ORPHEUS

Collinear Optical Parametric Amplifier

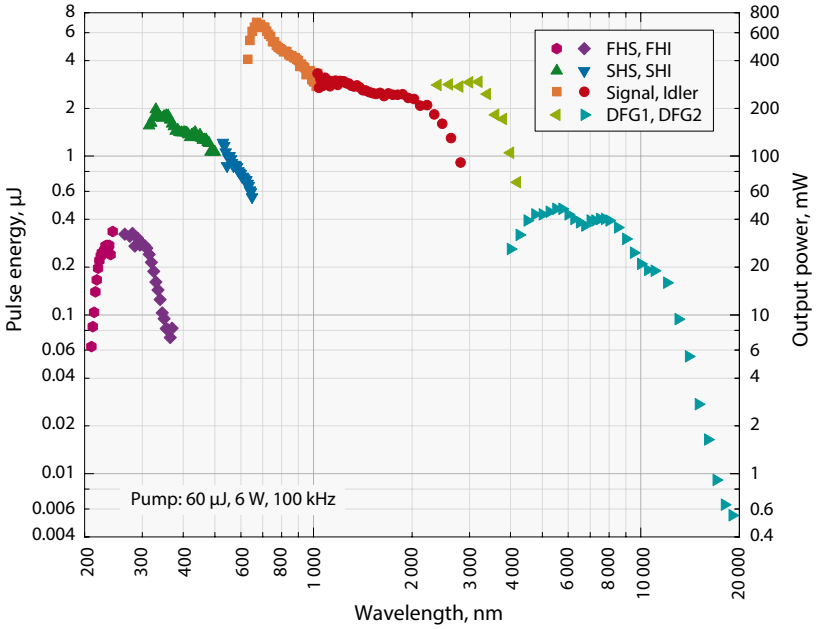
FEATURES

- 210 nm – 16000 nm tunable wavelenght
- Single pulse – 1 MHz repetition rate
- Up to 8 W pump power
- Up to 0.4 mJ pump energy (2 mJ upon request)
- Computer controlled

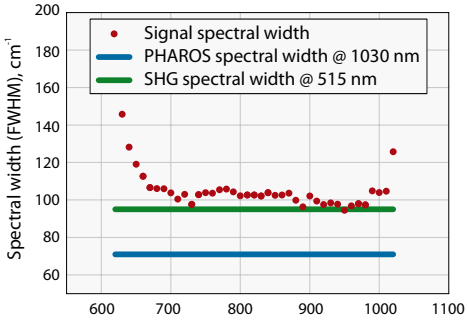
ORPHEUS is a collinear optical parametric amplifier of white-light continuum pumped by femtosecond Ytterbium based laser amplifiers. With the additional feature of being able to work at high repetition rates, ORPHEUS maintains the best properties of TOPAS series amplifiers: high output pulse stability 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.

ORPHEUS provides tunable OPA output (630 – 2600 nm) with residual second harmonic (515 nm) and fundamental radiation (1030 nm) beams at the same time.

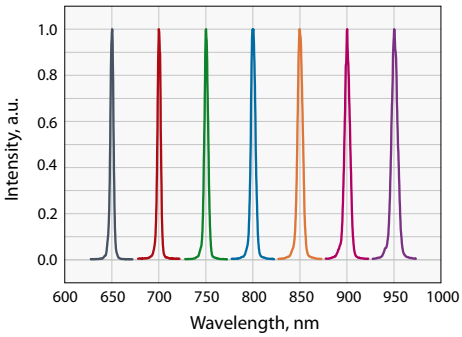
Femtosecond pulses, high power tunable output together with flexible multi-kilohertz repetition rate make the tandem of PHAROS and ORPHEUS an invaluable tool for multiphoton microscopy, micro-structuring and spectroscopy applications. Several ORPHEUS can be pumped by single PHAROS laser providing independent beam wavelength tuning.



