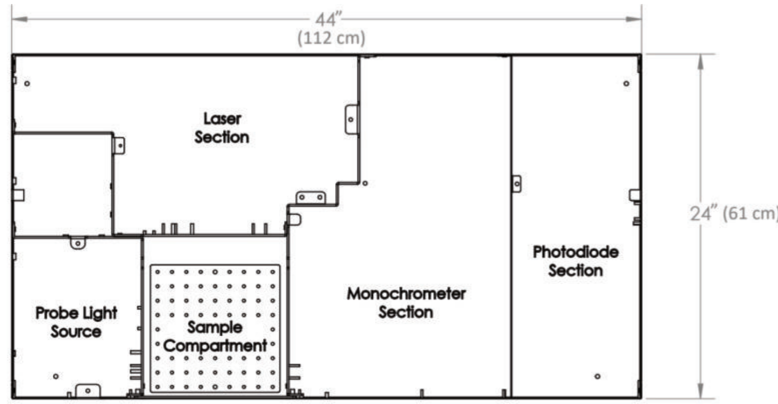

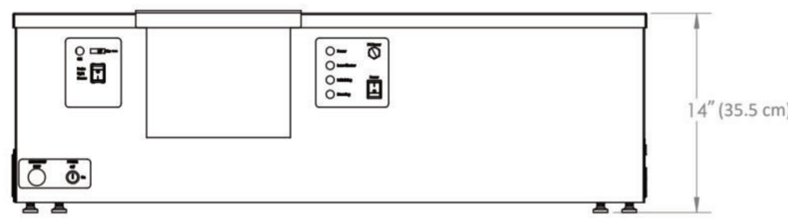

inspIRe™ Nanosecond Mid-IR TA Spectrometer	SPECIFICATIONS[1,2,3]
Probe wavelength range	2 - 11.7 µm (850 - 5000 cm^{-1})
Probe wavelength resolution	2.5 - 20 cm^{-1} (automated control) 10 cm^{-1} recommended
Excitation source (wavelength)	Internal pulsed Nd:YAG laser (1064, 532, 355, 266, or dual 532/355 nm) Compatible with a wide range of external lasers
Internal excitation laser rep-rate	Highest available ranges (lower rep-rate ranges available) • 0.4 - 18 kHz variable, automated (1064 or 532 nm) • 0.12 - 6 kHz variable, automated (dual 532/355 nm or 355 nm) • 0.24 - 10 kHz variable, automated (266 nm)
Time resolution	• ≤ 5 ns: Broadband detector (bandpass) • ≥ 35 ns: Spectral detector (monochromator)
Time window	• Up to 130 ms, depending on laser rep-rate
Variable bit resolution and sampling rate	• 8-bit (2 ns/point) • 12-bit (4 ns/point) • 14-bit (8 ns/point)
Detection limits (single wavelength)	• 10^{-7} Δ absorbance (one hour) • 10^{-6} Δ absorbance (one minute)
Instrument control	Fully automated control of instrument in software: time and frequency sampling, probe resolution, excitation rep-rate, etc.
Data Acquisition	Full time axis recorded with a single laser shot enables rapid data collection. User defined frequency sampling for full 2D, frequency-time data.
Sample Compartment	• Dimensions: 10" x 10" (255 x 255 mm) • Easily switch between pump/probe sample geometries using drop-in attachments • Capable of accommodating many sample holders including cryostats and flow cells
On board computer	High-end computer with graphics card, 16 GB RAM, and 512 GB SSD for real-time data collection and analysis
Software	Proprietary software for user friendly instrument control and data collection

[1] Specifications listed are for standard internal laser only
[2] Instrument can be customized to meet specific customer needs
[3] Due to our continuous product development, minimum specifications may change without notice .

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