

pulseCheck The Modular Autocorrelator

Pulse Measurement Perfection with the Multitalent from APE

- It is good to have plenty of options at hand. Suitable for the characterization of virtually any ultrafast pulsed laser, the pulseCheck autocorrelator from APE covers the broadest possible range of wavelengths and pulse widths. This flexibility is achieved by using exchangeable Optics Sets, typically consisting of a nonlinear crystal and a dedicated detector module.



- Exchangeable Optics Sets for broadest spectrum coverage from 200 nm to 12 μm
- Pulse widths from as low as <10 fs all the way up to 400 ps
- Ultra-precise delay resolution
- Toggle between interferometric and intensity autocorrelation
- Wide range of sensitivity levels covered with PMT, PD, and TPA
- Automatic phase matching
- Gaussian, Sech^2 , and Lorentzian fitting routines
- Ready to use software and USB interface
- TCP/IP remote control with standardized command set for easy programming
- NIST traceable calibration
- Option: FROG for complete pulse characterization (page 8)

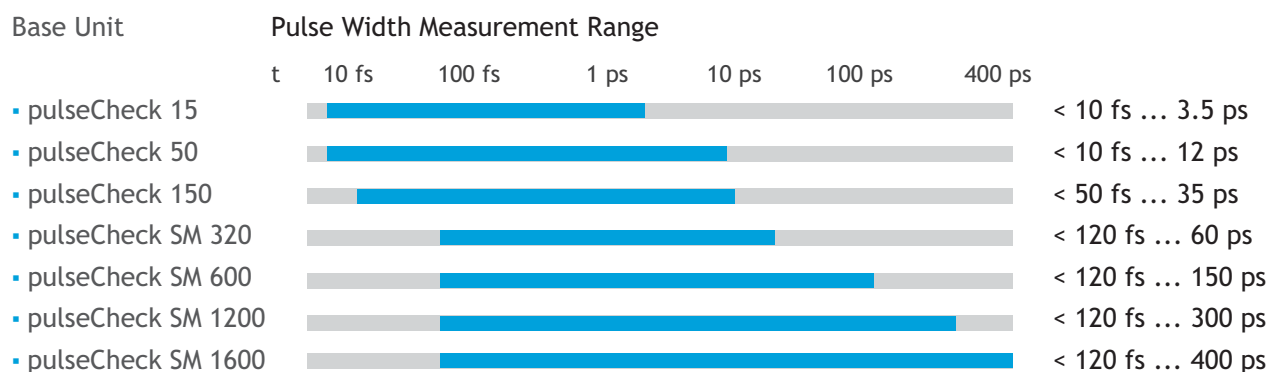
... Flexibility for your Experiments

Maximum Functionality through Modular Design

- APE fulfills a growing need for maximum functionality and flexibility with the modular concept on which its pulseCheck autocorrelator series is based.

1. From Ultrashort to Longer Pulses

- The various pulseCheck configurations can be optimized accordingly to suit your individual pulse width measurement needs. Extra-long pulse durations are accessible with pulseCheck SM, which utilizes fast and highly precise stepping motor technology to measure long pulses across a larger scan range.



2. High Sensitivity and Low Noise with Three Types of Detectors

- The three detector types address the need for low noise and enhanced sensitivity in different applications. For pulse measurement with extreme sensitivity and low pulse energy, we recommend our photomultiplier (PMT) detector. Spectrally enhanced photodiodes (PD, TPA), on the other hand, are the ideal choice for measurements requiring sensitivities of a few mW^2 .

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|-------------------------------|---|
| ▪ Photodiode Detector (PD) | Standard sensitivity up to 1 W^2 |
| ▪ Photomultiplier (PMT) | Highest sensitivity up to 10^{-6} W^2 |
| ▪ Two Photon Absorption (TPA) | High sensitivity up to 10^{-2} W^2 |

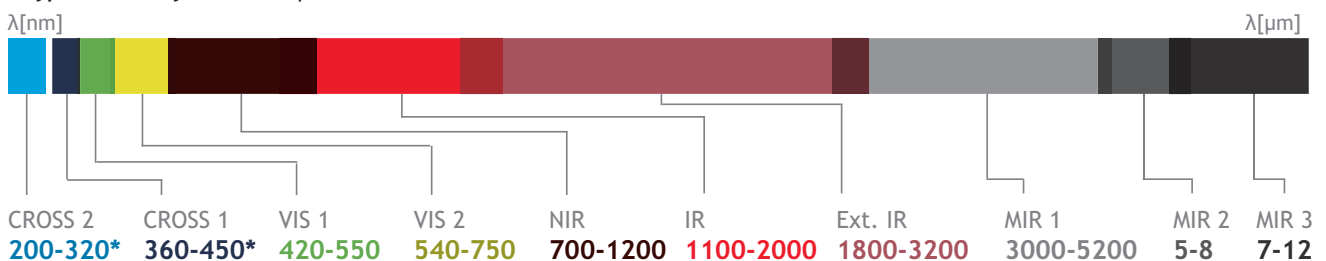
pulseCheck Unprecedented Wavelength Range

3. Ultimate Wavelength Range

- The detectors and Optics Sets available from APE cover a wide range of wavelengths, from UV at 200 nm to Mid-IR at 12 μm .

