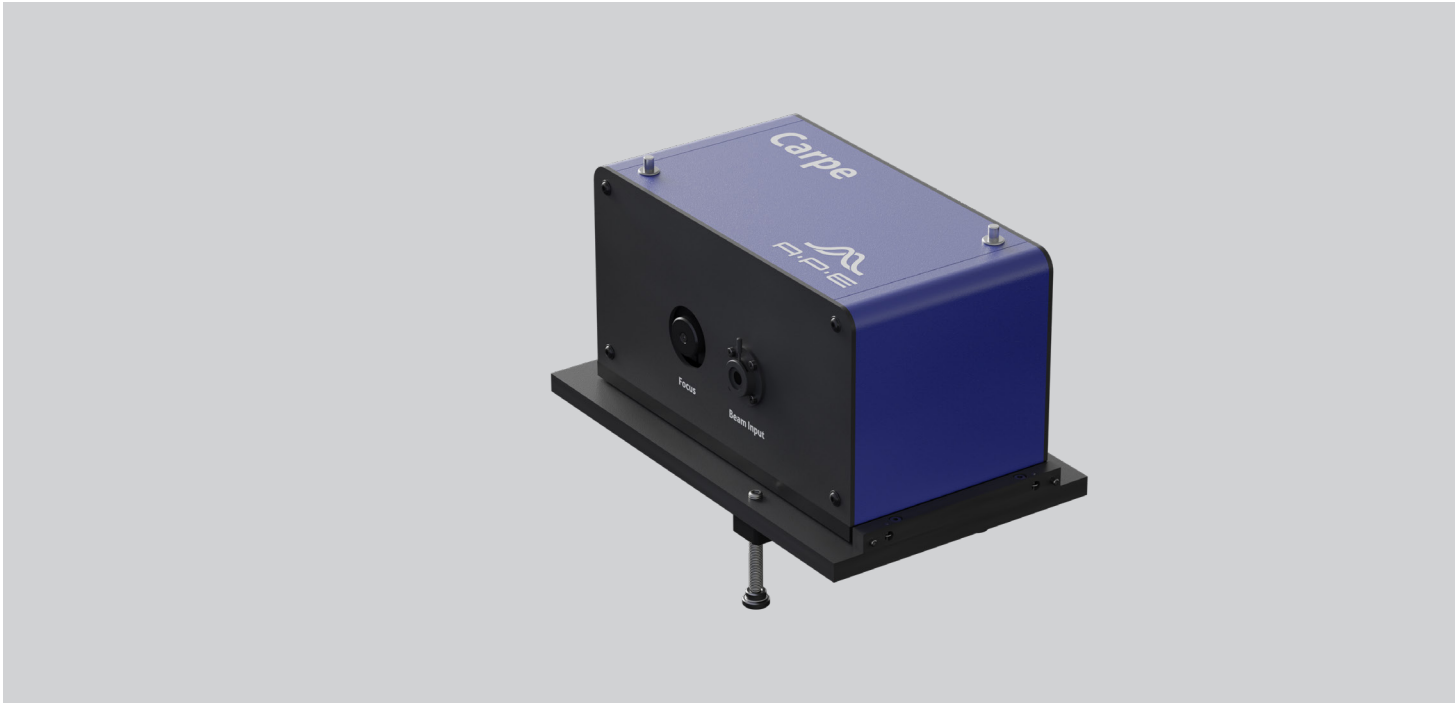
Carpe Autocorrelator for Microscopy & Lithography

Microscopy & Lithography Autocorrelator

APE's Carpe autocorrelator is designed to measure the pulse width of laser pulses directly at the sample location in a focus. It is therefore ideally suited for use in microscopy or lithography.

The Carpe autocorrelator measures the pulse width both at the sample location (e.g. behind the microscope optics) and at any other location between laser and sample. A comparison of the pulse widths obtained at these two locations allows the pulse broadening to be calculated and / or the pulse width to be optimized with a pre-chirper.

An additional power measurement (optional) at the sample location also supports systematic and quantitative studies on the laser power of ultrashort pulses.

