

CRONUS | 3P

Laser Source for Advanced Nonlinear Microscopy

FEATURES

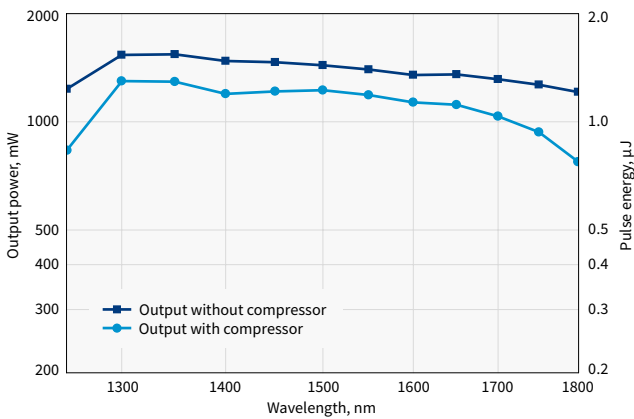
- High pulse energy, high repetition rate, and high average power
- 1250 – 1800 nm tuning range
- Down to 50 fs pulse duration
- Automated GDD control
- Industrial-grade design
- High output stability



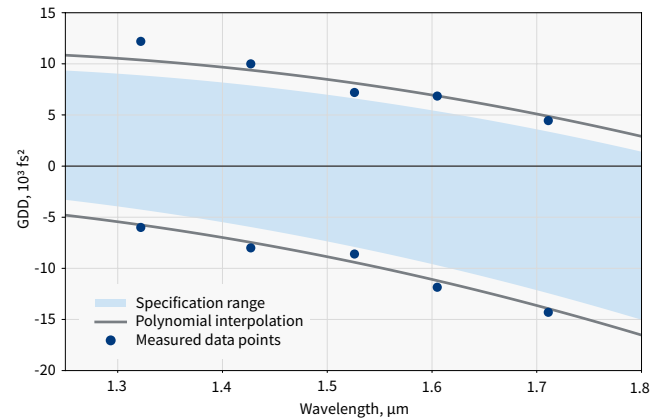
CRONUS-3P is a laser source developed specifically for advanced nonlinear microscopy. It provides μJ -level pulses down to 50 fs at repetition rates of up to 2 MHz and tunable in the short-wavelength infrared (SWIR) range from 1.25 to 1.8 μm , thus covering the biological transparency windows at 1.3 μm and 1.7 μm for three-photon microscopy.

Typically, multiphoton imaging in the SWIR range requires a complex multi-device laser system and, usually, a good portion of an optical table and skilled staff – this reality

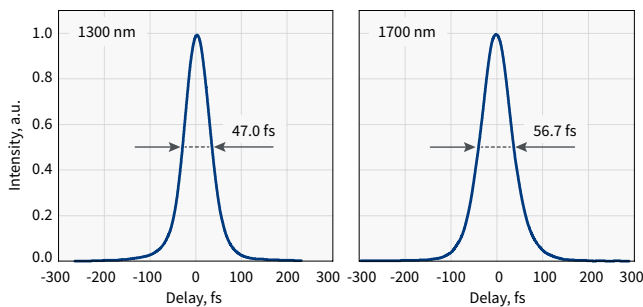
encumbers neuroscience and other biomedical applications – the CRONUS-3P system is a next-generation, industrial-grade, single-supplier solution that is more compact, more reliable, and more versatile, and achieves tunable femtosecond excitation with an integrated group delay dispersion (GDD) control, ensuring optimal pulse duration at the sample, and industrial-grade design to guarantee high short- and long-term output stability.



Output power and pulse energy vs wavelength.
Pump: 40 W, 1 MHz.



