

HARPIA

Comprehensive Spectroscopy System



The HARPIA comprehensive spectroscopy system performs a variety of sophisticated time-resolved spectroscopic measurements in a compact footprint. It offers an intuitive user experience and easy day-to-day maintenance, meeting the needs of today's scientific applications.

The HARPIA-TA is a transient absorption spectroscopy system. Extension modules and customization options tailor the HARPIA system to specific measurement needs. In particular, it can be expanded using time-correlated single-photon counting and fluorescence upconversion (HARPIA-TF), third beam delivery (HARPIA-TB), and microscopy (HARPIA-MM) modules. HARPIA is designed for easy switching between measurement modes and comes with dedicated data acquisition and analysis software. Each module is contained in a monolithic aluminum body, ensuring excellent optical stability and minimal optical path lengths.

The HARPIA-TG is a novel transient grating spectroscopy system dedicated to the measurement of the diffusion coefficient and carrier lifetime. The fully automated and computer-controlled system enables the measurement in a matter of minutes.

For a single-supplier solution, the HARPIA spectroscopy systems can be combined with a PHAROS or a CARBIDE laser together with ORPHEUS or I-OPA series of OPAs.

APPLICATIONS of HARPIA-TA with modules:

- Transient absorption and reflection in bulk and microscopy
- Multi-pulse transient absorption and reflection
- Femtosecond fluorescence upconversion
- Femtosecond stimulated Raman scattering (FSRS)
- Picosecond-to-microsecond fluorescence TCSPC
- Intensity-dependent transient absorption and reflection
- Flash photolysis
- Z-scan

APPLICATIONS of HARPIA-TG:

- Transient grating spectroscopy
- Single-wavelength transient absorption

HARPIA | TA

Ultrafast Transient Absorption Spectrometer

FEATURES

- Market-leading sensitivity
- 330 nm – 24 μm spectral range
- Probe delay ranges from 2 ns to 8 ns
- Pump pulse energies down to nJ
- Cryostat and peristaltic pump support

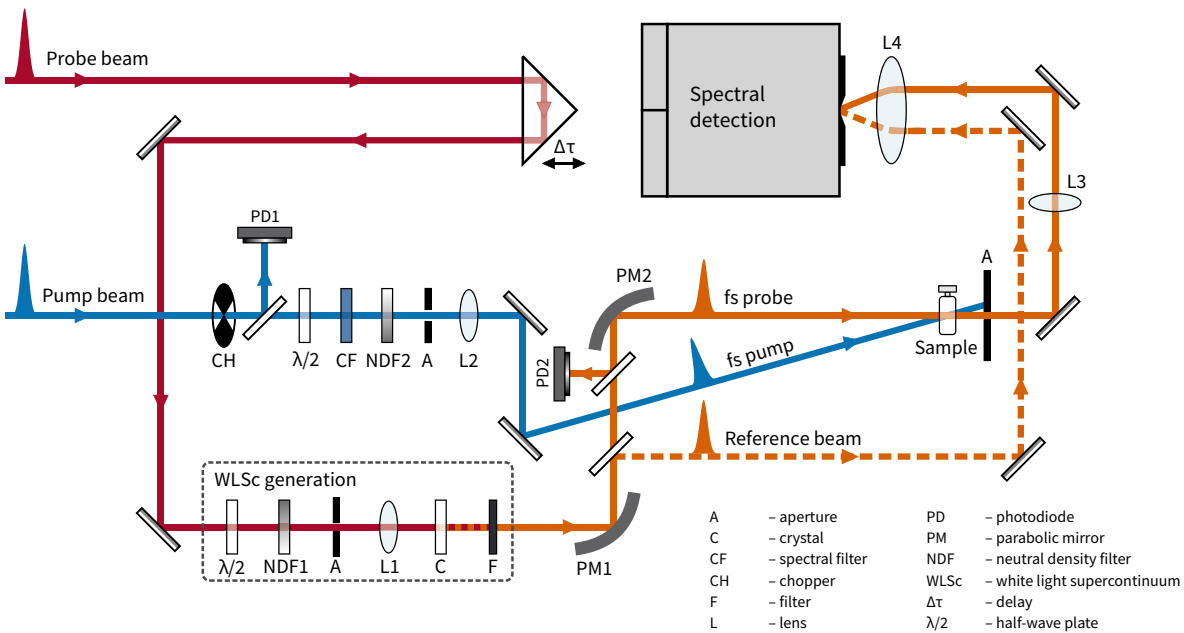


The HARPIA-TA ultrafast transient absorption spectrometer provides pump-probe measurement functionality in a HARPIA system. Several probe light configurations and detection options are available: from a photodiode for single-wavelength detection to white-light supercontinuum probing combined with spectrally-resolved broadband detection. HARPIA-TA features extensive automation options providing pump and probe beam position tracking and alignment, pump polarization control, supercontinuum generator switching, sample positioning, as well as switching between transient absorption and transient reflection measurements.

