

Compact, Few-Cycle, CEP-Stable OPCPA Systems

Few-cycle pulses in a compact footprint

Industrial-grade pump:
up to 480 W, 20 mJ

High repetition rate, up to MHz

High-contrast variable-bandwidth seed
source for CPA and OPCPA systems

CEP stabilization option



Specifications

Center wavelength ¹⁾	800 nm	1050 nm	1600 nm	2000 nm
Pump source	CARBIDE or PHAROS			
Pump power	20 – 480 W			
Pump pulse energy	0.2 – 20 mJ			
Repetition rate	1 kHz – 1 MHz			
Conversion efficiency ²⁾	> 7%	> 6%	> 10%	> 9%
Pulse duration ^{2) 3)}	< 10 fs / < 15 fs	< 40 fs / < 300 fs	< 40 fs	< 25 fs
CEP stability, 1 h ^{2) 4)}	< 250 mrad			
Temporal contrast	≥ 10 ¹⁰ : 1, from –500 to –50 ps ≥ 10 ⁹ : 1, from –50 to –15 ps ≥ 10 ⁶ : 1, from –15 to –5 ps		n/a ⁵⁾	
Long-term power stability, 8 h ^{2) 6)}	< 1.5%			
Pulse-to-pulse energy stability, 1 min ^{2) 6)}	< 1%			

¹⁾ Typical wavelengths, other wavelengths are available. For custom inquiries, contact sales@lightcon.com.

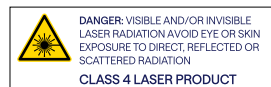
²⁾ Typical values. For custom inquiries, contact sales@lightcon.com.

³⁾ Uncompressed pulses available for seeding larger amplifiers.

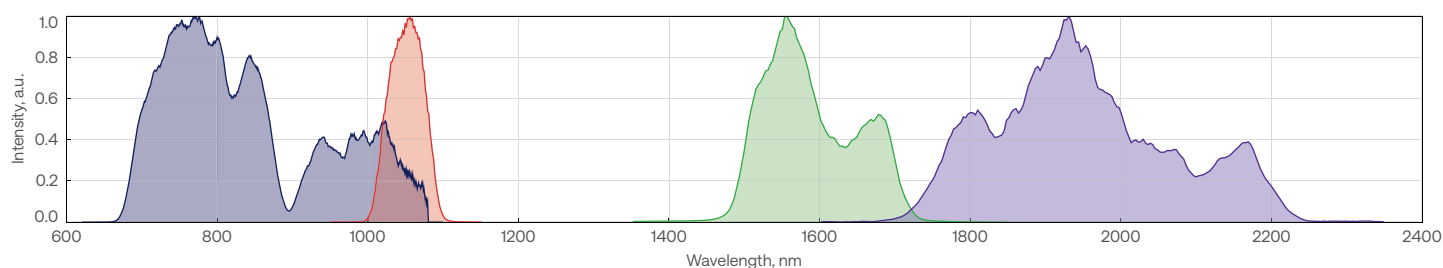
⁴⁾ CEP values calculated from unaveraged, single-shot measurements.

⁵⁾ Although the pulse contrast is not quantified, the identical OPA architecture is already validated at 800 nm and 1050 nm.

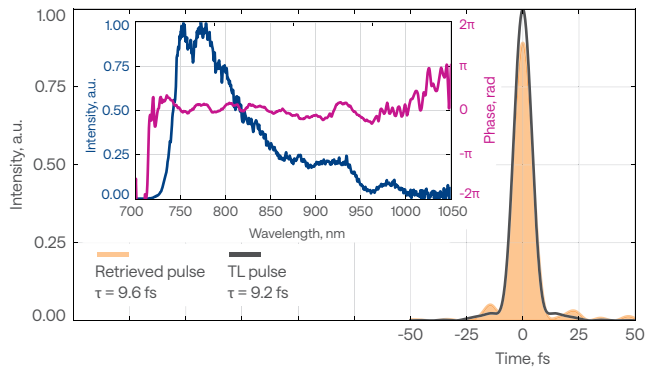
⁶⁾ Expressed as normalized root mean squared deviation (NRMSD).