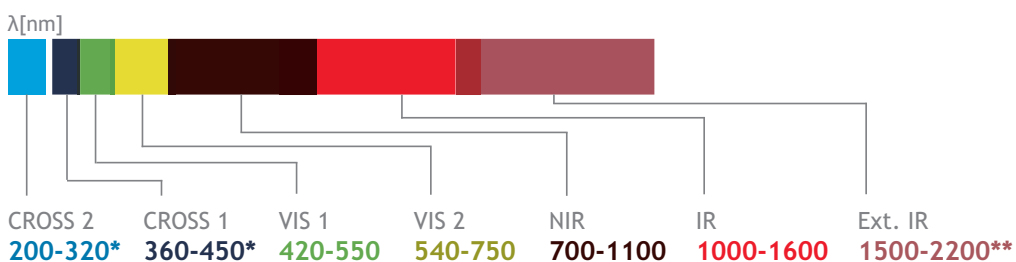
Photodiode (PD)

- Typ. Sensitivity: 1 W^2 • Rep. Rate: $> 10 \text{ Hz}$ • Measurement Mode: Collinear and Non-collinear



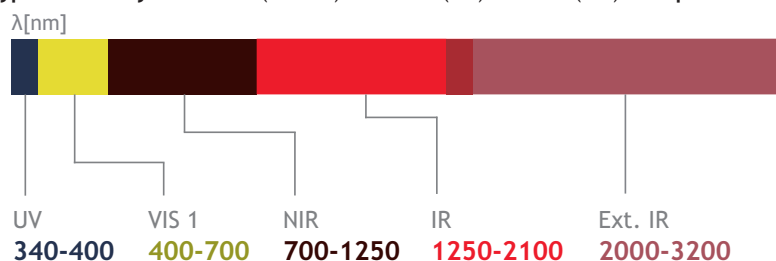
Photomultiplier (PMT)

- Typ. Sensitivity: up to 10^{-6} W^2 • Rep. Rate: $> 250 \text{ kHz}$ • Measurement Mode: Collinear and Non-collinear



Two Photon Absorption (TPA)

- Typ. Sensitivity: $< 0.1 \text{ W}^2$ (NIR/IR) $< 500 \text{ W}^2$ (UV) $< 50 \text{ W}^2$ (VIS) • Rep. Rate: $> 10 \text{ Hz}$ • Measurement Mode: Collinear Intensity



* For cross-correlation, wavelength range depends on pump wavelength

** For the wavelength range 1500 - 2200 nm we recommend to use the highly sensitive IR detector "Extended IR PD SELECTED"

pulseCheck Specifications

Specifications

Measurable Pulse Width Range	depending on Base Unit: < 10 fs ... 3.5 ps < 10 fs ... 12 ps < 50 fs ... 35 ps < 120 fs ... 60 ps < 120 fs ... 150 ps < 120 fs ... 300 ps < 120 fs ... 400 ps
Wavelength Range	200 nm - 12 μm, depends on Optics Set
Optics Sets	Exchangeable
Detector (Optics Sets)	PMT, PD, or TPA
Delay Resolution	< 0.001 % of scan range
Delay Linearity	< 1 %
Sensitivity	Typically 1 ... 10 ⁻⁶ W ² depending on Optics Set*
Recommended Repetition Rate	PD, TPA: 10 Hz and above; PMT: 250 kHz and above
Type of Measurement Mode	PMT, PD : non-collinear intensity, collinear interferometric; TPA: hybrid collinear intensity
Mode Switching	Available for PMT, PD
SHG Tuning for Phase Matching	PMT/PD: automatic; TPA: not applicable
Trigger Mode	TTL, f < 50 kHz; pulseCheck SM < 1 kHz
Input Polarization	Linear horizontal, vertical available as option
Input Beam Coupling	Free-space; Option: fiber coupling FC/PC, FC/APC, SMA
Max Input Power	1 W (e.g. oscillator with a rep. rate of approx. 70 MHz) or 10 μJ (e.g. amplified system with rep. rates in the kHz range), whichever results in lower value
Input Aperture	6 mm (free-space)
Software	Included; Real-time display of pulse width and central wavelength, different fitting routines
Fitting Routine	Gaussian, Sech ² , Lorentz
Connection	USB
Remote Control	Possible via TCP/IP (SCPI command set)
Calibration	NIST traceable calibration certificate included

Options

- Various Optics Sets incl. detector
- Fiber coupling
- Polarization rotator
- FROG**

Dimensions and Power

Dimensions	250 x 190 x 315 mm (pulseCheck 15 / 50) Different dimensions for pulseCheck 150 and SM series (See appendix for details)
Power	95 ... 240 V, 50 ... 60 Hz, 60 W

* Measured sensitivity including Optics Set, defined as average power times peak power of the incident pulses $P_{AV} * P_{peak}$

** Except for pulseCheck SM models