Broadband probe options cover a 330 – 1600 nm range, while a monochromatic probe can be used up to 24 μm. The probe delay stage is configurable from 2 ns to 8 ns.

HARPIA-TA features market-leading sensitivity of 0.05 mOD ($10^{-4} \Delta T/T$) and can be operated at high repetition rates of up to 1 MHz when used with a PHAROS or CARBIDE laser and an ORPHEUS series OPA, which allows the study of transient absorption dynamics with excitation pulse energies down to several nanojoules.

HARPIA-TA is compatible with cryostats and peristaltic pumps, and the capabilities of the spectrometer are extendable using expansion modules.



HARPIA-TA optical layout for pump-probe experiments

SPECIFICATIONS

Model	HARPIA-TA		
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PUMP-PROBE SPECIFICATIONS

Configuration	UV / VIS / NIR / SWIR			MIR
Probe excitation wavelength	1030 nm	515 nm	800 nm	n/a ¹⁾
Probe spectral range	460 – 1600 nm	350 – 750 nm	330 – 1400 nm	190 nm – 16000 nm ²⁾
Detection spectral range	200 – 1100 nm / 900 – 1700 nm / 900 – 2600 nm			2 – 13 μm ³⁾
Delay range	2 ns / 4 ns / 8 ns			
Delay resolution	2.1 fs / 4.2 fs / 8.3 fs			
Laser repetition rate	1 – 1000 kHz			
Temporal resolution	< 1.4× pump or probe pulse duration, whichever is longer			
Maximum data acquisition rate	4000 spectra/s			-
SNR ⁴⁾	250 : 1			-

OPTIONAL FLASH PHOTOLYSIS EXTENSION

Delay resolution	100 ps
Temporal resolution	2 ns
SNR ⁵⁾	40 : 1

DIMENSIONS

Physical dimensions (L × W × H) ⁶⁾	730 × 420 × 160 mm
Internal sample chamber area (L × W) ⁷⁾	205 × 216 mm

¹⁾ A wavelength-tunable source such as ORPHEUS-HP is used instead of a laser-excited white-light continuum.

²⁾ An extended tuning range of ORPHEUS-HP. Also applicable to UV / VIS / NIR / SWIR configuration.

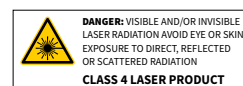
³⁾ Up to 24 μm available upon request; contact sales@lightcon.com for more details.

⁴⁾ Estimated as the standard deviation of a set of 2500 spectra measured in SCHOTT OG530 glass with 54 nJ, 370 nm pump and > 4.5 mOD at a maximum of the spectrum. Not applicable to all samples and configurations.

⁵⁾ Estimated as the standard deviation of a set of 2000 spectra measured in SCHOTT OG530 glass with 515 nm pump and > 10 mOD at a maximum of the spectrum. Not applicable to all samples and configurations.

⁶⁾ Without external spectrograph.

⁷⁾ External sample placement option is available.



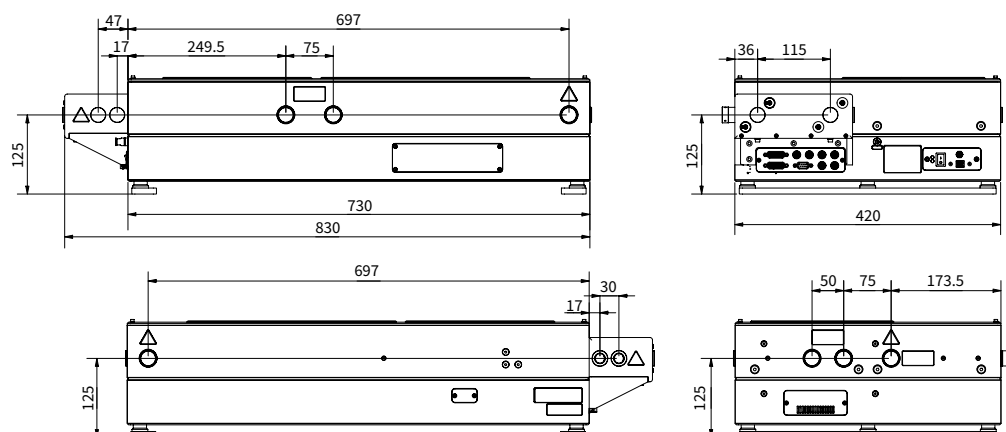
CRYOSTAT MOUNTING OPTION

HARPIA-TA supports cryostats that can be mounted externally or internally. For more details, contact sales@lightcon.com.



Internal cryostat mounting option

DRAWINGS



HARPIA-TA drawings