

# PhotoSonus T



## BENEFITS

- ▶ High pulse energy (up to 230 mJ) is highly beneficial for photoacoustics imaging applications
- ▶ Superior tuning resolution ( $1 - 2 \text{ cm}^{-1}$ ) allows recording of high quality spectra
- ▶ High integration level saves valuable space in the laboratory
- ▶ Flashlamps replacement without misalignment of the laser cavity saves on maintenance costs
- ▶ In-house design and manufacturing of complete systems, including pump lasers, guarantees on-time warranty and post warranty services and spares supply
- ▶ Variety of control interfaces: USB, RS232, optional LAN and WLAN ensures easy control and integration with other equipment
- ▶ Attenuator and fiber bundle coupling options facilitate incorporation of PhotoSonus T systems into various experimental environments

PhotoSonus T series tunable laser seamlessly integrates in a compact housing a nanosecond optical parametric oscillator and Nd:YAG Q-switched laser.

Three models with different output pulse energy values and different repetition rates are offered. The most powerful model has more than 230 mJ pulse energy. Narrow linewidth ( $<10 \text{ cm}^{-1}$ ) is nearly constant through almost whole tuning range, which makes laser suitable for many spectroscopy application.

The device is controlled from the remote keypad or PC using LabVIEW™ drivers that are supplied with the system. The remote pad features a backlit display that is easy to read even while wearing laser safety glasses.

System is designed for easy and cost-effective maintenance. Replacement of flashlamps can be done without misalignment of the laser cavity and deterioration of laser performance. OPO pump energy monitoring system helps to increase lifetime of the optical components.

## High Energy Table-Top Tunable Wavelength Lasers for Photoacoustic Imaging

### FEATURES

- ▶ Hands-free, automated wavelength tuning from 330 to 2600 nm
- ▶ Ultra-wide OPO signal tuning range from 660 to 1320 nm
- ▶ Up to 230 mJ in range 660 – 2600 nm, 35 mJ in range 330 – 660 nm
- ▶ Narrow linewidth across tuning range
- ▶ 3–5 ns pulse duration
- ▶ Remote control via keypad or PC
- ▶ Separate output port for 532 nm beam. Output for 1064 nm is optional
- ▶ OPO pump energy monitoring
- ▶ Fast Wavelength Switching within entire Signal or Idler ranges

### APPLICATIONS

- ▶ Photoacoustic imaging
- ▶ Flash photolysis
- ▶ Photobiology
- ▶ Remote sensing
- ▶ Non-linear spectroscopy

### Options

Optional items are available allowing optimization of the laser system for Your application, for example:

- ▶ Fiber bundle coupled output;
- ▶ Energy meter;
- ▶ Efficient second harmonic generator for 330–660 nm range;
- ▶ Pulse energy attenuator;
- ▶ Water-air cooled power supply.

Please inquire custom-build versions and options.

SPECIFICATIONS <sup>1)</sup>

Model	PhotoSonus T-10	PhotoSonus T-20	PhotoSonus T+
<b>OPO</b>			
Wavelength range			
Signal	660–1320 nm		660–1064 nm <sup>2)</sup>
Idler	1065–2600 nm		
SH (optional)	330–660 nm		330 – 530 nm (330 – 659 nm) <sup>3)</sup>
Output max pulse energy <sup>4)</sup>			
OPO	150 mJ	130 mJ	230 mJ
SH	25 mJ	21 mJ	35 mJ
Linewidth <sup>5)</sup>	< 10 cm <sup>-1</sup>		< 20 cm <sup>-1</sup>
Tuning resolution <sup>6)</sup>			
Signal	1 cm <sup>-1</sup>		
Idler	1 cm <sup>-1</sup>		
SH	2 cm <sup>-1</sup>		
Pulse duration <sup>7)</sup>	3–5 ns		
Typical beam diameter <sup>8)</sup>	7 mm		9 mm
Typical beam divergence <sup>9)</sup>	<2 mrad		
Polarization			
Signal beam	horizontal		
Idler beam	vertical		
SH beam	vertical		
<b>PUMP LASER <sup>10)</sup></b>			
Pump wavelength	532 nm		
Pulse duration	4 – 6 ns		
Beam quality	"Hat-Top" in near field. Close to Gaussian in far field		
Beam divergence	<0.6 mrad		
Pulse energy stability (StdDev)	<2.5 %		
Pulse repetition rate	10 Hz	20 Hz	10 Hz
<b>PHYSICAL CHARACTERISTICS</b>			
Unit size (W × L × H)	456 × 821 × 270 mm		
Power supply size (W × L × H)	330 × 490 × 585 mm		
Umbilical length	2.5 m		
<b>OPERATING REQUIREMENTS</b>			
Water consumption (max 20 °C) <sup>11)</sup>	<10 l/min		
Room temperature	18–27 °C		
Relative humidity	20–80 % (non-condensing)		
Power requirements <sup>12)</sup>	200 – 240 VAC, single phase, 50/60 Hz		
Power consumption	< 1.5 kW		
Cleanliness of the room	not worse than ISO Class 9		

