ORPHEUS | PS

Narrow-Bandwidth Optical Parametric Amplifier

FEATURES

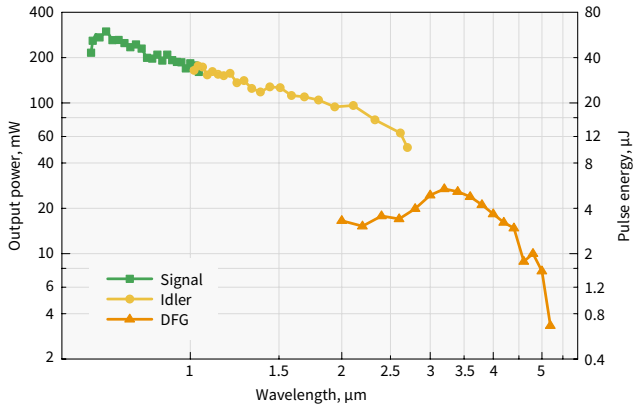
- 210 – 4800 nm tuning range
- 1 – 4 ps pulse duration
- Nearly bandwidth-limited output, < 15 cm^{-1} spectral bandwidth
- Up to 100 kHz repetition rate
- High stability by seeding with femtosecond white-light continuum

APPLICATIONS

- Femtosecond stimulated Raman spectroscopy (FSRS)
- Sum-frequency generation (SFG) spectroscopy

ORPHEUS-PS is a narrow-bandwidth optical parametric amplifier, designed for PHAROS and CARBIDE lasers. This device is pumped by the 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 stability compared to other methods of generating tunable picosecond pulses. The white-light generation module is integrated into the same housing as the amplification modules, enabling even better 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 laser radiation can be split to simultaneously pump a femtosecond OPA, providing broad-bandwidth 630 nm – 16 µm tunable pulses, 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.

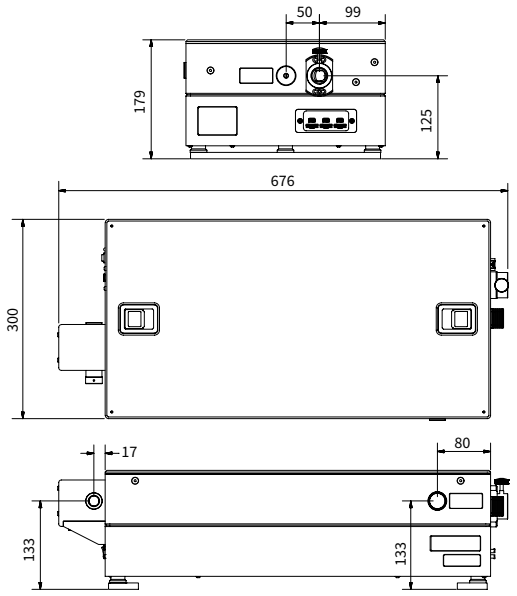
SPECIFICATIONS

Model	ORPHEUS-PS
OUTPUT FROM ORPHEUS-PS	
Tuning range	640 – 1000 nm (Signal) 1060 – 2600 nm (Idler)
Conversion efficiency at peak	> 8% (Signal and Idler combined)
Spectral bandwidth	< 20 cm^{-1} @ 700 – 2000 nm
Pulse duration	800 fs – 3 ps
Pulse-to-pulse energy stability [1)]	< 2% @ 700 – 960 nm & 1100 – 1500 nm
SHBC output	515 nm output port available, not simultaneous to OPA output Output pulse energy: > 15% of pump
Compressed pump output	1030 nm, < 300 fs, > 5 µJ
OPTIONAL WAVELENGTH EXTENSIONS	
SH option – Tuning range	320 – 500 nm (SHS) 530 – 640 nm (SHI)
SH option – Conversion efficiency	> 3% at peak
FH option – Tuning range	210 – 250 nm (FHS) 265 – 320 nm (FHI)
FH option – Conversion efficiency	> 0.3% at peak (for > 200 µJ pump energy)
DFG option – Tuning range	2400 – 4800 nm
DFG option – Conversion efficiency	> 0.25% at 3200 nm (for > 200 µJ pump energy)
PUMP LASER REQUIREMENTS	
Pump source	PHAROS or CARBIDE with uncompressed output option
Wavelength	1030 nm
Repetition rate	Single-shot – 100 kHz
Maximum pump power	20 W
Pump pulse energy	100 µJ – 3.2 mJ

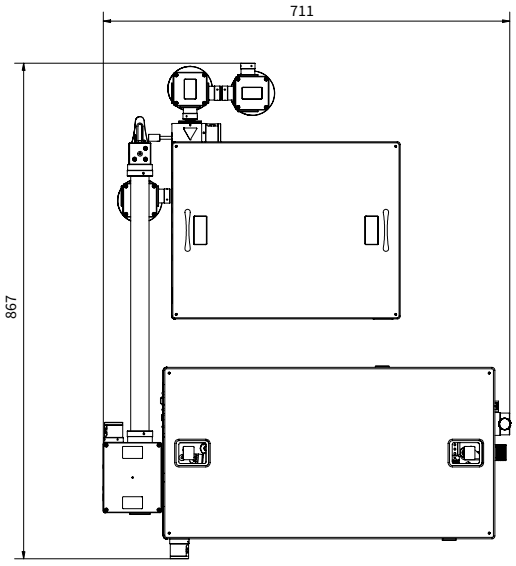
[1)] *Expressed as NRMSD (normalized root mean squared deviation).*

DANGER: VISIBLE AND/OR INVISIBLE LASER RADIATION AVOID EYE OR SKIN EXPOSURE TO DIRECT, REFLECTED OR SCATTERED RADIATION
CLASS 4 LASER PRODUCT

DRAWINGS



ORPHEUS-PS drawings



ORPHEUS-PS with SHBC drawing