GDD control range



Typical pulse duration at 1300 nm and 1700 nm

SPECIFICATIONS

Model	CRONUS-3P	
Tuning range ¹⁾	1250 – 1800 nm	
Repetition rate ²⁾	Single-shot to 2 MHz	
	1300 nm	1700 nm
Pulse duration	< 50 fs	< 65 fs
Output power	> 1100 mW @ 1 MHz > 800 mW @ 2 MHz	> 800 mW @ 1 MHz > 500 mW @ 2 MHz
GDD control range ³⁾	-4000 to +9000 fs ²	-12000 to +3500 fs ²
Beam diameter ⁴⁾	3 – 5 mm	
Beam quality (M ²)	< 1.4	
Beam ellipticity	> 0.8	
Beam divergence	< 1 mrad	
Long-term power stability, 24 h ⁵⁾	< 1%	
Pulse-to-pulse energy stability, 1 min ⁵⁾	< 1%	

OUTPUT WITHOUT COMPRESSOR

Output power	> 1500 mW @ 1 MHz > 1000 mW @ 2 MHz	> 1050 mW @ 1 MHz > 700 mW @ 2 MHz
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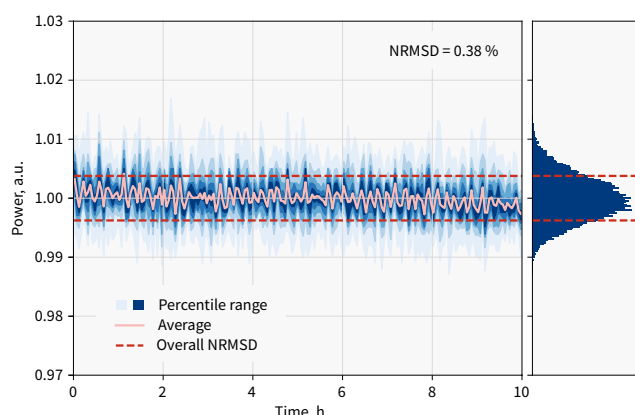
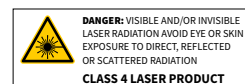
¹⁾ Alternative configuration with additional 920 nm output is available, contact sales@lightcon.com.

²⁾ Lower repetition rate and higher pulse energy options available.

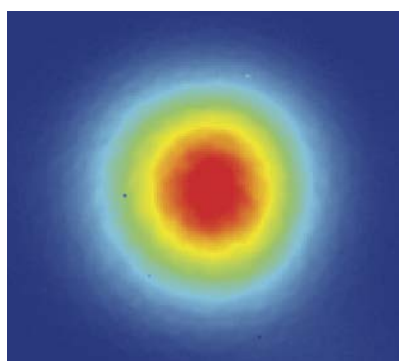
³⁾ Continuously controlled dispersion that can be added before the microscope, i.e., -3000 fs² compensates a microscope with +3000 fs².

⁴⁾ 1/e², measured at compressor output.

⁵⁾ Expressed as NRMSD (normalized root mean squared deviation).

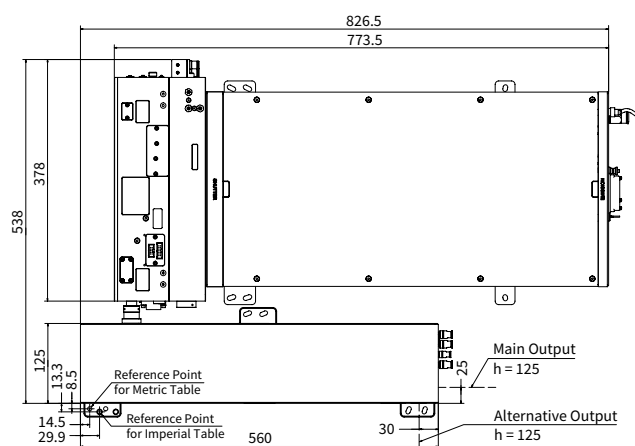


Long-term power stability, measured at 1700 nm over 10 h



Beam profile at 1300 nm, 4.2 mm diameter (1/e²)

