

ORPHEUS-F

Broad Bandwidth Hybrid Optical Parametric Amplifier



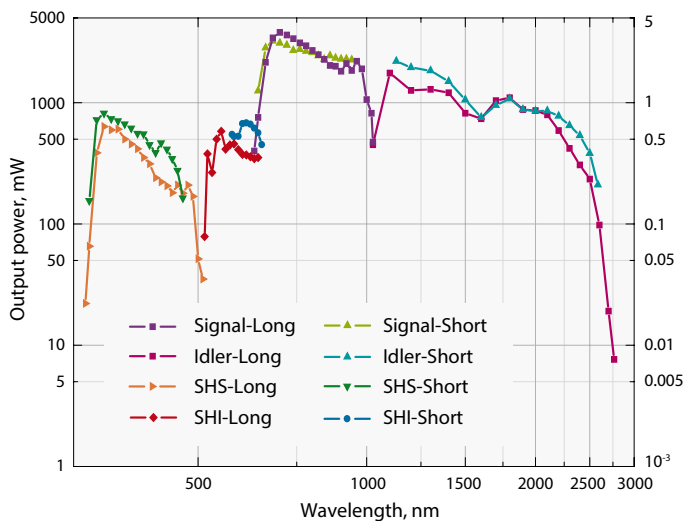
FEATURES

- Combines the best features of collinear and non-collinear OPA
- <100 fs pulse duration
- Variable bandwidth
- Single pulse – 1 MHz repetition rate
- Computer controlled
- Dual pulse width option provides gap free tunability (650 – 2500 nm)

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 (620 – 900 nm) offered by collinear OPA. 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.

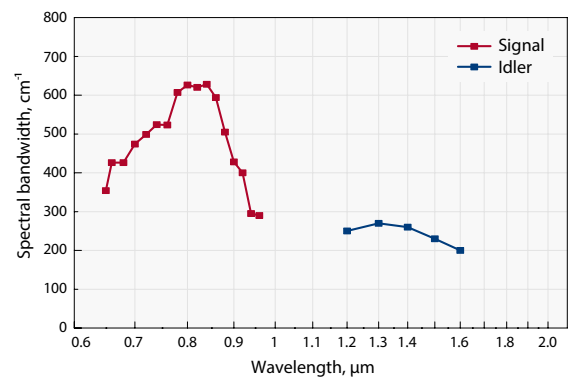
Standard ORPHEUS device uses spectral narrowing to produce bandwidth-limited 200 – 300 fs duration pulses directly at the output, with extended Signal/Idler tuning range and options to generate ultraviolet and mid-infrared light. Our non-collinear ORPHEUS-N-2H device produces even broader bandwidths, 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.



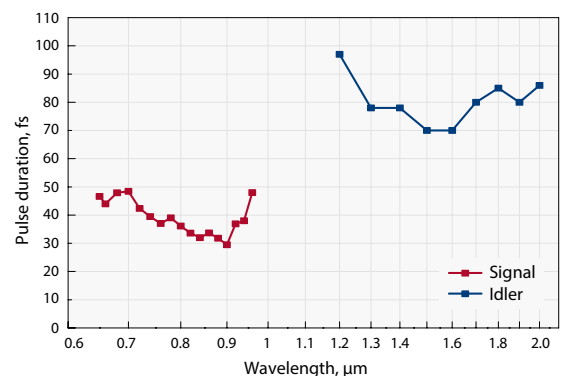
ORPHEUS-F

ORPHEUS-F energy conversion curve.
Pump: 40 W, 40 μJ, 1000 kHz

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



Typical spectral bandwidth of ORPHEUS-F



Pulse duration after compression of ORPHEUS-F

SPECIFICATIONS

| Product name | <i>ORPHEUS-F</i> [short pulse mode] | <i>ORPHEUS-F</i> [long pulse mode] |
|--------------|--|---------------------------------------|
|--------------|--|---------------------------------------|

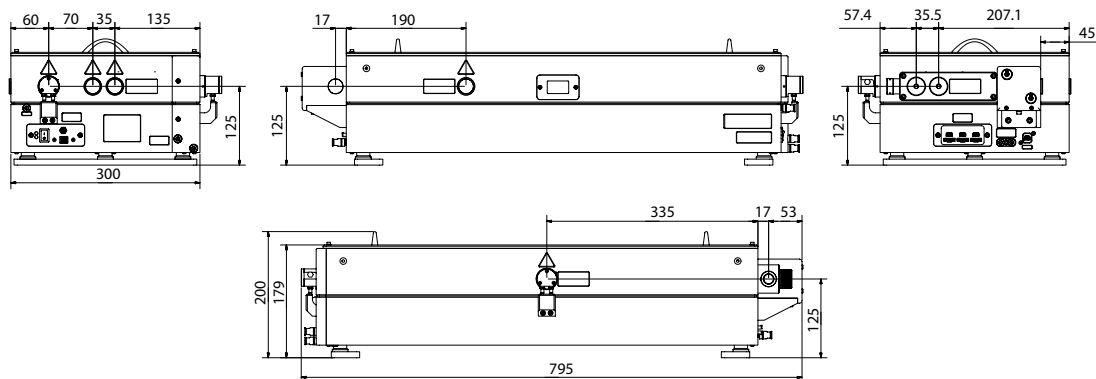
OUTPUT FROM ORPHEUS-F

| | | | |
|--|-------------------------|-------------------------------|--|
| Tuning range | Signal | 650 – 900 nm | 650 – 1010 nm |
| | Idler | 1 200 – 2 500 nm | 1050 – 2 500 nm |
| Integrated second harmonic generation efficiency | | > 35 % (515 nm) ¹⁾ | |
| Pump power (maximum) | | Up to 40 W | |
| Pump energy | | 10 – 500 μJ | |
| Conversion efficiency at peak, Signal + Idler combined | | > 10 % | |
| Pulse duration before compression | | < 290 fs | |
| Pulse bandwidth | 650 – 900 nm | 200 – 750 cm ⁻¹ | 80 – 150 cm ⁻¹ (PHAROS / CARBIDE) 100 – 220 cm ⁻¹ (PHAROS-SP) |
| | 800 – 900 nm | < 55 fs | — |
| Pulse duration after compressor | 650 – 800 nm | < 70 fs | |
| | 1200 – 2000 nm | < 100 fs | |
| | Typical: 650 – 900 nm | 25 – 70 fs | |
| | Typical: 1200 – 2000 nm | 40 – 100 fs | |
| Compressor transmission | 650 – 900 nm | > 65 % | — |
| | 1200 – 2000 nm | > 80 % | |
| Long term power stability (8 h) | | < 2 % @ 800 nm | |
| Pulse energy stability (1 min) | | < 2 % @ 800 nm | |

WAVELENGTH EXTENSIONS

| | | | |
|---------|-----------------------------|--------------------------|---------|
| At peak | 325 – 450 nm (SH of Signal) | > 1 % | — |
| | 325 – 505 nm (SH of Signal) | — | > 1 % |
| | 525 – 650 nm (SH of Idler) | — | > 0.5 % |
| | 600 – 700 nm (SH of Idler) | > 0.5 % | — |
| | 210 – 252 nm (FH of Signal) | — | > 0.1 % |
| | 263 – 325 nm (FH of Idler) | — | > 0.2 % |
| | 2200 – 4200 nm (DFG1) | Contact Light Conversion | |
| | 4000 – 16 000 nm (DFG2) | Contact Light Conversion | |

¹⁾ At designated output port.



ORPHEUS-F outline drawings