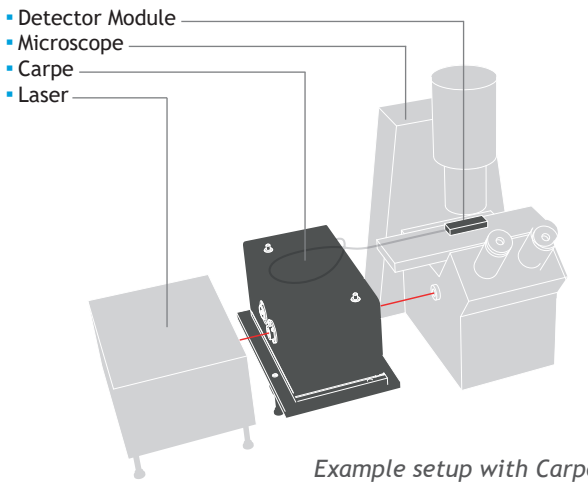


- Study the effect of pulse duration, power, and optics dispersion on microscopy imaging
- Measure pulse widths at the sample position and before microscope input
- Measure average power at sample position (optional)
- Estimate the peak power in conjunction with the pulse width
- Option: short working distance, e.g. for immersion objective lenses
- Option: pre-chirper femtoControl for pulse compression & dispersion compensation

Carpe Specifications

Carpe	UV	VIS	NIR	IR
Pulse width	30 fs … 3.5 ps			
Wavelength range	250 nm … 400 nm	420 nm … 700 nm	700 nm … 1250 nm	1250 nm … 2000 nm
Recommended repetition rate	>100 kHz			
Sensitivity*, typical	100 W^2	1 W^2		
Max. input power, pulse energy	0.5 W for quasi-cw laser 5 µJ for kHz laser			
Input beam polarization	Linear, horizontal			
Input beam coupling	Free-space with 6 mm aperture			
Input beam height	94 mm … 127 mm			
Measurement refresh rate	10 Hz			
Delay resolution	1 femtosecond			
Type of measurement mode	Collinear intensity			
Available detector types	Internal sensor: Two-Photon Absorption (TPA) External sensor: TPA exchangeable			
External AC sensor	Measures pulse width at sample location, included for same wavelength range as internal detector. For Carpe VIS, NIR, IR: Additional external sensors for other wavelength ranges are available and can be used with same base unit.			
External power sensor, optional	Measures power at sample location, wavelength range: 700 nm … 1050 nm, up to 300 mW			
Working distance	>4.5 mm	>0.5 mm or <0.5 mm optional e.g. immersion lenses		
Calibration	NIST traceable calibration certificate included			
Intensity resolution	16 bit			
Connectivity	USB, TCP/IP (SCPI command set)			
Remote control	Programmable via API			

* The sensitivity can be calculated as ($P_{average}$ * P_{peak}) = ($P_{average}^2$ / ($f_{rep.rate}$ * $\tau_{pulse\ duration}$)) = W^2. The resulting value of W^2 must be higher than the specification. Note: Sensitivity gives an approximation within an order of magnitude as it doesn't take into account other factors such as beam parameters and pulse quality.



Example setup with Carpe autocorrelator

Appendix Technical Drawings

All dimensions in mm

Carpe

- First choice for multiphoton microscopy

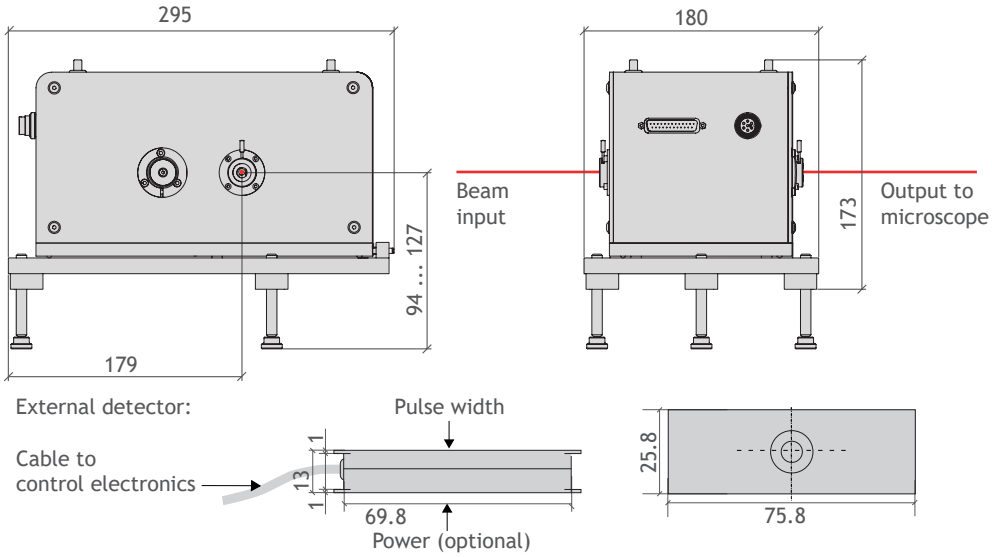


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