

FluoTime 300

High-End Photoluminescence Spectrometer



FluoTime 300 is a high-performance photoluminescence spectrometer for materials science, life science and photochemistry applications with the following capabilities:

- Steady-state and time-resolved (TCSPC, MCS) operation mode
- Highly modular and flexible design, optimal for upgradability
- Fully automated for lifetime ranges from picoseconds to seconds
- Spectral coverage from 230 to 1700 nm
- Superior sensitivity with > 32 000:1 water Raman SNR measured with PMA Hybrid detectors
- Single or double monochromator in excitation and emission
- Switchable double monochromator between additive and subtractive modes in emission
- Intuitive acquisition and analysis EasyTau 2 software with application wizards for easy and fast measurements
- Optionally available as laser class I system (or upgradable later to laser class I system)*

This outstanding system with superior sensitivity as well as spectral and temporal resolution includes the following data acquisition and analysis functions:

- Fluorescence and phosphorescence spectra
- Fluorescence and phosphorescence lifetime decay
- Steady-state and time-resolved fluorescence anisotropy
- Absolute photoluminescence quantum yield determination
- Emission-excitation matrix (EEM)
- Time-resolved photoluminescence (TRPL)
- Time-resolved emission spectra (TRES)
- Software-controlled, temperature dependent steady-state and time-resolved measurements
- Time-gated measurements up to hours

*Note: Upgrades to laser class I are only available for FluoTime 300 systems produced as of 2024.

Typical applications

Thanks to its highly flexible design and PicoQuant's over 25 years of experience in time-resolved technologies, the FluoTime 300 can investigate the following applications:

- Characterization of photovoltaics and solar cells
- Investigation of LEDs / OLEDs
- Study of nanostructures like quantum dots, nanoparticles, 1D and 2D materials
- Photophysical characterization of new materials e.g., dyes, nanoparticles, composites, inorganic complexes
- Analysis of semiconductor films and their properties
- Property studies of crystals and powders
- Low volume or low concentrated solutions measurements
- Temperature dependent investigations of different materials

Upgrades and add-ons

FluoTime 300 is highly modular and can be upgraded anytime later with the following options that make it future-proof for new methods, applications and materials.

- Micro-photoluminescence via confocal (MicroTime 100, MicroTime 200) or widefield (FluoMic) microscope coupling
- Steady-state CW lamp excitation with single or double excitation monochromator
- Integrating sphere for absolute photoluminescence quantum yield measurement
- Cryostats for deep temperature measurements down to 77 K or ≤ 4 K even
- Class 1 laser safety for systems produced after January 2024
- Special sample holders for materials science like a front face sample holder with integrated electrical connectors
- A broad range of (even customized) sample holders are available to enable the broad range of different applications

Specifications

Monochromators		
Type	single, Czerny-Turner design	double, Czerny-Turner design
Focal length	300 mm	2x 300 mm
Stray light rejection	10^{-5}	10^{-8}
Grating*	1200 g/mm, blazed at 300 nm in excitation 1200 g/mm, blazed at 500 nm in emission 600 g/mm, blazed at 1250 nm in emission	1200 g/mm, blazed at 300 nm in excitation 1200 g/mm, blazed at 500 nm in emission 600 g/mm, blazed at 1250 nm in emission
Resolution	0.30 nm	0.30 nm (subtractive), 0.15 nm (additive)
Step size (min)	0.01 nm (grating dependent)	0.01 nm (grating dependent)
Adjustable slit width	0-10 mm, (0-27 nm BP) (continuously adjustable and motorized)	0-10 mm (0-27 nm BP subtractive, 0-13.5 nm BP additive) (continuously adjustable and motorized)
Dispersion	2.70 nm/mm	2.70 nm/mm (subtr.), 1.35 nm/mm (add.)

Excitation sources		
Light source	Laser Diode Heads (LDH Series)	Pulsed LEDs (PLS Series)
Wavelength range	375 - 1990 nm	255 - 600 nm
Pulse width range	< 40 - 200 ps, up to 6,000 ps	400 - 1200 ps
Repetition rate	1 Hz up to 100 MHz	1 kHz up to 40 MHz ^a
Operation modes	Pulsed, CW and burst mode	Pulsed, CW ^a and burst mode ^a

Further excitation sources		
Light source	ps Fiber-Amplified Laser / -Systems	ps Laser Module (Prima)
Wavelength range	266, 280, 295, 355, 515, 530, 560, 590 nm	375, 405, 450, 485, 515, 640 nm
Pulse width range	< 80 up to < 100 ps	< 85 up to < 170 ps
Repetition rate	1 MHz ^{bc} up to 80 MHz	1 kHz up to 200 MHz
Operation modes	Pulsed mode	Pulsed, CW and fast switched CW mode
Light source	10 W pulsed Xenon lamp	300 W cw Xenon lamp
Wavelength range	200 - 1100 nm	200 - 1100 nm
Pulse width range	< 1 µs	
Repetition rate	1 Hz - 300 Hz	

Detectors				
PMT based	PMA-C 175	PMA-C 192	NIR-PMT 1400	NIR-PMT 1700
Spectral range	230 - 700 nm	230 - 920 nm	900 - 1400 nm	950 - 1700 nm
Dark counts (at 20°C)	< 50 cps	< 1,100 cps	< 10,000 ^d cps	< 200,000 ^d cps
TTS (FWHM)	< 180 ps	< 180 ps	< 370 ps	< 370 ps
Recom. max. count rate	< 5.0 MHz	< 5.0 MHz	< 1.5 MHz	< 1.5 MHz
PMA Hybrid	PMA Hybrid-07	PMA Hybrid-40	PMA Hybrid-42	PMA Hybrid-50
Spectral range	220 - 850 nm	300 - 720 nm	300 - 87 nm	< 370 - 920 nm
Dark counts (at 20°C)	< 150 cps	< 150 cps	< 200 cps	< 600 cps
TTS (FWHM)	< 50 ps	< 120 ps	< 130 ps	< 160 ps
Recom. max. count rate	< 80 MHz ^e			

TCSPC electronics			
TCSPC device	PicoHarp 330	TimeHarp 260 Pico	TimeHarp 260 Nano
Number of channels	1 + 4 ^f	1 + 1 or 2	1 + 1 or 2
Min. bin width	1 ps	25 ps / 2.50 ns (MCS)	250 ps
Max. number of time bins	65,536	32,768	32,768
Full scale time range	65,536 ps - 550 ms	819 ns - 170 s (MCS)	8.20 µs - 17.10 s
Interface	USB 3.0	PCIe 2.0 x1	PCIe 2.0 x1

Operation conditions	
PC requirements	Dual Core CPU (x86 chipset), min. 1.5 GHz CPU clock, min. 1 GB RAM memory
Operating system	Windows™ 10 / 11
Power requirements	110 V to 230 V, 50 / 60 Hz

Dimensions and weight		
Configuration	Single monochromator based	Double monochromator based
Without Xe lamp option	550 x 900 x 400 mm (w x d x h), 65 kg	550 x 1035 x 400 mm (w x d x h), 75 kg
With Xe lamp option	1100 x 900 x 400 mm (w x d x h), 90 kg	1460 x 1035 x 400 mm (w x d x h), 100 kg

^aFor PLS-IB only

^bDown to 10 Hz for selected heads

^cDown to 1 Hz for VisUV laser systems

^dValues provided by Hamamatsu

^eWith CW excitation

^fUpgradeable



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