

# ORPHEUS | OPCPA

## Compact, Few-cycle, CEP-stable OPCPA Systems

### FEATURES

- Few cycle pulses in a compact footprint
- 800 nm, 1600 nm, 2000 nm, or 3000 nm output
- High repetition rate, up to MHz
- High-contrast seed source for CPA and OPCPA systems
- Exceptional power, pulse energy, and CEP stability
- SH/TH options



Benefiting from the industrial-grade stability and reliability of the PHAROS and CARBIDE lasers, ORPHEUS-OPCPA delivers few-cycle, CEP-stable pulses in a package as compact as our standard parametric amplifiers. All of the ORPHEUS OPCPA models use the same base architecture to produce CEP-stable, few-cycle pulses in one of the four center wavelengths: 800 nm, 1600 nm, 2000 nm, and 3000 nm. ORPHEUS-OPCPA is available with a pulse compressor or without, thus,

intended as seed sources, delivering background-free pulses with near-single-cycle bandwidths, excellent spectral phase coherence, and CEP stability.

Using synchronized industrial-grade CARBIDE or PHAROS lasers, pump power of up to 480 W and pump pulse energy of up to 8 mJ is accessible. The use of other pump sources for higher power, such as thin-disk or innoslab lasers, is available upon request.

### SPECIFICATIONS

Model	ORPHEUS-OPCPA			
	800 nm	1600 nm	2000 nm	3000 nm
Center wavelength	800 nm	1600 nm	2000 nm	3000 nm
Pump source <sup>1)</sup>	PHAROS / CARBIDE			
Pump power <sup>1)</sup>	20 – 480 W			
Pump pulse energy <sup>1)</sup>	0.2 – 8 mJ			
Repetition rate	1 kHz – 1 MHz			
Conversion efficiency <sup>2)</sup>	> 7%	> 10%	> 9%	> 6%
Pulse duration <sup>2)</sup>	< 10 fs	< 40 fs	< 25 fs	< 45 fs
Transform-limited pulse duration <sup>2) 3)</sup>	< 6 fs	< 30 fs	< 15 fs	< 35 fs
CEP stability, 1h <sup>2) 4)</sup>	< 250 mrad			
Long-term power stability, 8 h <sup>2) 5)</sup>	< 1.5%			
Pulse-to-pulse energy stability, 1 min <sup>2) 5)</sup>	< 1.5%			

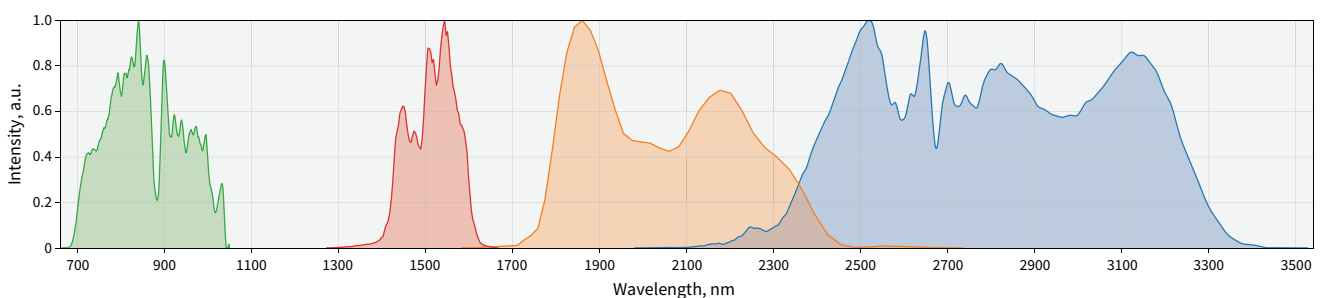
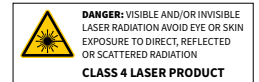
<sup>1)</sup> For using other pump sources, such as thin-disk or innoslab lasers, contact sales@lightcon.com.

<sup>2)</sup> Typical values. For custom inquiries, contact sales@lightcon.com.

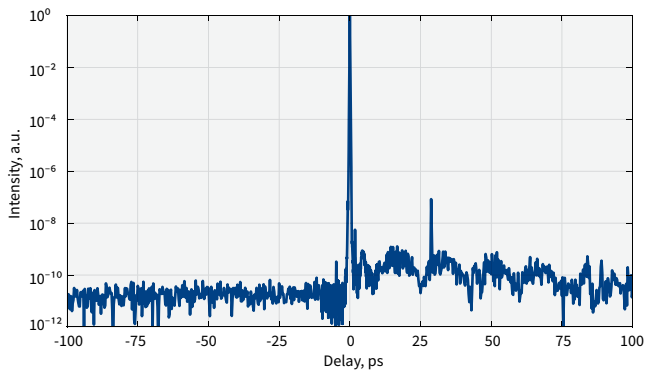
<sup>3)</sup> Uncompressed, for seeding larger amplifiers.

<sup>4)</sup> CEP values calculated from unaveraged, single-shot measurements.