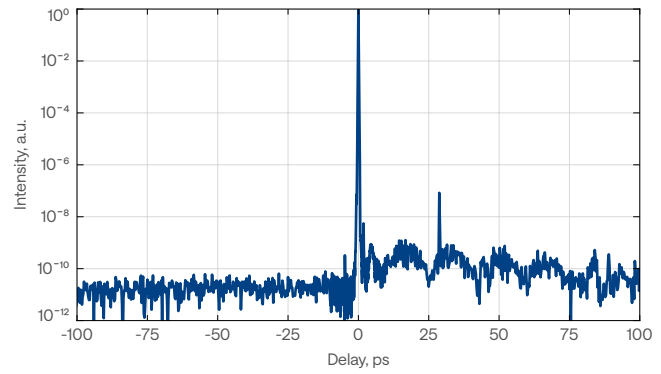
ORPHEUS-OPCPA example spectra of four models



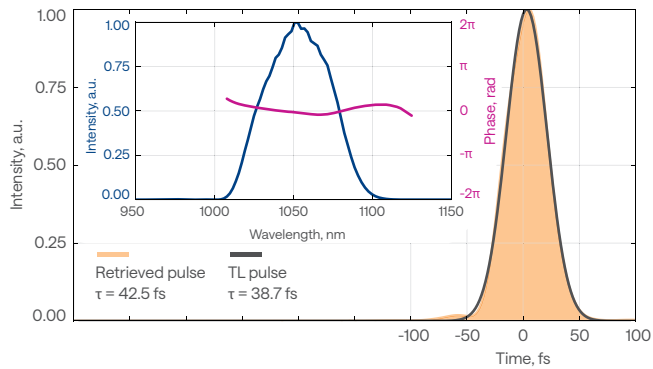
ORPHEUS-OPCPA temporal pulse profile at 800 nm



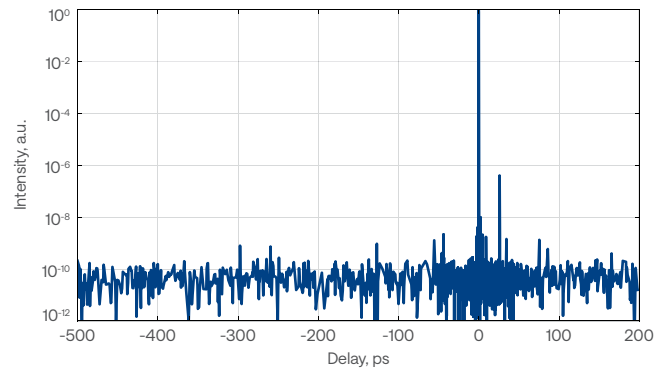
ORPHEUS-OPCPA pulse contrast measurement using a high-dynamic-range third-order autocorrelator at 800 nm



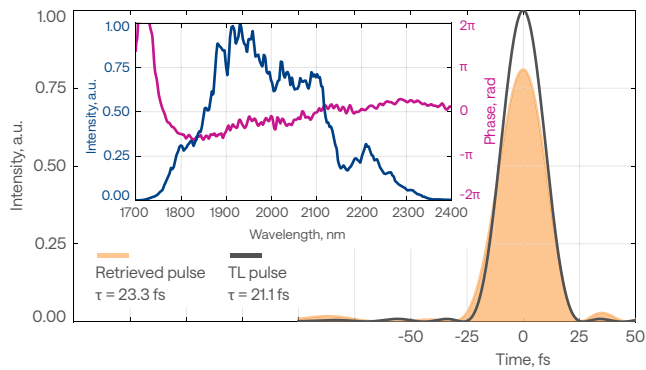
ORPHEUS-OPCPA temporal pulse profile at 1050 nm



