

Rincon Cross-Correlator

Pulse Profiling Systems



How good is the output from your femtosecond laser? The new third-order cross-correlator was specifically developed for measuring a wide array of output parameters from ultrafast laser systems including: contrast ratio of laser pulses, determining pulse pedestal, pre- and post-pulses, and amplified spontaneous emission in femtosecond systems. It also provides information about the third-order cross-correlation function of pulse intensity on a femtosecond scale and can be used for alignment of high power femtosecond lasers. A portion of the input pulse is converted to the second harmonic (SH) with a nonlinear crystal. A dichroic mirror reflects the SH and transmits the fundamental thus splitting the beam into the two arms of the cross-correlator. The fundamental beam arm includes a retro reflector and delay-line. After passing through the delay-line the fundamental is recombined with the SH and focused into a DKDP or BBO crystal (depending on the input pulse wavelength). Mixing the fundamental and SH pulses in the nonlinear crystal produces non-collinear third harmonic generation (TH). By filtering out the fundamental

and SH frequencies, the TH can be isolated. Measuring the TH signal as a function of the optical delay between the fundamental and SH pulses gives the third order cross correlation function.

The third order cross-correlator is ideal for looking at the full range of output from amplified femtosecond laser systems. High temporal resolution over a long (close to 1 ns) window shows pulse features that are usually missed, giving the user a detailed and complete picture of the quality and stability of the output pulse parameters of their femtosecond laser system.

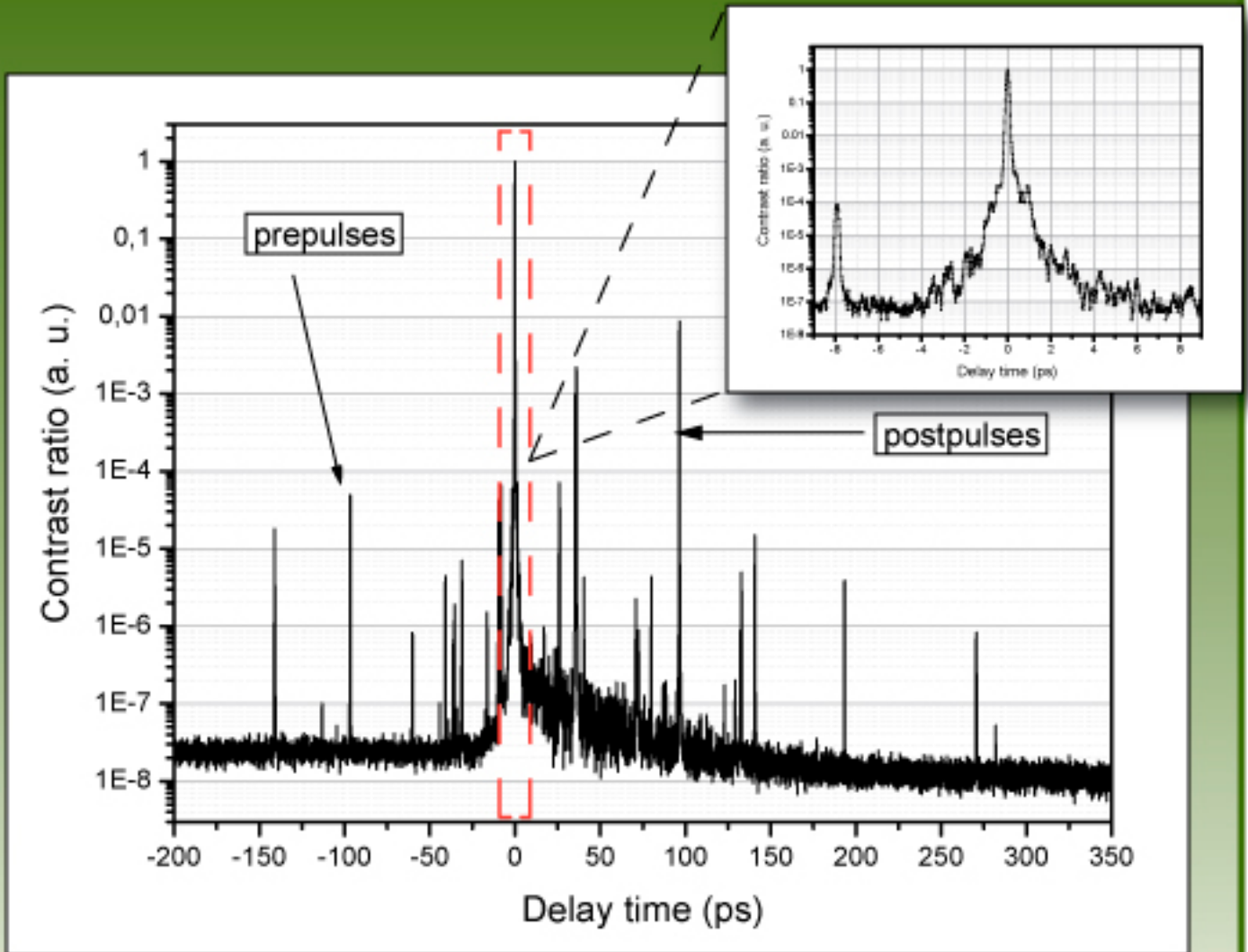
Our cross-correlator includes opto-mechanical assembly and electronics connected with USB interface for a PC. The system is easy to operate and includes a full set of user friendly software tools for data collection and analysis.

Cross-Correlator Specifications

- Wavelength : 800-1250 nm
- Pulse width : >20 fs
- Input pulse repetition rate : <3 kHz
- Dynamic range : 10^{10}
- Temporal range : 950 ps
- Input power: <300 mW
- Resolution - 70 fs
- Input polarization - linear- horizontal
- Electric power - 220V AC, 50/60 Hz \pm 10%
- Dimension:
 - optical unit – 430 mm x 333 mm x 155 mm
 - control unit – 280 mm x 195 mm x 70 mm

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Cross-correlation measurements of a regenerative amplifier taken over a range of 550 ps show pre-pulses, post-pulses, and the main pulse relative to the ASE level. A 16 ps scan of the main peaks (inset) shows further temporal structure of the main peak. The relative strength of the secondary peaks is easily seen at both ranges.



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