FROG

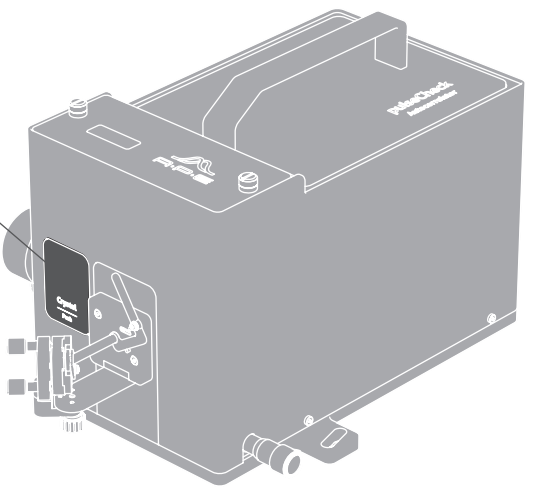
Complete Pulse Characterization with pulseCheck NX and FROG Option

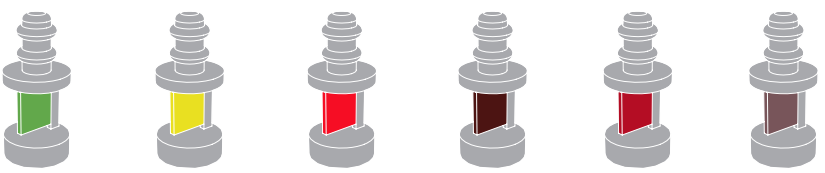
Second harmonic generation FROG is the most popular spectrometer-less Frequency Resolved Optical Gating method. The pulseCheck NX autocorrelators by APE optionally integrate FROG, giving access to complete pulse characterization. This option opens the door to complete spectral and temporal pulse measurements.

Crystal Module

FROG Setup:

1. Crystal module within pulseCheck
2. Replacement focus mirror
3. FROG software upgrade





VIS I	VIS II	NIR	IR I	IR II	Ext. IR I
420-550	550-700	700-900	900-1200	1200-1600	1800-2200

Different crystal modules for various wavelength ranges.

- Complete spectral and temporal pulse characterization
- Different crystal modules available to cover wavelengths from 420 ... 2200 nm
- FROG trace data processing and visualization with included software
- Pulse width ranges from as low as 20 fs up to 6 ps
- High spectral resolution up to 0.1 nm
- Available for the pulseCheck NX autocorrelator*

* Required laser rep. rate >10 kHz

... FROG Pulse Characterization Software

FROG Trace

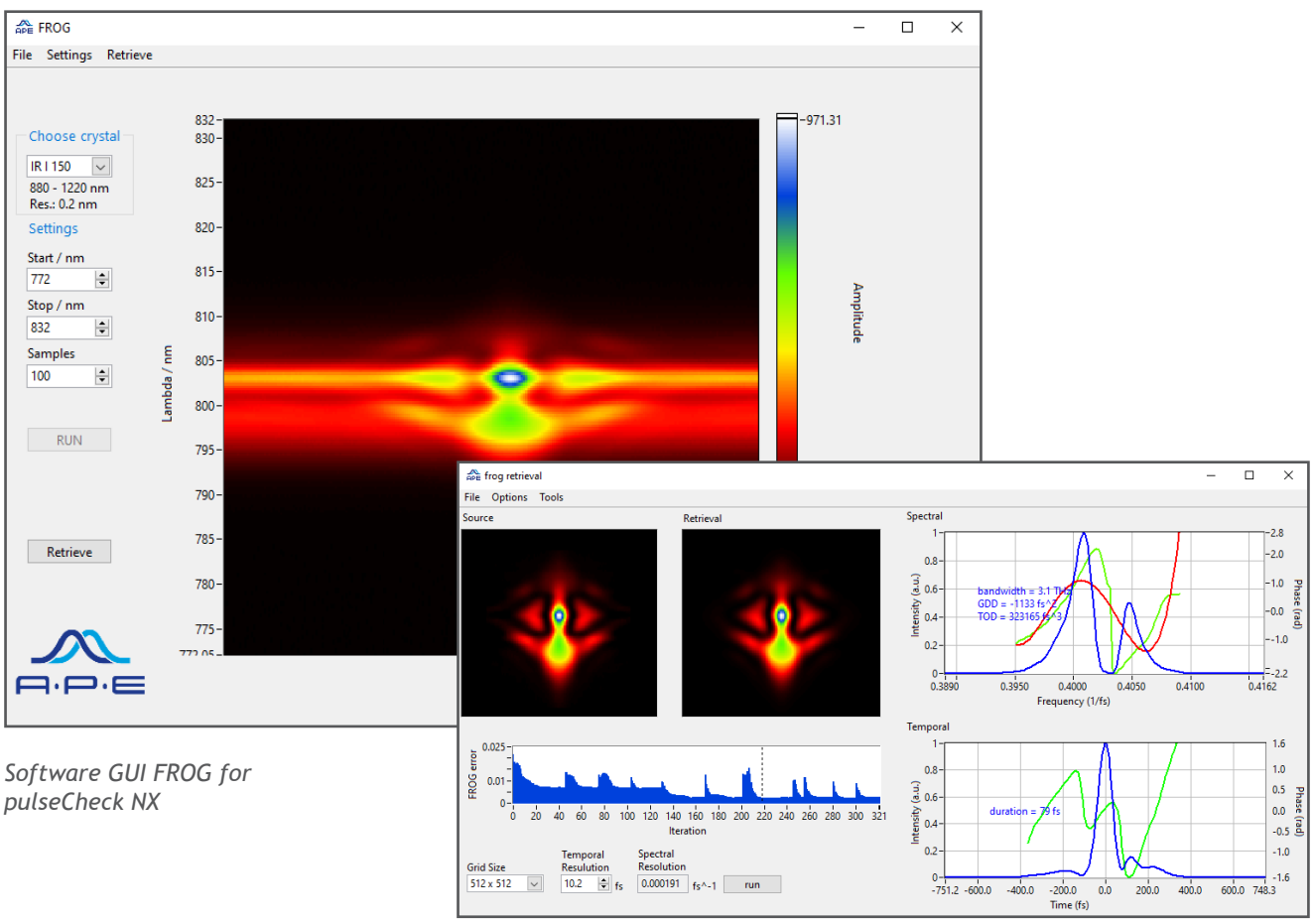
The software provides laser pulse intensity as a function of time and frequency (wavelength). Results are visualized in the form of a FROG trace diagram as well as pulse shape and spectrum.

