

## Broad-Bandwidth Hybrid Optical Parametric Amplifier



Combination of best collinear and non-collinear OPA features

Ultrashort pulses in NIR (650 – 900 nm and 1200 – 2500 nm)

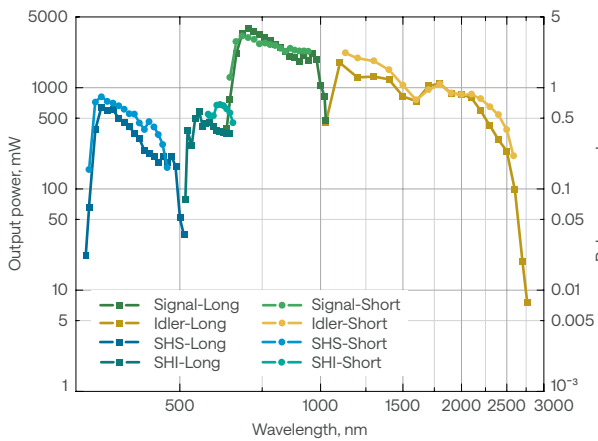
Single-shot – 2 MHz repetition rate

< 100 fs pulse duration

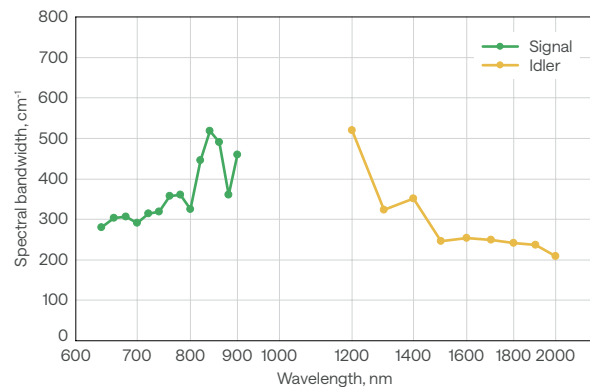
Adjustable spectral bandwidth

Optional long pulse mode for gap-free tunability

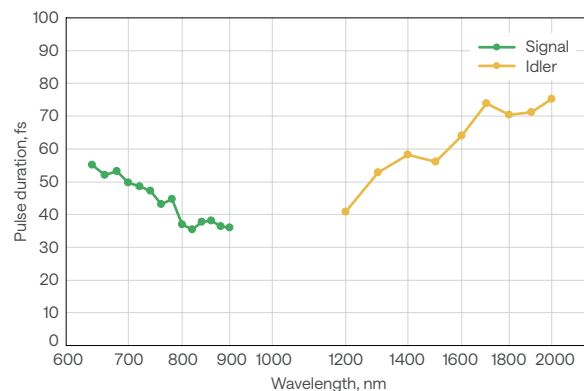
ORPHEUS-F typical tuning curves.  
Pump: 40 W, 40  $\mu$ J, 1000 kHz



ORPHEUS-F typical spectral bandwidth



ORPHEUS-F pulse duration after compression



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

# Specifications

## MAIN OUTPUT (650 – 900 nm and 1200 – 2500 nm)

Mode of operation	Short pulse mode <sup>1)</sup>	Long pulse mode
Tuning range	650 – 900 nm (signal) 1200 – 2500 nm (idler)	650 – 1010 nm (signal) 1050 – 2500 nm (idler)
Maximum pump power	80 W	
Pump pulse energy	10 – 500 $\mu$ J	
Conversion efficiency <sup>2)</sup>	> 7% @ 700 nm	
Integrated 2H (515 nm) generation efficiency <sup>3)</sup>	> 35%	
Pulse duration before compression <sup>1)</sup>	< 290 fs	
Spectral bandwidth	200 – 750 $\text{cm}^{-1}$ @ 650 – 900 nm	60 – 220 $\text{cm}^{-1}$ @ 650 – 900 nm
Pulse duration after compressor <sup>1)</sup>	< 55 fs @ 800 – 900 nm < 70 fs @ 650 – 800 nm < 100 fs @ 1200 – 2000 nm	n/a
Compressor transmission	> 65% @ 650 – 900 nm > 80% @ 1200 – 2000 nm	
Long-term power stability, 8 h <sup>4)</sup>	< 2% @ 800 nm	
Pulse-to-pulse energy stability, 1 min <sup>4)</sup>	< 2% @ 800 nm	

## WAVELENGTH EXTENSION OPTIONS (325 – 15000 nm) <sup>5)</sup>

325 – 450 nm (SHS)	> 1%	n/a
325 – 505 nm (SHS)	n/a	> 1%
525 – 650 nm (SHI)		> 0.5%
600 – 650 nm (SHI)	> 0.5%	n/a
210 – 252 nm (FHS)	n/a	> 0.1%
263 – 325 nm (FHI)		
2500 – 15000 nm	See ORPHEUS-MIR; page 42	

## PUMP LASER REQUIREMENTS

Pump laser	PHAROS or CARBIDE
Center wavelength	1030 $\pm$ 10 nm
Maximum pump power	80 W
Repetition rate	Single-shot – 2 MHz
Pump pulse energy	10 – 500 $\mu$ J
Pulse duration <sup>6)</sup>	180 – 500 fs

## ENVIRONMENTAL & UTILITY REQUIREMENTS

Refer to [www.lightcon.com](http://www.lightcon.com)

<sup>1)</sup> In short pulse mode, broadband pulses are compressed externally. Typical pulse duration before compression: 120 – 250 fs, after compression: 25 – 70 fs @ 650 – 900 nm, 40 – 100 fs @ 1200 – 2000 nm.

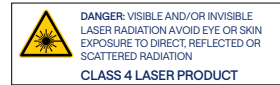
<sup>2)</sup> Specified as a percentage of pump power, before compressor. Conversion efficiency at peak is equal to 10% for signal and idler combined.

<sup>3)</sup> At designated output port; not simultaneous to OPA output.

<sup>4)</sup> Expressed as normalized root mean squared deviation (NRMSD).

<sup>5)</sup> For > 15  $\mu$ J pump pulse energy.

<sup>6)</sup> FWHM, assuming Gaussian pulse shape.



## Drawings

### ORPHEUS-F drawings

