

Transient Absorption Spectrometer (TAS)



Newport's Transient Absorption Spectrometer (TAS) is a state-of-the-art instrument for femtosecond pump-probe spectroscopy. In an ultrafast pump-probe experiment using TAS, the sample of interest is excited by the pump pulse and the dynamics of the sample are monitored as a function of time at many wavelengths by a white-light supercontinuum probe routed with reflective optics to minimize chirp. The probe light is sensed as a function of wavelength by the combination of a fiber coupled multichannel detector and imaging spectrograph, offering the optimum combination of sensitivity and dynamic range. Since TAS was designed with the scientific research community in mind, there is substantial flexibility in the configuration of the optical layout, detection range, and spectral resolution. TAS can be configured for ultrafast amplifiers and OPAs with repetition rates ranging from < 1 kHz to 1 MHz and comes with straightforward LabView[®]-based software. TAS incorporates Newport's highest quality optics, opto-mechanics, spectrograph, optical chopper, vibration control, delay-line

stage, and easy-to-use LabVIEW[™] based software to deliver high quality results with consistency.

Many options are available, including extended delay, automated beam steering, SHG pump, OPA pump, motorized sample holder, NIR probe generation and detection, UV-VIS probe reference, computer controlled pump power control, free space coupling to spectrometer, parabolic mirrors, femtosecond stimulated Raman spectroscopy, two-dimensional spectroscopy, extended warranty

For more information, please see <https://www.newport.com/f/transient-absorption-spectrometer>

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Specifications

TAS Specifications	Standard	Upgrade Options
Probe Spectral Range*	320-1100 nm	320-1600 nm
Pump-Probe Delay Range	4.3 ns	8.6 ns
Delay Stage Step Size	75 nm = 1 fs	75 nm = 2 fs
Delay Stage Bidirectional Repeatability	+/- 0.15 μm = +/-2 fs	+/- 0.15 μm = +/-4 fs
Delay Stage Maximum Speed	500 mm/s (6.67 ns/s)	500 mm/s (13.34 ns/s)
Delay Stage Maximum Acceleration	7.5 m/s ² = (100 ns/s ²)	7.5 m/s ² = (200 ns/s ²)
Supported Data Acquisition Rate	10 Hz - 2 kHz @ 14-bit	10 kHz @ 16-bit
Supported Laser Rate	1 Hz - 1 MHz	
Spectrometer Spectral Range**	300 to 1100 nm	200 nm to 20 μm
Spectrometer Spectral Resolution with Visible Camera**	< 2 nm	0.13 nm
Spectrometer Spectral Resolution with Near Infrared Camera **	< 2.5 nm	0.2 nm
Noise level ***	< 2 x 10 ⁻⁵ OD standard deviation in 5 seconds	
Visible Camera Range	200 – 1100 nm	
NIR Camera Range	650-1600 nm	1000 – 2600 nm
Probe wavelength range supported by optics	<320 nm to >2600 nm	
Breadboard Dimensions	2' x 3' (600 mm x 900 mm)	

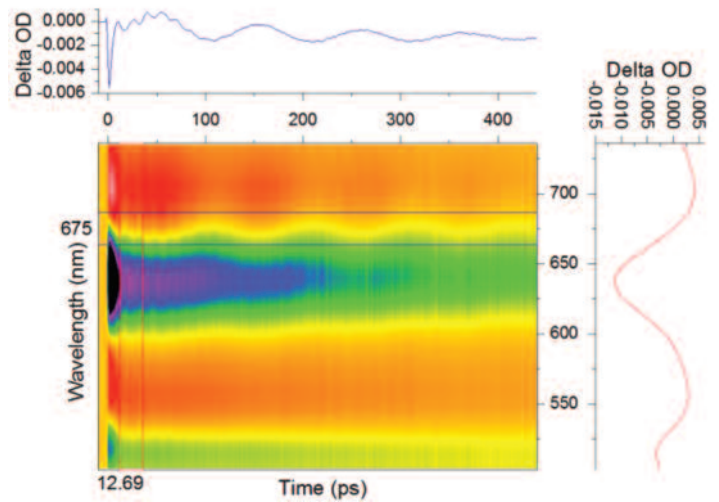
*The probe spectral range as listed relies on 1-2 μJ pulses with <120 fs pulse duration at 800 nm. Spectrum might be limited or shifted when using longer pulses or different fundamental wavelengths

**Spectrometer is limited by grating options chosen. Up to 3 gratings can be installed offering several resolutions and spectral ranges.

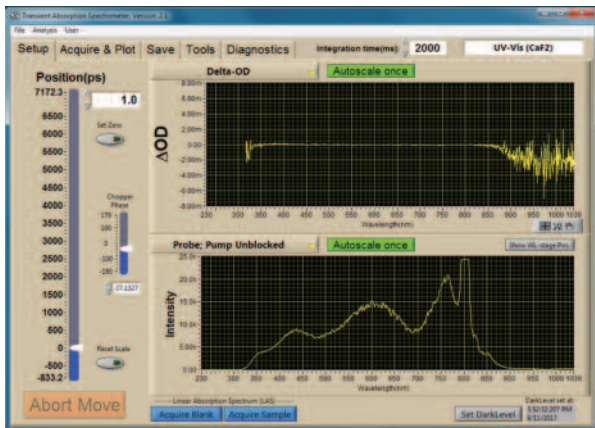
*** There are many factors contributing to the noise level including laser stability, repetition rate, use of reference channel, probe signal level after losses in sample, and environmental factors. The above is listed as a "best effort."



MS260i with dual-sensor UV-Vis camera and additional NIR camera on the axial output port.



A gold nanorod solution as tested in the Newport Technology and Applications Center



TAS Software GUI Setup tab with the CaF2 generated supercontinuum spectrum.



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