

# Mai Tai®

## Ultrafast One Box Ti:Sapphire Lasers

**mks** | Spectra-Physics®

The Spectra-Physics Mai Tai Ti:Sapphire oscillator is used for a variety of applications ranging from general spectroscopy to multiphoton microscopy. With its leading performance specifications and largest installed base of any laser of its type, the Mai Tai is truly a cutting-edge tool for basic research and biological imaging.

The Mai Tai series includes three models of increasing power and tuning range to allow customers to choose the system to best match their application. Ideal for multiphoton microscopy, the Mai Tai HP provides more than 300 nm (690–1040 nm) in useable tuning range with over 2.5 W of average power and a pulse width of less than 100 fs. For customers interested in systems with a shorter pulse width, the Mai Tai BB provides more than 240 nm in useable tuning range with a pulse width of less than 80 fs. Finally, the Mai Tai XF-1 provides more than 200 nm in useable tuning range with an even shorter pulse width of less than 70 fs. For access to longer wavelengths beyond 1040 nm, Spectra-Physics offers InSight® X3™ with exceptionally wide tuning range (680–1300 nm) for deep in vivo imaging.

The Mai Tai series reliability is maintained using proven, ultra-stable regenerative mode-locking. Using this method, the Mai Tai oscillator is capable of hands free, drop-out free wavelength tuning enabling speedy collection of excitation profiles all at the click of a mouse. StabiLok® real-time monitoring technology also enhances system reliability by providing excellent beam pointing stability and minimal average power fluctuations, as well as eliminating wavelength drift. These two features combine to make the Mai Tai oscillator the most reliable and most versatile hands-free laser source available.

### The Mai Tai Advantage

- Short output pulse width to provide high peak power
- Wide tuning range for efficient excitation of all commonly used fluorophores
- Smooth tuning with no pulse drop outs
- Outstanding pointing stability eliminates the need to realign experimental set-up
- Regenerative mode locking for unmatched stability

### Applications

- Multiphoton microscopy
- Time-resolved photoluminescence
- Non-linear spectroscopy
- Optical computed tomography
- Surface second harmonic generation
- Terahertz imaging
- Semiconductor metrology
- Materials processing
- Amplifier seeding



# Mai Tai Specifications<sup>1, 10</sup>

	Mai Tai HP	Mai Tai BB	Mai Tai XF-1
Output Characteristics			
Pulse Width <sup>2, 3</sup>	<100 fs	<80 fs	<70 fs
Tuning Range <sup>4</sup>	690–1040 nm	710–990 nm	710–920 nm
Average Power at 800 nm <sup>2</sup>	>2.5 W	>1.5 W	>900 mW
Average Power, Alternative Wavelengths <sup>5</sup>	>500 mW at 690 nm >1.35 W at 710 nm >1.35 W at 920 nm >300 mW at 1040 nm	>650 mW at 710 nm >650 mW at 920 nm >250 mW at 990 nm	>400 mW at 710 nm >400 mW at 920 nm
Beam Roundness <sup>2</sup>	0.9–1.1		
Astigmatism <sup>2</sup>	<10%		
Repetition Rate <sup>2, 6</sup>	80 MHz ±1 MHz		
Beam Pointing Stability	<50 μrad/100 nm		
Noise <sup>2, 7</sup>	<0.15%		
Stability <sup>8</sup>	<±1%		
Spatial Mode <sup>2</sup>	TEM <sub>00</sub> , M <sup>2</sup> <1.1		
Polarization	>500:1 Horizontal		
Beam Divergence <sup>2</sup>	<1.2 mrad		
Beam Diameter (1/e <sup>2</sup> ) <sup>2</sup>	<1.2 mm		
Physical Characteristics			
Size (L x W x H)	23.89 x 13.79 x 5.95 in (606.81 x 350.27 x 151.13 mm)		
Weight – Laser Head	70 lbs (32 kg)		
Umbilical Length	10 ft (3 m)		
Environmental Requirements			
Altitude	Up to 2000 m		
Temperature, Operating	20–25°C		
Relative Humidity, Operating	Maximum 75% non-condensing up to 25°C		
Temperature, Storage	15–35°C		
Relative Humidity, Storage	<65% for 15–35°C		
Cooled Water Temperature in Closed-loop Chiller	21°C typical <sup>9</sup>		

1. Due to our continuous product improvement program, specifications may change without notice.

2. Specification applies to 800 nm only.

3. A sech<sup>2</sup> pulse shape is used to determine the pulse width as measured with a Newport PulseScout® autocorrelator.

