

ORPHEUS | PS

Narrow-Bandwidth Optical Parametric Amplifier

FEATURES

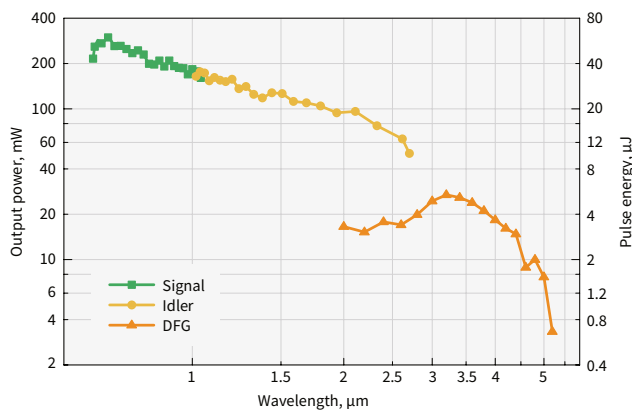
- Picosecond pulses from femtosecond pump
- 210 – 4800 nm tuning range
- 800 fs – 3 ps pulse duration
- $< 20 \text{ cm}^{-1}$ spectral bandwidth
- Up to 100 kHz repetition rate
- High output stability



ORPHEUS-PS is a narrow-bandwidth optical parametric amplifier (OPA), designed for PHAROS and CARBIDE lasers. The device is pumped by picosecond pulses produced in a second harmonic bandwidth compressor SHBC and is seeded by a white-light continuum generated by femtosecond pulses. This enables very high pulse-to-pulse energy stability compared to other methods for generating tunable picosecond pulses. The white-light generation is integrated into the same housing as the amplification, enabling high long-term stability and

ease of use. The system features high conversion efficiency, bandwidth- and diffraction-limited output, and full computer control.

Part of the pump laser radiation can be split to simultaneously pump a femtosecond OPA, giving access to the complete set of beams necessary for versatile spectroscopy applications such as femtosecond stimulated Raman spectroscopy (FSRS) and sum-frequency generation (SFG) spectroscopy.



ORPHEUS-PS tuning curves.
Pump: 5 W, 1000 μJ, 5 kHz from PHAROS-SP.

SPECIFICATIONS

Model	ORPHEUS-PS
MAIN OUTPUT	
Tuning range ¹⁾	640 – 1000 nm (Signal) 1060 – 2600 nm (Idler)
Conversion efficiency	> 6% @ 700 nm
Pulse duration	800 fs – 3 ps
Spectral bandwidth	< 20 cm ⁻¹ @ 700 – 2000 nm
Pulse-to-pulse energy stability ²⁾	< 2% @ 800 nm
AUXILIARY OUTPUT 1 (515 nm)	
Center wavelength ³⁾	515 nm ± 5 nm
Generation efficiency ⁴⁾	> 15%
AUXILIARY OUTPUT 2 (1030 nm)	
Center wavelength ⁵⁾	1030 ± 10 nm
Pulse duration	< 300 fs
Pulse energy	> 5 µJ
WAVELENGTH EXTENSION	
SH package 320 – 500 nm (SHS), 530 – 640 nm (SHI)	> 3% @ 350 nm
FH package 210 – 250 nm (FHS), 265 – 320 nm (FHI)	> 0.3% @ 230 nm
2400 – 4800 nm (DFG)	> 0.25% @ 3200 nm ⁶⁾
PUMP LASER REQUIREMENTS	
Pump source	PHAROS or CARBIDE with uncompressed output option
Wavelength	1030 ± 10 nm
Repetition rate	Single-shot – 100 kHz
Maximum pump power	20 W
Pump pulse energy	100 µJ – 3.2 mJ

¹⁾ For single wavelength (515 nm) picosecond output, refer to SHBC.

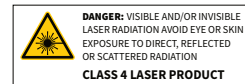
²⁾ Expressed as NRMSD (normalized root mean squared deviation).

³⁾ Direct SHBC output, not simultaneous to OPA; see details in SHBC specifications.

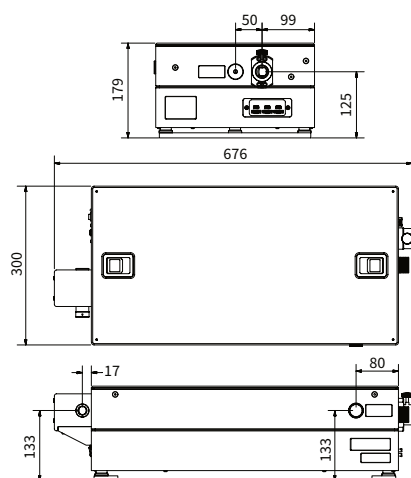
⁴⁾ Specified as percentage of pump pulse energy.

⁵⁾ Compressed pump output.

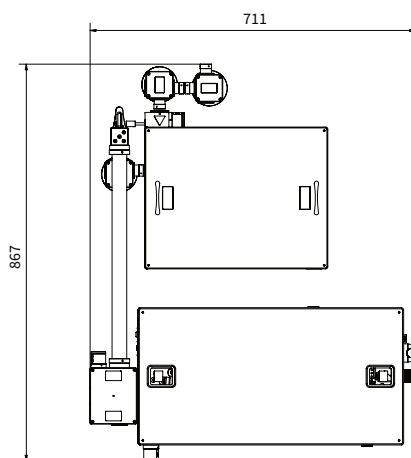
⁶⁾ For > 200 µJ pump pulse energy.



DRAWINGS



ORPHEUS-PS drawings



ORPHEUS-PS with SHBC drawing