

# ORPHEUS

## Collinear Optical Parametric Amplifier

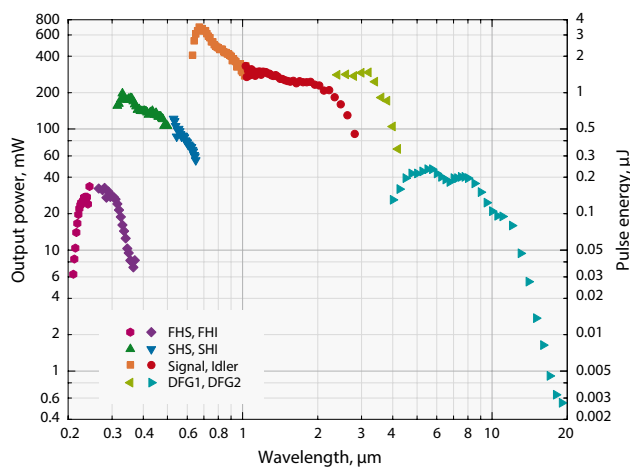
### FEATURES

- 190 – 16000 nm tunable wavelength
- Single-pulse – 1 MHz repetition rate
- Up to 40 W pump power
- Up to 2 mJ pump energy
- Completely automated
- Integrated spectrometers for monitoring the output wavelength

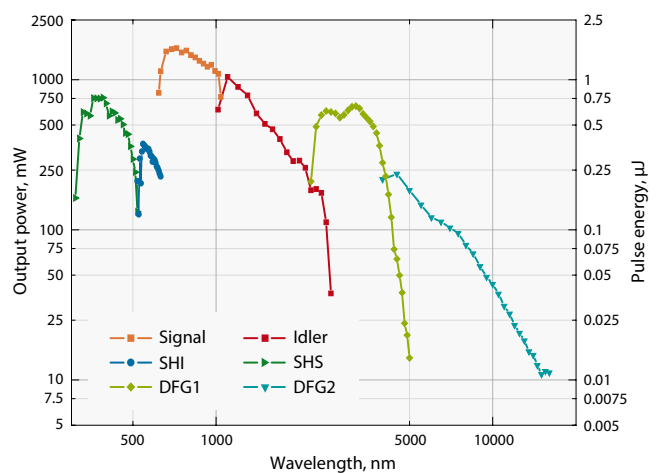


ORPHEUS is collinear optical parametric amplifier of white-light continuum pumped by femtosecond Ytterbium based laser amplifiers. With the additional feature of being able to work at high repetition rates, ORPHEUS maintains the best properties of TOPAS series OPAs: high output pulse stability throughout the entire tuning range, high output beam quality and full computer control via USB port as well as optional frequency mixers to extend the tuning range from UV up to mid IR ranges. Femtosecond pulses and high power tunable output together with flexible multi kilohertz repetition rate make the tandem of ORPHEUS and PHAROS or CARBIDE lasers an invaluable tool for multiphoton microscopy, micro structuring and spectroscopy applications. Several ORPHEUS can be pumped by a single PHAROS or CARBIDE laser providing independent beam wavelength tuning.

ORPHEUS-HP and ORPHEUS-HE devices are modified versions of the ORPHEUS. ORPHEUS-HP is available with UV-VIS tuning range frequency mixers integrated into a thermally stabilized monolithic housing. Also, it provides the option of generating deep-ultraviolet pulses (190 – 215 nm) and DFG (2200 – 16000 nm). The design offers completely hands-free wavelength tuning and automated wavelength separation, ensuring the same position and direction for all wavelengths in UV, VIS and near IR regions. A mini spectrometer is integrated for online monitoring of output wavelength and comes with specialized software that enables wavelength feedback and automatic calibration. ORPHEUS-HE is available with UV-VIS tuning range extension and is dedicated for high energy pump lasers (1 – 2 mJ).



Typical tuning curve of **ORPHEUS**.  
Pump: 6 W, 30  $\mu$ J, 200 kHz



Typical tuning curve of **ORPHEUS-HP**.  
Pump: 40 W, 40  $\mu$ J, 1000 kHz

For custom tuning curve value visit <http://toolbox.lightcon.com/tools/tuningcurves/>