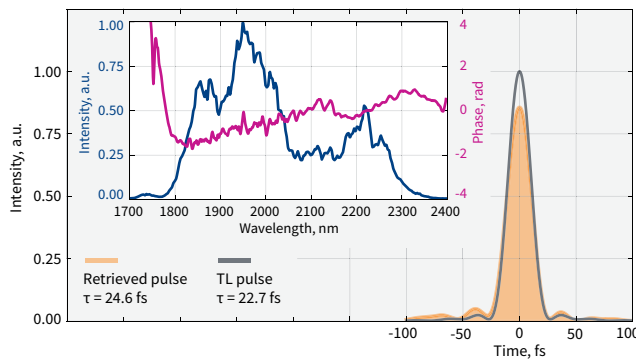
<sup>5)</sup> Expressed as normalized root mean squared deviation (NRMSD).



Example spectra of four models of ORPHEUS-OPCPA

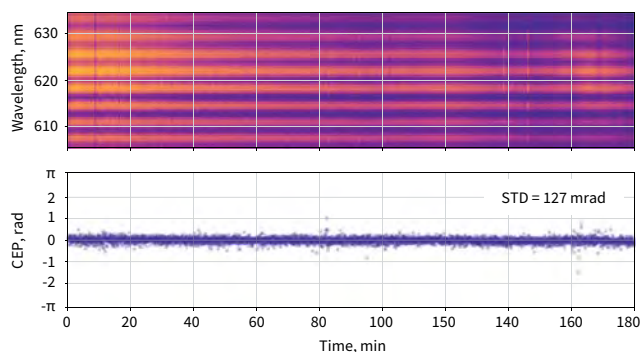


High-dynamic-range third order autocorrelation measurement of ORPHEUS-OPCPA system at 800 nm

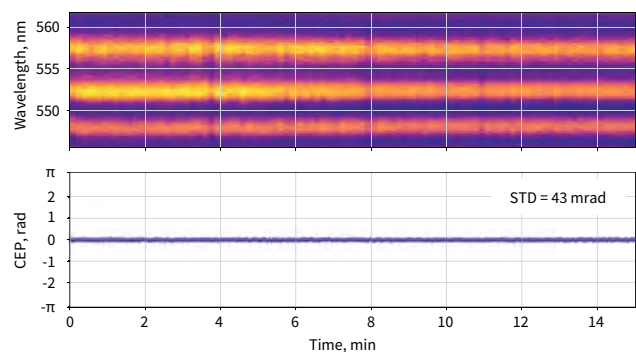


Temporal profile of ORPHEUS-OPCPA output pulses at 2 μm

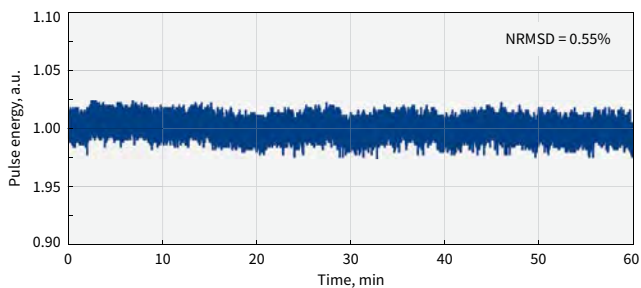
## STABILITY



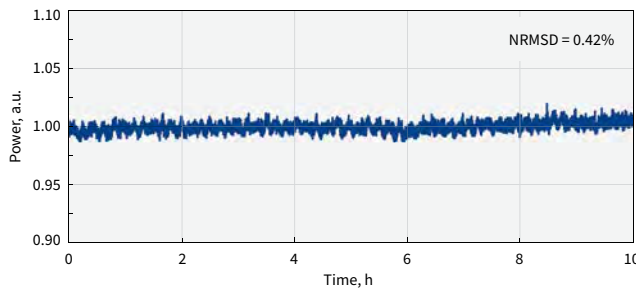
CEP stability\* of ORPHEUS-OPCPA (800 nm, 100 kHz)



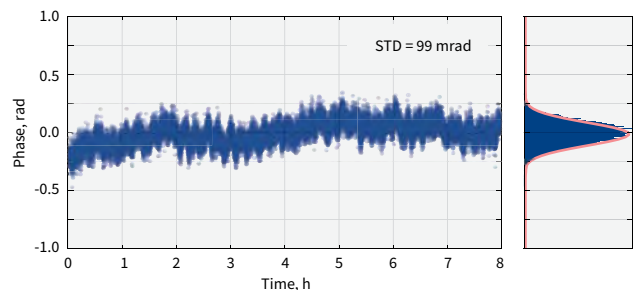
CEP stability\* of ORPHEUS-OPCPA (3 μm, 1 kHz)



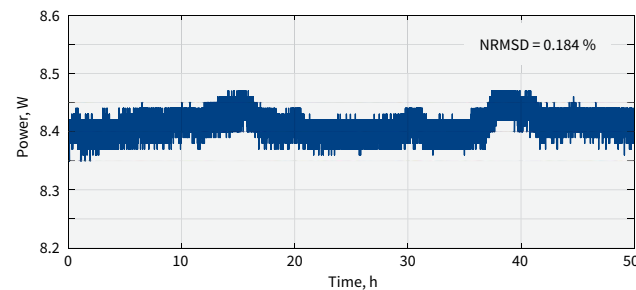
Pulse-to-pulse energy stability of ORPHEUS-OPCPA at 800 nm



Long-term output stability of ORPHEUS-OPCPA at 800 nm



CEP stability\* of ORPHEUS-OPCPA (2 μm, 100 kHz) without slow-loop CEP stabilization



Long-term output stability of ORPHEUS-OPCPA at 2 μm

\* All CEP values calculated from unaveraged, single-shot measurements!