

# FROG Option for *pulseCheck* USB



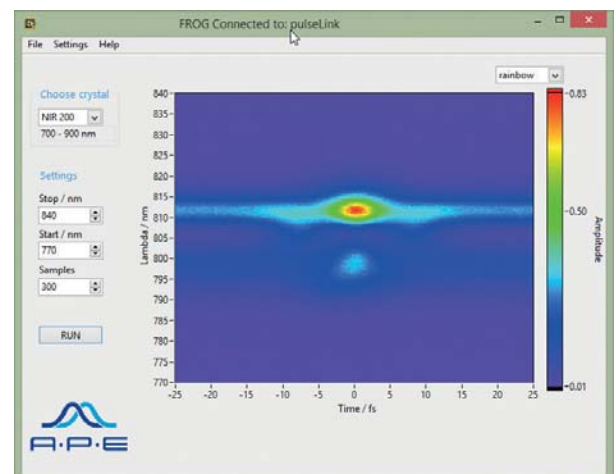
A·P·E *pulseCheck* USB autocorrelators can be modified to acquire FROG (Frequency Resolved Optical Gating) data of pulses in the femtosecond and picosecond range. While the standard autocorrelator provides temporal pulse characterization (autocorrelation only), the FROG Option offers access to the frequency domain of the ultrafast pulses, enabling pulse characterization and analysis in the temporal as well as spectral domain. The phase information is automatically calculated from the retrieved data by the Software.

## Functionality

The FROG Option provides access to spectral information, with the same simplicity as standard pulse width measurements with the *pulseCheck* USB. Only small modifications of the *pulseCheck* USB with FROG Option are needed: the non-linear crystal and possibly a mirror needs to be exchanged, which can be done in-field by the user.

With the retrieval software analysis of the data is fast and easy and does not require extra training.

This single point detector approach allows covering an extremely wide spectral range with high sensitivity.



Measured FROG raw data

- Complete pulse characterization in one instrument
- No spectrometer needed
- High sensitivity
- Broad spectral coverage (VIS to IR Optics Sets)
- Pulse width range 20 fs to 1 ps
- Simple add-on solution for standard *pulseCheck* USB as well as existing *pulseChecks*



## Option for Autocorrelator Full Laser Pulse Characterization

### Specifications

Pulse width range	20 fs ... 1 ps <sup>1)</sup>
Wavelength range	410 nm ... 1.6 μm <sup>1)</sup>
Spectral resolution	~ 0.1 nm (for pulses > 1 ps) ... 10 nm (for pulses < 30 fs)
Sensitivity <sup>2)</sup>	< 1 W <sup>2</sup>
Laser repetition rate	≥ 100 kHz (for lower repetition rates (minimum 10kHz) a FROG trace may take several minutes for acquisition.)

1) Several FROG crystals and subsequent Optics Sets required

2) Sensitivity is defined as average power times peak power of the incident pulses  $P_{AV} * P_{Peak}$ .

### Description

After defining parameters in the software, e.g. for wavelength range, resolution and pulse width range, the automated measurement of the FROG raw data takes place. The crystal turns automatically in small steps, and at each position an autocorrelation trace is recorded. The resulting intensity matrix is shown as a FROG pattern and the retrieval software calculates the spectral and temporal shape and phases, i.e. electric fields.

### Components of the FROG Option

- A specific non-linear crystal, can easily exchanged by the user against the standard crystal
- A mirror (depending on configuration)
- PC data acquisition software

#### Contact:

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

or

A-P-E America (for the Americas)  
45401 Research Avenue | Suite 141 | Fremont, CA 94539 | USA  
T: +1 (888) 690 3250 | E: sales@ape-america.com | www.ape-america.com

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