4. Mai Tai is also available with a fixed, factory preset wavelength within the wavelength range noted.

5. Specifications apply to operation at the wavelength noted.

6. Laser operation is specified at a nominal repetition rate of 80 MHz.

7. Specification represents rms noise measured in a 10 Hz to 10 MHz bandwidth.

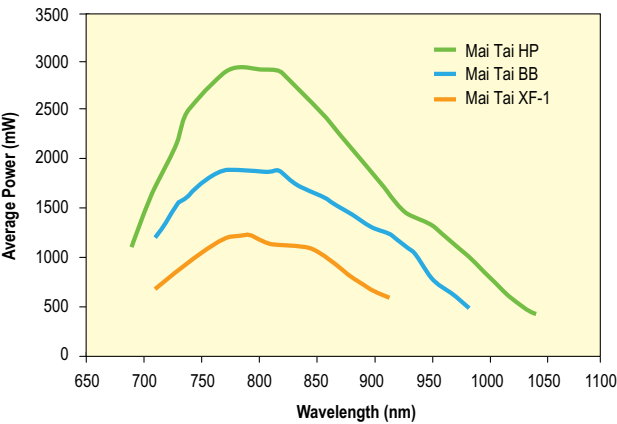
8. Percent power drift in any 2-hour period with  $\pm$ 1°C temperature change after a 1-hour warm up.

9. Avoid obstructing the air exhaust grills which will result in the recirculation of hot exhaust air. Cooling air enters through the front panel and exits through the rear fan apertures.

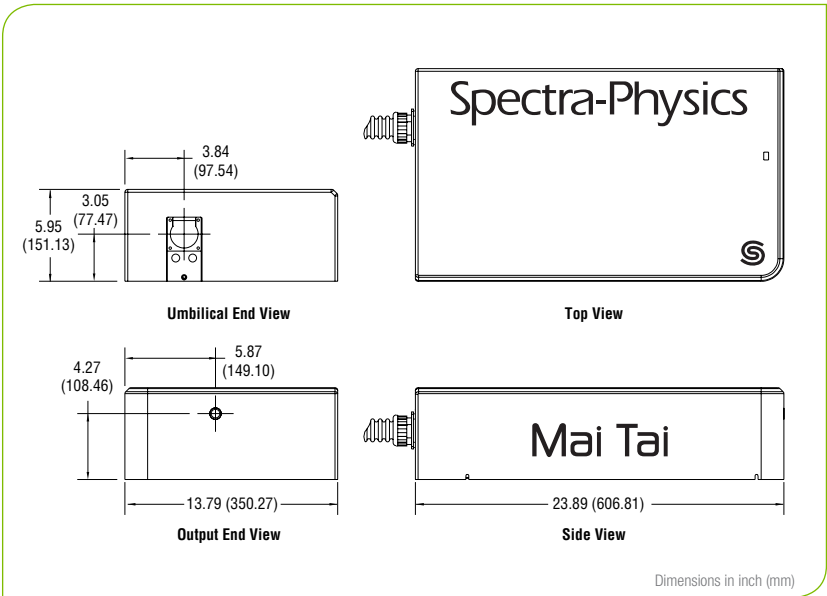
10. The Mai Tai is a Class IV – High-Power Laser, whose beam is, by definition, a safety and fire hazard. Take precautions to prevent exposure to direct and reflected beams. Diffuse as well as specular reflections can cause severe skin or eye damage.

# Mai Tai

Mai Tai Series Typical Tuning Curves<sup>1</sup>



1. Typically measured performance; not a guaranteed or warranted specification.



Mai Tai Dimensions



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