## SPECIFICATIONS

Model	ORPHEUS		ORPHEUS-HP		ORPHEUS-HE
<b>OUTPUT FROM ORPHEUS</b>					
Tuning range	630 – 1030 nm (Signal) 1030 – 2600 nm (Idler)				
Integrated second harmonic generation efficiency	> 35 % (515 nm) port B		not specified		
Pump power (max)	8 W		40 W		10 W
Pump energy	8 – 20 μJ	20 – 400 μJ	8 – 20 μJ	20 – 400 μJ	400 – 2000 μJ <sup>1)</sup>
Conversion efficiency at peak	> 6 % (Signal + Idler combined)	> 12 % (Signal + Idler combined)	> 4.5 % (Signal) > 2.8 % (Idler)	> 9 % (Signal) > 4 % (Idler)	
Pulse duration	130 – 290 fs (PHAROS / CARBIDE) 120 – 190 fs (PHAROS-SP)				
Pulse bandwidth @ 700 – 960 nm	80 – 150 cm <sup>-1</sup> (PHAROS / CARBIDE) 100 – 220 cm <sup>-1</sup> (PHAROS-SP)				
Long term power stability (8 h)	< 2 % @ 800 nm				
Pulse energy stability (1 min)	< 2 % @ 800 nm				
Features	Cost effective		Completely automated		High energy & completely automated

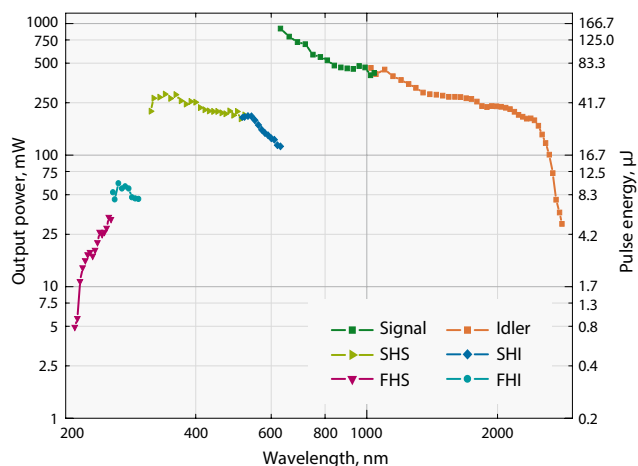
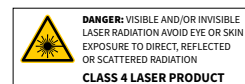
## WAVELENGTH EXTENSIONS

When pump energy	8 – 20 μJ	20 – 400 μJ	8 – 20 μJ	20 – 400 μJ	400 – 2000 μJ <sup>1)</sup>
315 – 515 nm (SH of Signal)	> 1.2 %	> 3 %	> 1.2 %	> 2.4 %	
515 – 630 nm (SH of Idler)					
210 – 315 nm (TH of Signal)	n/a		> 0.4 % <sup>2)</sup>	> 0.8 % <sup>2)</sup>	
210 – 255 nm (FH of Signal)	> 0.3 %	> 0.6 %	n/a		
255 – 315 nm (FH of Idler)					
190 – 215 nm (DeepUV)	—			> 0.3 % <sup>3)</sup>	
2200 – 4200 nm (DFG1)	> 1.5 % @ 3000 nm	> 3 % @ 3000 nm	> 1.5 % @ 3000 nm	> 3 % @ 3000 nm	Contact sales@lightcon.com
4000 – 16 000 nm (DFG2)	> 0.1 % @ 10000 nm	> 0.2 % @ 10000 nm	> 0.1 % @ 10000 nm	> 0.2 % @ 10000 nm	

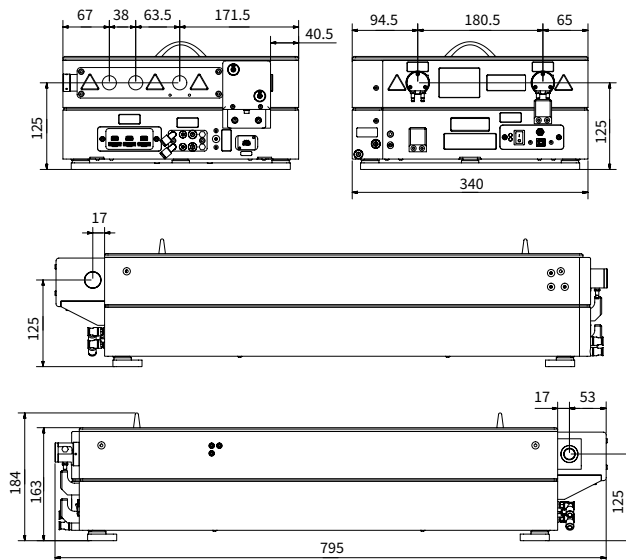
<sup>1)</sup> Pump energy up to 5 mJ available, please contact sales@lightcon.com for specifications.

<sup>2)</sup> Maximum output power 400 mW.

<sup>3)</sup> DeepUV conversion efficiency is specified only when pump input to OPA is <10 W. In case of higher pump power, DeepUV efficiency decreases, the maximum output power is limited to ~40 mW @ 200 nm.



Typical tuning curve of **ORPHEUS-HE**.  
Pump: 6 W, 1 mJ, 6 kHz



ORPHEUS drawings