

# ORPHEUS-F

## Broad Bandwidth Hybrid Optical Parametric Amplifier



ORPHEUS-F is a hybrid optical parametric amplifier of white-light continuum pumped by femtosecond Ytterbium based laser amplifiers. This OPA combines the short pulse durations that are produced by a non-collinear OPA and wide wavelength tuning range offered by collinear version. The Signal beam can be easily compressed with a simple prism-based setup down to <60 fs in most of the tuning range, while Idler is compressed in bulk material down to 40 – 90 fs depending on wavelength. Switching to standard OPA configuration for tuning in 900 – 1200 nm range (250 fs) is optional. It possible to limit the output bandwidth to some extent (up to 2 – 3 times) without losing any output power. Standard ORPHEUS device uses spectral narrowing to produce bandwidth-limited 200 – 300 fs duration pulses directly at the output, with extended Signal/Idler tuning range and options to generate ultraviolet and mid-infrared light. Our non-collinear ORPHEUS-N-2H device produces even broader bandwidths, compressible down to <20 fs, but limits the tuning range to 650 – 900 nm. For most applications, the performance of ORPHEUS-F configuration is the optimal choice.

### SPECIFICATIONS <sup>1)</sup>

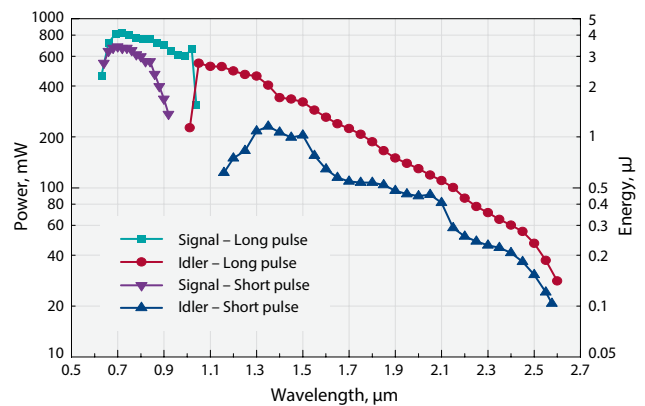
	ORPHEUS-F OPA
Required pump laser	PHAROS, PHAROS-SP or CARBIDE laser
Tuning range	650 – 900 nm (signal) and 1200 – 2500 nm (idler)
Conversion efficiency at peak of tuning curve, second stage signal and idler combined	> 10 %, when pump energy is 10 – 500 $\mu$ J
Pulse energy stability	< 2 % rms @ 700 – 900 nm and 1200 – 2000 nm
Pulse bandwidth	200 – 750 $\text{cm}^{-1}$ @ 650 – 900 nm 150 – 500 $\text{cm}^{-1}$ @ 1200 – 2000 nm
Pulse duration before compression	< 290 fs
After compression, typical <sup>2)</sup>	25 – 70 fs @ 650 – 900 nm 40 – 100 fs @ 1200 – 2000 nm
Compressor transmission <sup>2)</sup>	> 65 % @ 650 – 900 nm > 80 % @ 1200 – 2000 nm

<sup>1)</sup> Conversion efficiency specified as the percentage of input power to ORPHEUS-F.

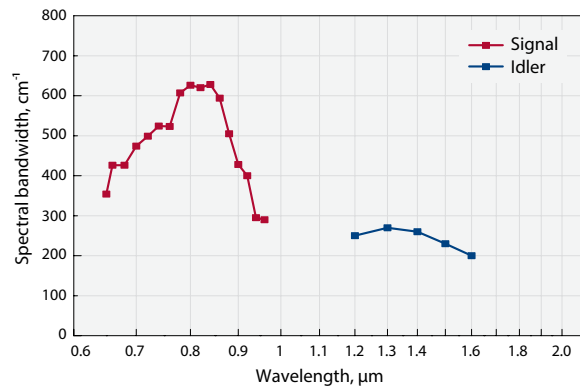
<sup>2)</sup> Optional compressor includes two prism compressor for signal and bulk compressor for idler.

### FEATURES

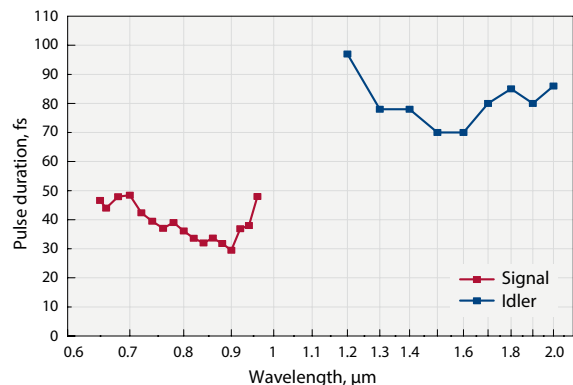
- Combines the best features of collinear and non-collinear OPA
- <100 fs pulse duration
- Variable bandwidth
- Single pulse – 1 MHz repetition rate
- Computer controlled
- Gap filling dual pulse length option



ORPHEUS-F energy conversion curve.  
Pump: 6 W @ 200 kHz



Typical spectral bandwidth of ORPHEUS-F



Pulse duration after external compression of ORPHEUS-F