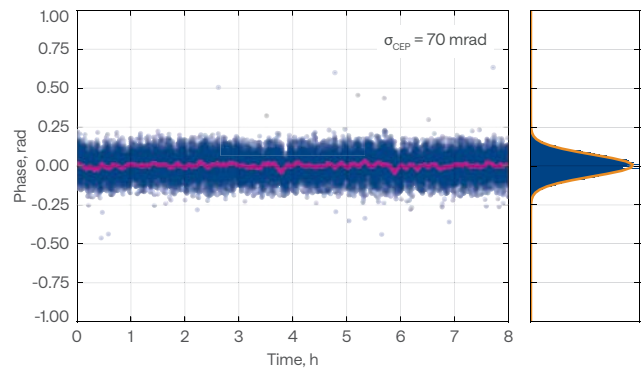
ORPHEUS-OPCPA pulse contrast measurement at 1050 nm



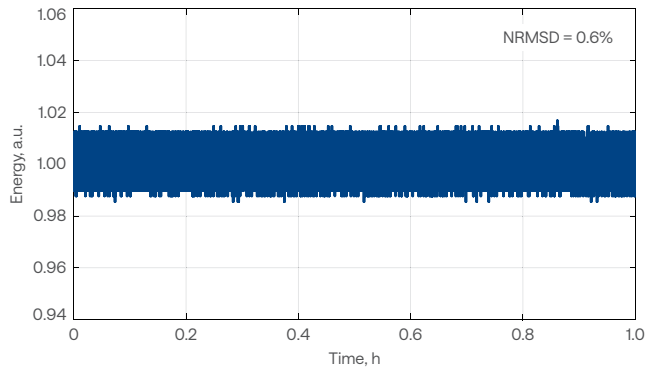
ORPHEUS-OPCPA temporal pulse profile at 2 μ m



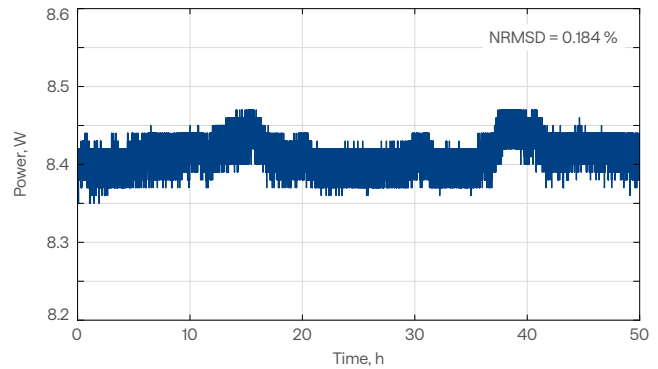
ORPHEUS-OPCPA CEP stability at 2 μ m



ORPHEUS-OPCPA pulse-to-pulse energy stability at 2 μ m



ORPHEUS-OPCPA long-term output stability at 2 μ m



High-Energy OPCPA Systems

Multi-TW peak-power pulses at up to 1 kHz

Few-cycle pulse duration and high pre-pulse contrast

Exceptional CEP and pulse energy stability

800 nm, 1600 nm, 2000 nm output

Robust design with a warm-up time of < 1 hour

Spectral-temporal pulse shaping options



Specifications

Center wavelength	800 nm	1600 nm	2000 nm
Pump source	Picosecond Nd:YAG lasers, seeded by ORPHEUS-OPCPA		
Repetition rate	10 Hz – 1 kHz		
Maximum output pulse energy ¹⁾	250 mJ	100 mJ	50 mJ
Pulse duration ¹⁾	< 9 fs	< 50 fs	< 30 fs
CEP stability, 1 h ^{1) 2)}	< 250 mrad		
Long-term power stability, 8 h ^{1) 3)}	< 1.5%		
Pulse-to-pulse energy stability, 1 min ^{1) 3)}	< 1.5%		

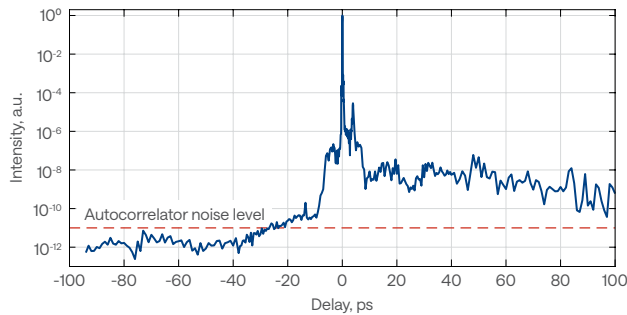
¹⁾ Typical values. For custom inquiries, contact sales@lightcon.com.