DRAWINGS



CRONUS-3P drawing

CRONUS | 2P

Three-Channel Wavelength-Tunable Femtosecond Laser

FEATURES

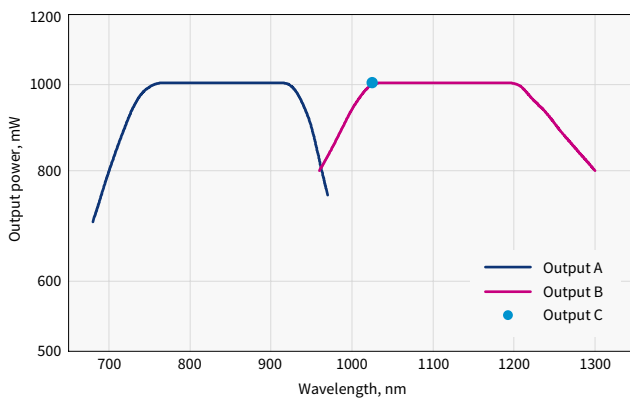
- Three simultaneous and synchronized outputs
- Watt-level output, high repetition rate
- Automated GDD control
- Industrial-grade design
- High output stability



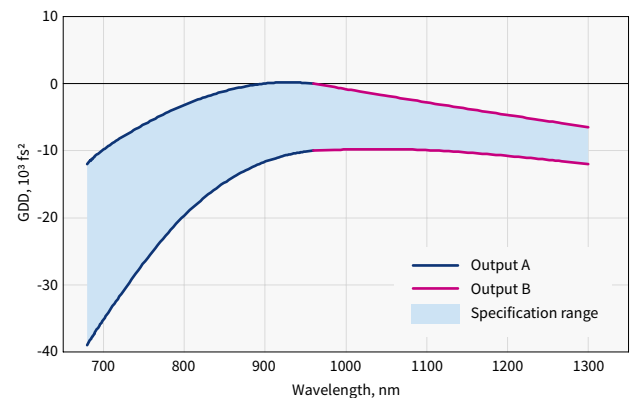
CRONUS-2P is a femtosecond laser providing watt-level three simultaneous and synchronized outputs with high repetition rate, short pulse duration, and GDD control, making it the ultimate source for nonlinear microscopy. Two outputs are independently tunable in the 680 – 960 nm and 960 – 1300 nm ranges, while the third is fixed at 1025 nm. The CRONUS-2P can be used for simultaneous excitation of multiple fluorescent probes, calcium indicators, or opsins at their absorption maxima, whereas second- and third-harmonic emission (SHG and THG) can be spectrally shifted for ease of detection or resonant enhancement.

The three simultaneous outputs also enable advanced coherent anti-Stokes and stimulated Raman scattering (CARS and SRS) applications with dual-band imaging, a broader selection of vibrational resonance frequencies, constant-difference dual-beam tuning, resonant enhancement, and more.

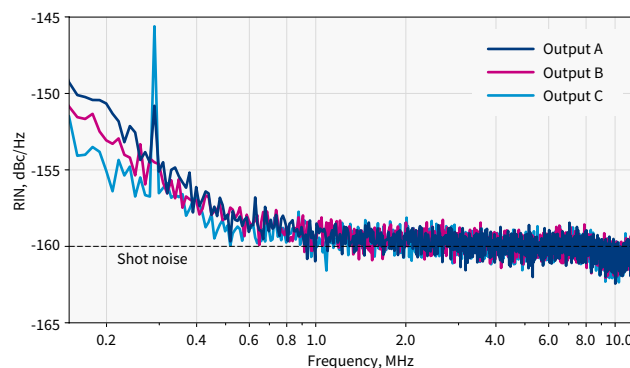
CRONUS-2P is a fully automated and robust next-generation laser system built on over 25 years of experience in designing and manufacturing femtosecond lasers and wavelength-tunable sources.



