

## Fast FROG

FROG stands for Frequency Resolved Optical Gating. Based on Second Harmonic Generation, Fast FROG is reliable and compact. Key design features, such as the wavefront division technique and the use of our mini imaging spectrometer MISS, make the Fast FROG very easy to use and versatile while leading to accurate measurements. Six models are available, covering different pulse duration ranges from sub-5 fs to 10 ps, over a broad spectral range. Two designs are available: one for long pulses mainly relying on transmission optics, and one for ultrashort pulses which is fully achromatic.



### Key features

- ◆ Easy to use: no calibration and no tweaking necessary
- ◆ User-friendly and powerful software (*STAR* : Software Technology for Acquisition and retrieval)
- ◆ Can access Spatio-Temporal couplings (Spatial Chirp, Pulse Front Tilt)
- ◆ Versatile: *instant-swap* of spectrometer for different wavelength ranges
- ◆ Broad available spectral range (480 – 2100 nm)
- ◆ Phase loop compatible with several pulse shaper for fast compression
- ◆ Suitable for any repetition rate
- ◆ Single-pulse extraction possible up to 80 kHz laser repetition rate
- ◆ Sub-5 fs can be measured
- ◆ Achromatic and non-dispersive (FC and FS models)
- ◆ Fiber connector available (FC/APC, FC/PC)

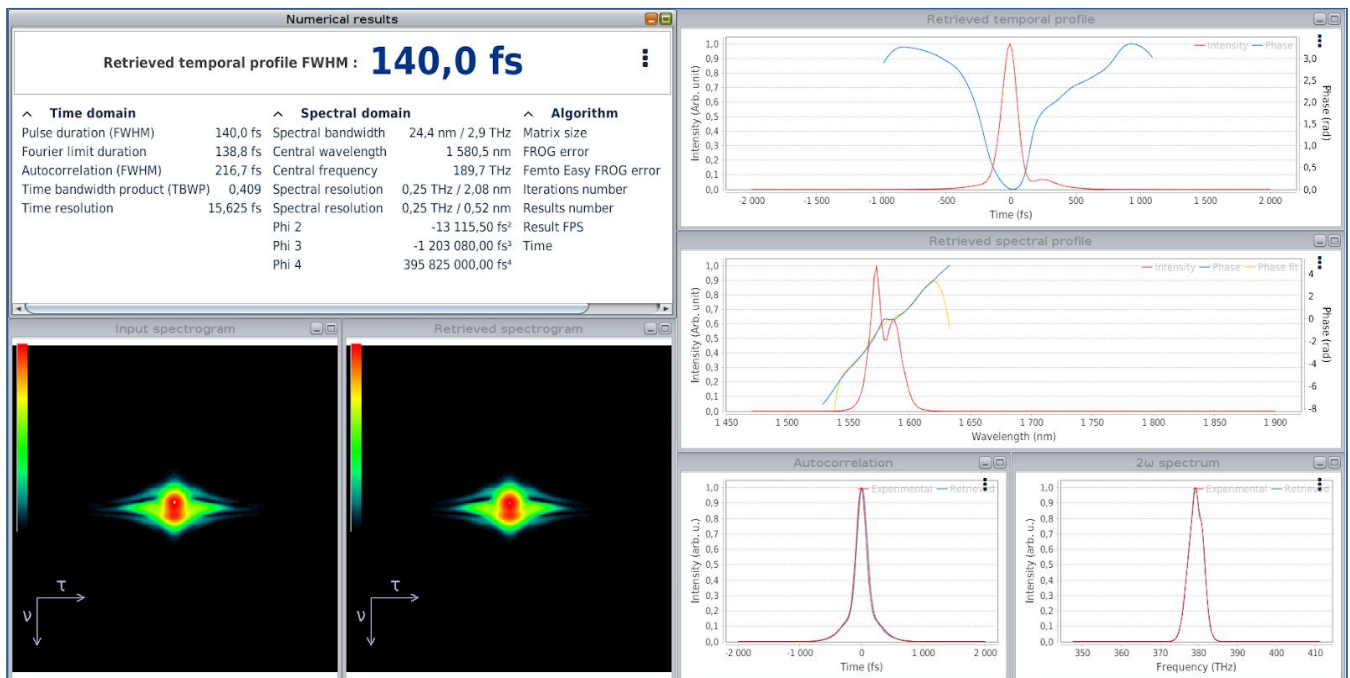
# Specifications

| Fast FROG Models                     |             | FC   | FS               | PS1              | PS3    | PS5    | PS10                    |  |
|--------------------------------------|-------------|--|------------------|------------------|--------|--------|-------------------------|--|
| Pulse duration range                 | min         | 4 fs   | 10 fs            | 50 fs            | 100 fs | 150 fs | 300 fs                  |  |
|                                      | max         | 150 fs   | 250 fs           | 1 ps             | 3.5 ps | 5 ps   | 10 ps                   |  |
| Accessible spectral range (nm)       |             | 480 - 2100 <sup>1</sup>  |                  |                  |        |        | 800 - 2100 <sup>1</sup> |  |
| Spectral Window $\Delta\lambda$ (nm) |             | 580 <sup>1</sup>   | 420 <sup>1</sup> | 300 <sup>1</sup> |        |        |                         |  |
| Input pulse repetition rate          |             | single-shot to GHz <sup>2</sup>  |                  |                  |        |        |                         |  |
| Single-pulse measurement             |             | Up to 80 kHz laser repetition rate (with synchronization, or 40 kHz without) |                  |                  |        |        |                         |  |
| Min input pulse energy <sup>3</sup>  | Single-shot | 250 $\mu$ J  | 1 $\mu$ J        | 1 $\mu$ J        |        |        |                         |  |
|                                      | 1 kHz       | 10 $\mu$ J   | 100 nJ           | 50 nJ            |        |        |                         |  |
|                                      | 50 MHz      | 20 nJ  | 1 nJ             | 200 pJ           |        |        |                         |  |
|                                      | 1 GHz       | n/a  | 50 pJ            | 25 pJ            |        |        |                         |  |
| Input polarization                   |             | linear vertical  |                  |                  |        |        |                         |  |
| Detection                            |             | CMOS 12 Bits – 3 Mpx – 72 dB   |                  |                  |        |        |                         |  |
| PC Interface                         |             | USB 3.1 (or GigE as an option)   |                  |                  |        |        |                         |  |
| Beam height (mm)                     |             | 75 - 155   |                  |                  |        |        |                         |  |
| Dimensions (mm)                      |             | 326 x 194 x 129  |                  |                  |        |        |                         |  |

<sup>1</sup> Effective spectral bandwidth to be defined within the accessible spectral range according to customer's requirements. Additional spectrometers can be provided to address different spectral windows

<sup>2</sup> The measurements are averaged over several pulses for laser with repetition rate higher than 80 kHz.

<sup>3</sup> Those values give an order of magnitude, with "low energy" option when applicable. The exact sensitivity depends on many parameters (pulse duration, beam profile, wavelength...)



- ◆ Live extraction of shot to shot pulse properties: temporal profile intensity and phase, fundamental spectrum and phase, Chirp, Third-order dispersion...
- ◆ Several algorithms (including the Ptychographic Iterative Engine) are combined to enhance the reconstruction speed and quality
- ◆ Enhanced background & hot pixels treatment, for optimum dynamic and signal to noise ratio
- ◆ Client / Server interface, allowing remote control through network
- ◆ All data exportable into most common formats