Typical tuning curve of ORPHEUS



Typical output pulse spectral width



Typical spectra of signal wave

SPECIFICATIONS [1]

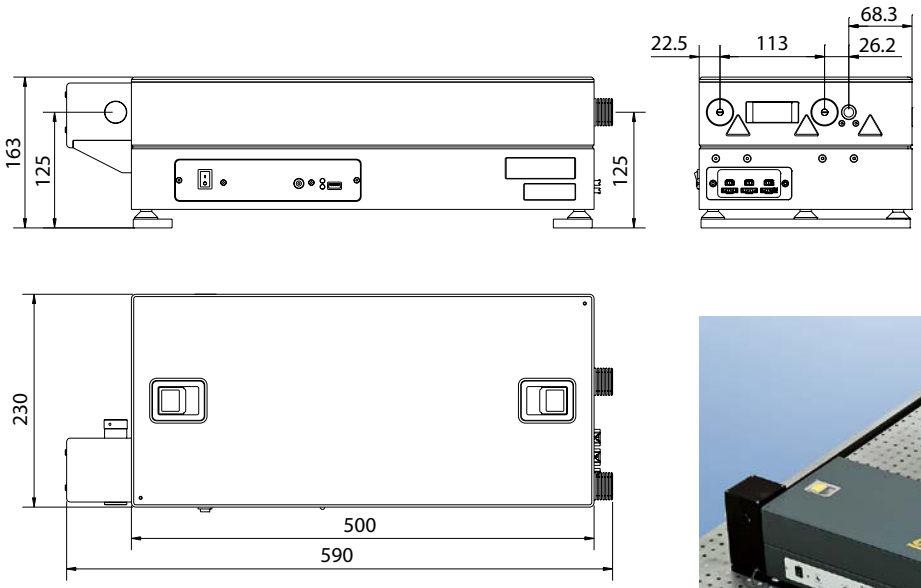
	ORPHEUS OPA
Required pump laser	PHAROS or CARBIDE laser
Tuning range	630 – 1020 nm (signal) and 1040 – 2600 nm (idler)
Integrated second harmonic (515 nm) generation efficiency	>40 %
Conversion efficiency at peak of tuning curve, signal and idler combined	>12 %, when pump energy is 20 – 400 µJ [2] >6 %, when pump energy is 8 – 20 µJ
Pulse energy stability	2 % rms @ 700 – 960 nm and 1100 – 2000 nm
Pulse bandwidth	80 – 120 cm^{-1} @ 700 – 960 nm, pumped by PHAROS 120 – 220 cm^{-1} @ 700 – 960 nm, pumped by PHAROS-SP
Pulse duration	150 – 230 fs, pumped by PHAROS 120 – 190 fs, pumped by PHAROS-SP
Time-bandwidth product	< 1.0
Integrated mini spectrometer [3]	Wavelength range: 650 – 1050 nm, resolution: ~1.5 nm

[1] *Conversion efficiency specified as the percentage of input power to ORPHEUS.*
[2] *High energy version ORPHEUS-HE available for pump energies up to 2 mJ.*
[3] *ORPHEUS-HP only.*

WAVELENGTH EXTENSIONS (210 – 630 nm and 2200 – 16000 nm)

Tuning range	Conversion efficiency at peak [1]
315 – 510 nm (SH of Signal)	> 3 % at peak @ 20 – 400 µJ [2] > 1.2 % at peak @ 8 – 20 µJ
520 – 630 nm (SH of Idler)	
210 – 255 nm (FH of Signal)	> 0.6 % at peak @ 20 – 400 µJ [2] > 0.3 % at peak @ 8 – 20 µJ
260 – 315 nm (FH of Idler)	
2200 – 4200 nm (DFG1)	> 3.0 % at 3000 nm @ 20 – 400 µJ [2] > 1.5 % at 3000 nm @ 8 – 20 µJ
4000 – 16000 nm (DFG2)	> 0.2 % at 10000 nm @ 20 – 400 µJ [2] > 0.1 % at 10000 nm @ 8 – 20 µJ

[1] *Conversion efficiency specified as the percentage of input power to ORPHEUS.*
[2] *High energy version ORPHEUS-HE available for pump energies up to 2 mJ.*



ORPHEUS drawings

Compact layout of PHAROS pump laser
in tandem with ORPHEUS on 0.5 square meter