It is a matter of seconds to automatically find the required phase matching tuning angle - thanks to the automated phase matching routine by pulseCheck NX.

Wavelength and Pulse Width Coverage

Various crystals guarantee coverage of wavelengths from 420 nm up to 2200 nm and pulse widths from 20 fs to 6 ps (numbers given for Fourier transform limited pulses). High spectral resolution down to 0.1 nm is supported.

The FROG option is designed for laser repetition rates above 10 kHz and is available for the pulseCheck NX autocorrelator series (except for pulseCheck SM 2000).



Software GUI FROG for pulseCheck NX

FROG Crystals

FROG crystals	Wavelength range	Pulse width range	Required spectral bandwidth	Spectral measurement resolution
VIS-I-200	420 nm … 550 nm	>200 fs	>1 nm	0.1 nm
VIS-I-50	420 nm … 550 nm	50 fs … 200 fs	>3 nm	0.3 nm
VIS-I-20	420 nm … 550 nm	20 fs … 70 fs	>10 nm	1.0 nm
VIS-II-150	550 nm … 700 nm	>150 fs	>1 nm	0.1 nm
VIS-II-50	550 nm … 700 nm	50 fs … 200 fs	>3 nm	0.3 nm
VIS-II-20	550 nm … 700 nm	20 fs … 60 fs	>20 nm	2.0 nm
NIR-200	700 nm … 900 nm	>200 fs	>1 nm	0.1 nm
NIR-50	700 nm … 900 nm	50 fs … 500 fs	>2 nm	0.2 nm
NIR-20	700 nm … 900 nm	20 fs … 50 fs	>30 nm	3.0 nm
IR-I-150	900 nm … 1200 nm	>150 fs	>2 nm	0.2 nm
IR-I-60	900 nm … 1200 nm	60 fs … 200 fs	>10 nm	1.0 nm
IR-I-30	900 nm … 1200 nm	30 fs … 60 fs	>50 nm	5.0 nm
IR-II-100	1200 nm … 1600 nm	>100 fs	>5 nm	0.5 nm
IR-II-50	1200 nm … 1600 nm	50 fs … 100 fs	>20 nm	2.0 nm
IR-II-30	1200 nm … 1600 nm	30 fs … 50 fs	>90 nm	9.0 nm
Ext. IR-I-50	1800 nm … 2200 nm	>50 fs	>190 nm	19 nm

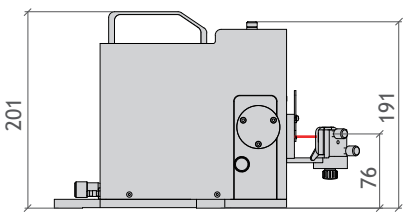
A FROG crystal is suitable if the "Pulse width range" matches or, if the actual spectral bandwidth of the laser is wider than the "Required spectral bandwidth".

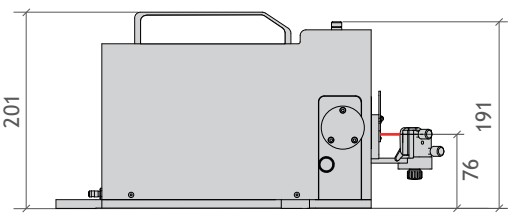
Appendix Technical Drawings

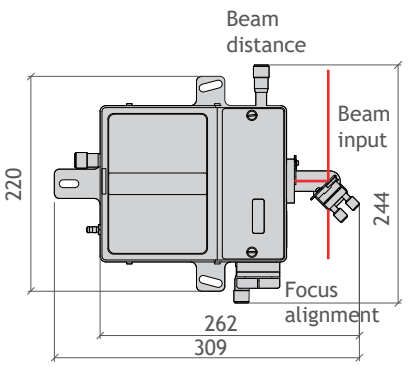
All dimensions in mm

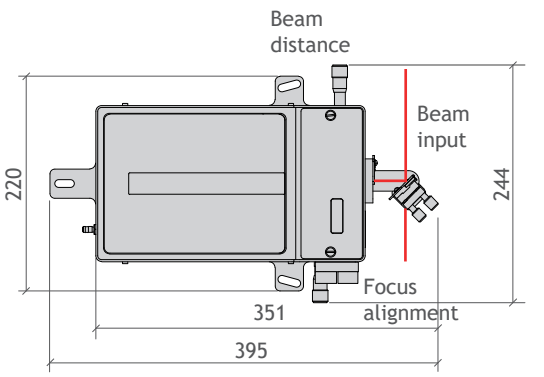
pulseCheck NX

- Multitalent
  for any task









Contact

APE Angewandte Physik & Elektronik GmbH
Plauener Str. 163-165|Haus N|13053 Berlin|Germany
T: +49 30 986 011-30
F: +49 30 986 011-333
E: sales@ape-berlin.de
www.ape-berlin.de

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Therefore, specifications are subject to change without notice.