<sup>1)</sup> Due to continuous improvement, all specifications are subject to change without notice. The parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture. Unless stated otherwise all specifications are measured at 700 nm and for basic system without options.

<sup>2)</sup> Optional signal extended range: 660 – 1320 nm.

<sup>3)</sup> When extended signal range is selected.

<sup>4)</sup> See tuning curves for typical outputs at different wavelengths.

<sup>5)</sup> At 700 nm or higher wavelengths.

<sup>6)</sup> When wavelength is controlled from PC. When wavelength is controlled from keypad, tuning resolution is 0.1 nm for signal, 1 nm for idler and 0.5 nm for SH.

<sup>7)</sup> FWHM measured with photodiode featuring 1 ns rise time and 300 MHz bandwidth oscilloscope.

<sup>8)</sup> Beam diameter is measured at 700 nm at the 1/e<sup>2</sup> level and can vary depending on the pump pulse energy.

<sup>9)</sup> Full angle measured at the FWHM level at 700 nm.

<sup>10)</sup> Separate output port for the 532 nm beam is standard. Output for 1064 nm beam is optional. Pump laser output will be optimized for the best OPO operation and specification may vary with each unit we manufacture.

<sup>11)</sup> Air cooled power supply is available as option.

<sup>12)</sup> Mains voltage should be specified when ordering.



PERFORMANCE

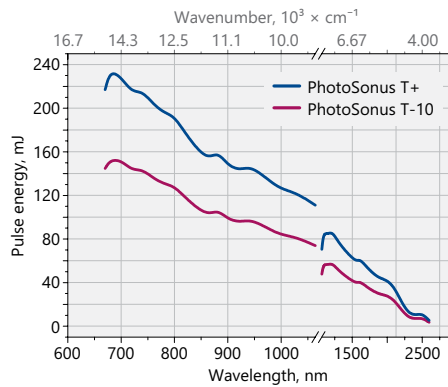


Fig 1. Typical output energy of the PhotoSonus T tunable wavelength systems

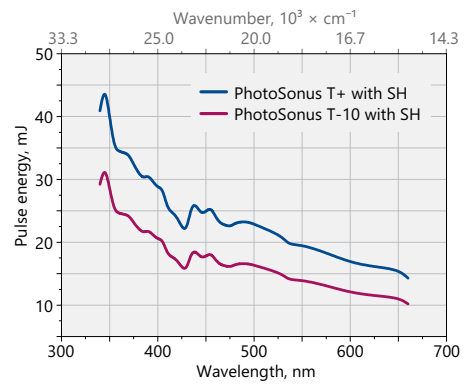


Fig 2. Typical output energy of the PhotoSonus T tunable wavelength systems with SH option

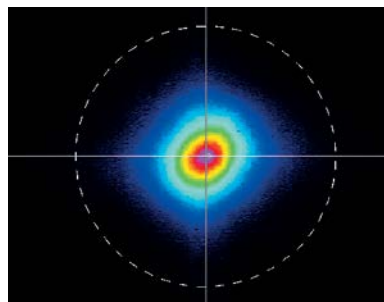


Fig 3. Typical far field beam profile of PhotoSonus T laser at 800 nm

ORDERING INFORMATION

**Note:** Laser must be connected to the mains electricity all the time. If there will be no mains electricity for longer than 1 hour then laser (system) needs warm up for a few hours before switching on.