CRONUS-2P tuning curve



GDD control range



CRONUS-2P relative intensity noise (RIN)

SPECIFICATIONS

Model	CRONUS-2P		
	Output A	Output B	Output C
Tuning range	680 – 960 nm	960 – 1300 nm	1025 nm (fixed)
Output power	> 1 W @ 920 nm	> 1 W @ 1100 nm	> 1 W
Pulse duration ^{1) 2)}	< 160 fs		
Repetition rate	77 ± 1 MHz		
Beam quality ²⁾	TEM ₀₀ ; M ² < 1.2		
Polarization	Linear, horizontal		
Beam divergence, full angle	< 1 mrad		< 1.5 mrad
Beam diameter ²⁾ (1/e ²)	3.0 ± 0.4 mm	3.2 ± 0.4 mm	2.8 ± 0.4 mm
Beam ellipticity ²⁾	> 0.8		
Beam astigmatism ²⁾	< 20%		
Beam pointing stability ³⁾	< 200 μrad		-
Long-term power stability ^{2) 4)}	< 1%		
GDD control range	-10000 to -35000 fs ² @ 700 nm -3000 to -20 000 fs ² @ 800 nm 0 to -10 000 fs ² @ 960 nm	0 to -10 000 fs ² @ 960 nm -3000 to -10 000 fs ² @ 1100 nm -6 000 to -12 000 fs ² @ 1300 nm	-

ENVIRONMENTAL REQUIREMENTS

Altitude	< 2000 m
Temperature, operating	18 – 30 °C
Temperature, storage	10 – 35 °C
Relative humidity, operating	< 80% (non-condensing)

DIMENSIONS

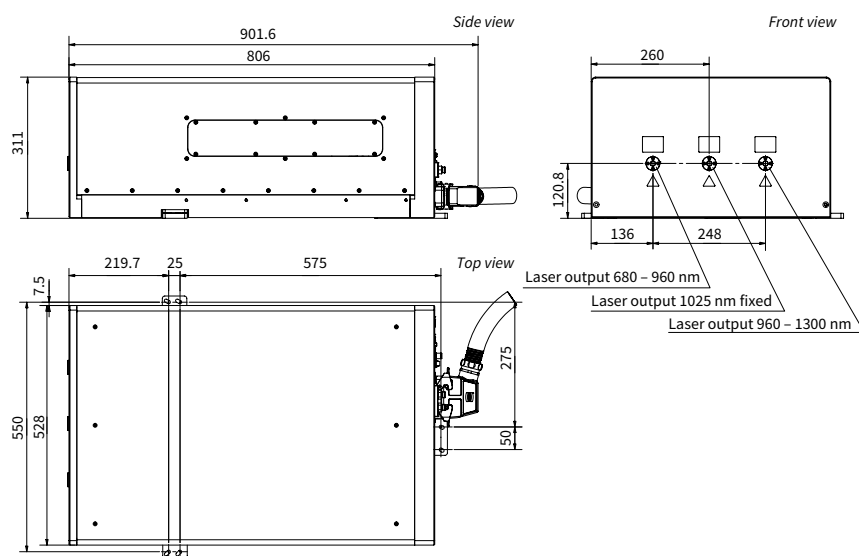
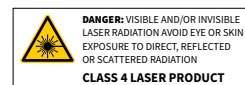
Laser head (L × W × H)	806 × 528 × 311 mm
Rack for power supply and chiller (L × W × H)	642 × 553 × 673 mm

¹⁾ IR pulse duration determined assuming sech² shape.

²⁾ At 900 nm, 1100 nm, and 1025 nm, respectively.

³⁾ Beam pointing deviation over the entire tuning and GDD control range.

⁴⁾ Expressed as NRMSD (normalized root mean squared deviation) over 2 h with less than ±1 °C temperature change after 1 h warm up.



CRONUS-2P drawing