Mai Tai®

Ultrafast One Box Ti:Sapphire Lasers

mks | Spectra-Physics

The Spectra-Physics Mai Tai® Ti:Sapphire oscillator is a proven, industry standard laser source for applications ranging from general spectroscopy to multiphoton microscopy. With a large installed base and decades of field use, the Mai Tai platform is recognized as a mature, dependable solution for demanding research and imaging environments where stability and ease of use are critical.

The Mai Tai series consists of two models differentiated by pulse width and power. The Mai Tai HP provides more than 300 nm of usable tuning range (690–1040 nm), over 2.5 W of average output power, and sub 100 fs pulse widths. For users requiring shorter pulse durations, the Mai Tai eHP offers improved temporal performance relative to the HP, while offering higher power and preserving wide tunability.

Mai Tai reliability is built on proven, ultra stable regenerative mode locking technology. This design enables truly hands free, drop out free wavelength tuning, allowing rapid acquisition of excitation profiles with point and click control. Integrated StabiLok® real time monitoring further enhances long term stability by ensuring excellent beam pointing performance, minimal average power fluctuations, and elimination of wavelength drift. Together, these features make the Mai Tai oscillator a highly reliable, low maintenance ultrafast laser source for everyday laboratory operation.

For users requiring access to longer wavelengths beyond 1040 nm, Spectra Physics offers the InSight® X3™, providing an exceptionally broad tuning range from 680 to 1300 nm. In addition, for microscopy applications, the Mai Tai platform is available with DeepSee™ dispersion precompensation, enabling short pulses at the sample by compensating for dispersion introduced by microscope optics.



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

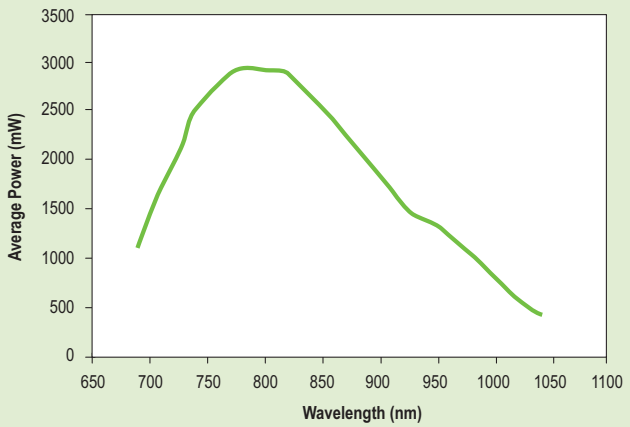
- Multiphoton microscopy
- Time-resolved photoluminescence
- Non-linear spectroscopy
- Optical computed tomography
- Surface second harmonic generation
- Terahertz imaging
- Semiconductor metrology
- Materials processing
- Amplifier seeding

Mai Tai Specifications[1, 10]

	Mai Tai eHP	Mai Tai HP
Output Characteristics		
Pulse Width[2, 3]	<70 fs	<100 fs
Tuning Range[4]	690–1040 nm	
Average Power at 800 nm[2]	>2.6 W	>2.5 W
Average Power, Alternative Wavelengths[5]	>540 mW at 690 nm >1.38 W at 710 nm >1.38 W at 920 nm >330 mW at 1040 nm	>500 mW at 690 nm >1.35 W at 710 nm >1.35 W at 920 nm >300 mW at 1040 nm
Beam Roundness[2]	0.9–1.1	
Astigmatism[2]	<10%	
Repetition Rate[2, 6]	80 MHz ±1 MHz	
Beam Pointing Stability	<50 µrad/100 nm	
Noise[2, 7]	<0.15%	
Stability[8]	<±1%	
Spatial Mode[2]	TEM_{00}, M^2 <1.1	
Polarization	>500:1 Horizontal	
Beam Divergence[2]	<1.2 mrad	
Beam Diameter $(1/e^2)^2$	<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[9]	

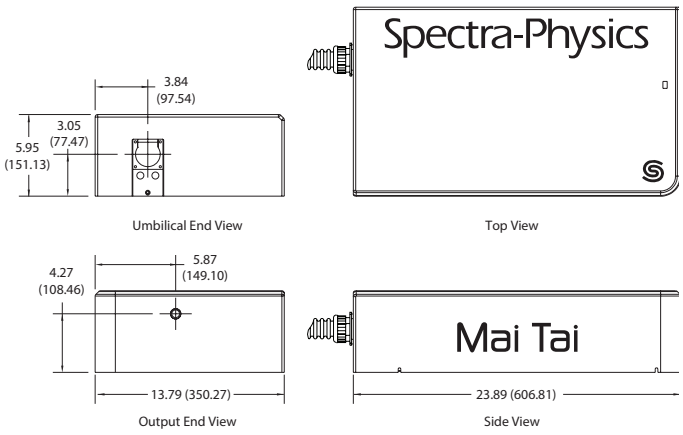
1. Due to our continuous product improvement program, specifications may change without notice.
2. Specification applies to 800 nm only.
3. A sech2 pulse shape is used to determine the pulse width as measured with a Newport PulseScout® autocorrelator.
4. Mai Tai is also available with a fixed, factory 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 <±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 HP Typical Tuning Curve[1]



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

Mai Tai Dimensional Drawing



Dimensions in inch (mm)

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