

## SOPRANO

### Femtosecond Laser for Multiphoton Microscopy



#### DESCRIPTION

SOPRANO – the latest femtosecond laser of Cycle GmbH – is the ideal solution for various multiphoton imaging techniques. With two (or optional three) simultaneous wavelength outputs and pulse duration below 100 fs. It is particularly suitable for specific applications in multiphoton microscopy (MPM). For example, deep-tissue 3-photon excitation fluorescence imaging (3PEF) of green/red fluorescent protein (GFP/RFP) within the biological transmission windows at 1300 nm and 1700 nm, using only one laser source.

Since the center wavelengths of the dual outputs of the SOPRANO can be customized and tunable, other applications and multi-modal imaging techniques may also benefit from this state-of-the-art dual wavelength ultrafast laser, please see the application section on the reverse.

SOPRANO is designed to survive harsh industrial as well as scientific environments and to deliver reliable 24/7 operation. It was developed in close cooperation with biomedical experts to provide a unique light source with the best features of complex laser systems at an affordable price.

#### KEY SPECIFICATIONS

- Tunable wavelength around **1300 nm** and **1700 nm** simultaneously
- Average power **500 mW**
- Repetition rates **1 MHz** to **30 MHz** fixed (tunable optional)
- Pulse duration below **100 fs**

Please feel free to discuss also your other laser needs with us. Our team of experienced laser engineers will find a useful combination of parameters which will best fit your application. We love to **design custom lasers** too.

Parameters	Laser	Comment
Center wavelength	1300 nm & 1700 nm	1550 nm output optional
Wavelength tunability	typ. 1300 – 1700 nm	down to 1250 nm optional
Pulse Duration	<100 fs	wavelength dependent
Avg. output power	500 mW	at 1300 and 1700 nm
Pulse energy	16 – 500 nJ	Repetition rate dependent
Peak power	5 MW	at 1 MHz
Pulse repetition rate	30 MHz	down to 1 MHz optional
Spectral bandwidth	transform-limited	$\tau_p \cdot \Delta\nu \sim 0.35$
Beam quality	$M^2 < 1.2$ , TEM <sub>00</sub>	
PER	> 20 dB	
Laser output	collimated free space	
<b>Mechanical</b>		
Size laser head (L x W x H)	800 x 450 x 300 mm <sup>3</sup>	
Weight laser head	10 kg	
Size controller	19"/3U rack mount	
Weight controller	10 kg	
<b>Electrical</b>		
Power supply	100 – 240 VAC 50 – 60 Hz	
Power consumption	< 300 W	

Please inquire about other possible specifications!

#### APPLICATION

- Semiconductor Testing (e.g. OBIC)
- Deep-tissue Imaging
- MPM Modality
  - 2PEF/3PEF
  - SHG/THG
- Biomedical Applications
  - Neuroscience
  - Optical virtual skin biopsy
  - Histopathology, morphology
- Spectroscopy
- Sensing

#### OPTIONS

- Output port 1550 nm
- Pulse Picker (down to 1 MHz)
- Energy up to 0.5  $\mu$ J at 1 MHz
- Dispersion compensation module (for Microscope Optics)
- SHG Modules

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