

ORPHEUS | PS

Narrow Bandwidth Optical Parametric Amplifier

FEATURES

- Built on well-known TOPAS-800 OPA basis
- Continuously tunable picosecond pulses in 320–5000 nm
- Near bandwidth limited output, <math><15\text{ cm}^{-1}</math> spectral width (typical)
- High stability is possible by seeding with femtosecond white-light continuum
- Repetition rate up to 100 kHz
- Computer-controlled

APPLICATIONS

- Stimulated Raman Spectroscopy
- Surface sum-frequency spectroscopy

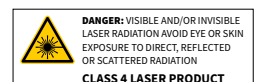
ORPHEUS-PS is a narrow bandwidth optical parametric amplifier of white-light continuum, designed for PHAROS / CARBIDE pump laser. This device is pumped by the picosecond pulses produced in SHBC-515 narrow bandwidth second harmonic generator and seeded by white-light continuum generated by femtosecond pulses. This enables very high pulse to pulse stability compared to other methods of generating tunable picosecond pulses. The white-light generation module is also 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, full computer control via USB port and LabVIEW drivers. A part of the PHAROS / CARBIDE 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, for example, narrowband Raman spectroscopy measurements, or surface sum-frequency spectroscopy.

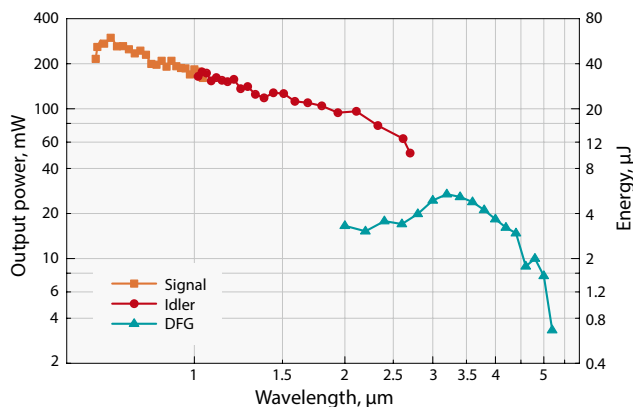
SPECIFICATIONS

Model	ORPHEUS-PS
Tuning range	640–1010 nm signal and 1050–2600 nm idler
Pulse energy conversion efficiency	>20 % (of pump from SHBC)
Pulse energy stability	<math><2.0\text{ % rms}</math> @ 700–960 nm and 1100–1500 nm
Spectral width	<math><20\text{ cm}^{-1}</math> @ 700–2000 nm if pump bandwidth <math><10\text{ cm}^{-1}</math>
Pulse duration	1–4 ps depending on pump pulse duration from SHBC-515
SH option	Tuning range: 320–505 nm; 525–640 nm. Conversion efficiency: >3 % at peak
DFG option	Available, contact sales@lightcon.com for details



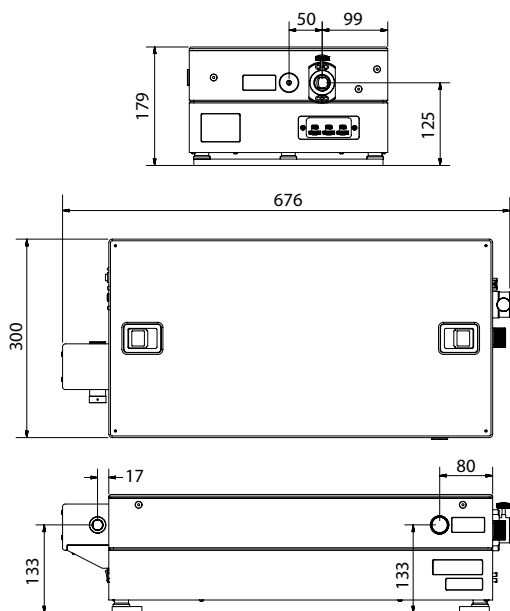
REQUIREMENTS FOR THE INPUT PULSES

- Picosecond 515 nm, produced by SHBC-515: energy 120 μJ – 1 mJ, pulse duration 1–3 ps, spectral width $<20\text{ cm}^{-1}$;
- Uncompressed input from SHBC is required.
- Max pump power limitation:
 6 W @ 40–100 kHz;
 8 W @ 20–40 kHz;
 10 W @ 1–20 kHz.



ORPHEUS-PS performance.
 Pump: 2 W, 400 μJ , 5 kHz from SHBC 514.2 nm, $\Delta\lambda = \sim 8\text{ cm}^{-1}$, $\tau = 2.7\text{ ps}$

OUTLINE DRAWINGS



ORPHEUS-PS drawings