²⁾ CEP values calculated from unaveraged, single-shot measurements.

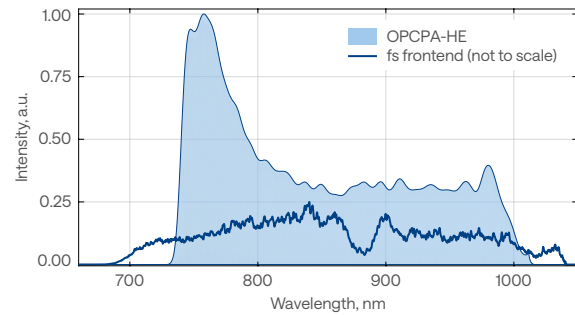
³⁾ Expressed as as normalized root mean squared deviation (NRMSD).



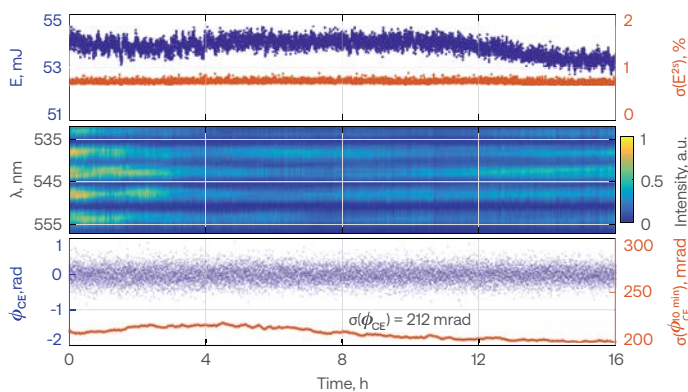
OPCPA-HE system high-dynamic-range third order autocorrelation measurement at 800 nm



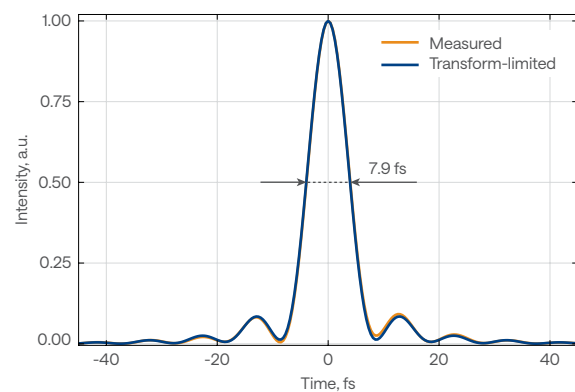
OPCPA-HE output spectrum at 800 nm



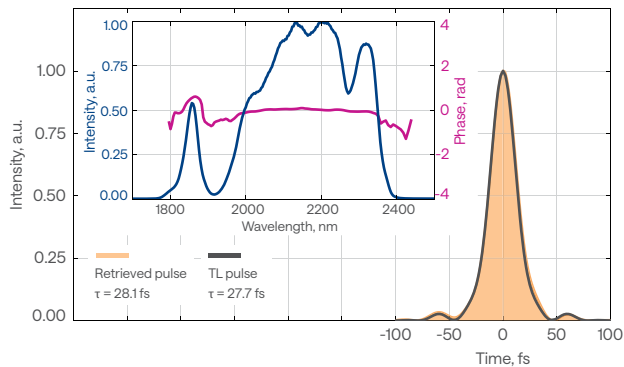
OPCPA-HE pulse energy, f-2f interferogram and CEP stability measured over 16 h at 800 nm



OPCPA-HE output pulses' temporal profile measured with a self-referenced spectral interferometry device at 800 nm



OPCPA-HE output pulses' temporal profile at 2 μm



OPCPA-HE pulse-to-pulse energy stability at 2 μm

