

Mai Tai[®] DeepSee[™]

ULTRAFAST Ti:SAPPHIRE LASER WITH DISPERSION COMPENSATION



The Mai Tai DeepSee Advantage

- Delivers the highest peak power to the sample while obtaining the most fluorescence signals
- Wide tuning range for efficient excitation of all commonly used fluorophores
- Smooth tuning with no pulse drop outs
- Fully automated with all adjustments synchronized with the wavelength of the Mai Tai laser
- Excellent beam quality and pointing stability to preserve the critical alignment to the sample
- Compact design to maximize valuable table space
- Most experienced service and support team

The Mai Tai[®] DeepSee[™] Ti:Sapphire oscillator with our patented automated dispersion compensation¹ has been specifically optimized for use in multiphoton microscopy. The Mai Tai DeepSee laser delivers the industry's highest peak power to the sample thus maximizing the fluorescence signal.

In addition, the Mai Tai DeepSee laser has over 2.4 W of average power and 350 nm (690-1040 nm) in useable tuning range. Access to longer wavelengths alleviates the need for additional light sources, making your laboratory complete with a single laser system.

The Mai Tai DeepSee oscillator's reliability is maintained through the ultra-stable regenerative mode locking technique made famous by the Spectra-Physics Tsunami[®] laser. Capable of hands free, drop-out free wavelength tuning, excitation profiles can be quickly collected with just 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 make the Mai Tai DeepSee oscillator the most reliable and most versatile hands-free laser currently on the market.

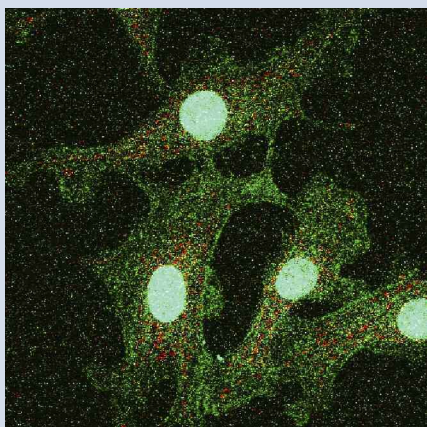
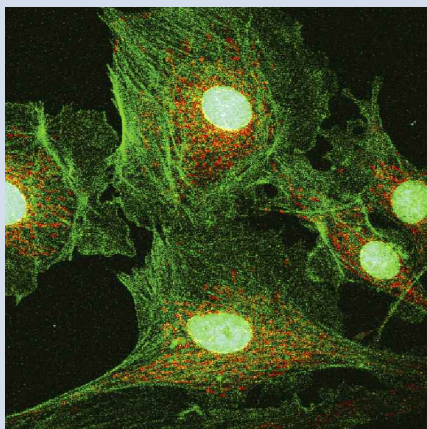
APPLICATIONS

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

 Spectra-Physics[®]
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1. The automated dispersion compensation technology in this product is protected by US patent number 7,962,046.

Mai Tai[®] DeepSee[™]



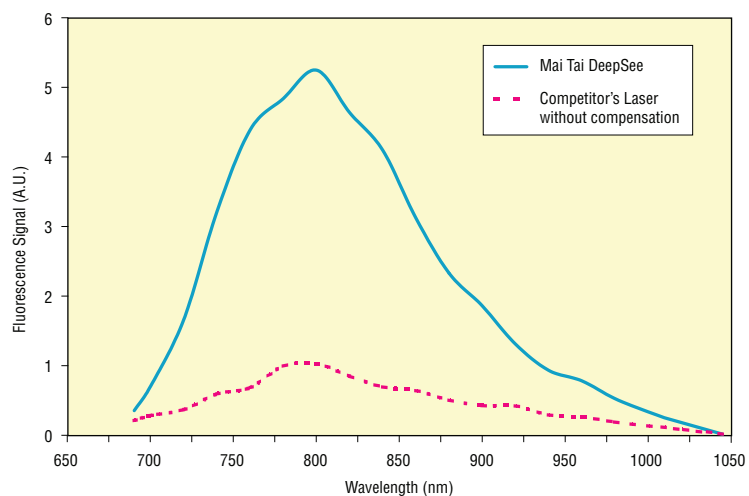
Two multiphoton microscope images of bovine endothelial cells; both were taken at 800 nm with 1.5 mW average power at the sample and the same PMT settings. The image with dispersion compensation on the top has a higher resolution than the image on the bottom without compensation.

Images courtesy of Holly Aaron at the Molecular Imaging Center at UC Berkeley

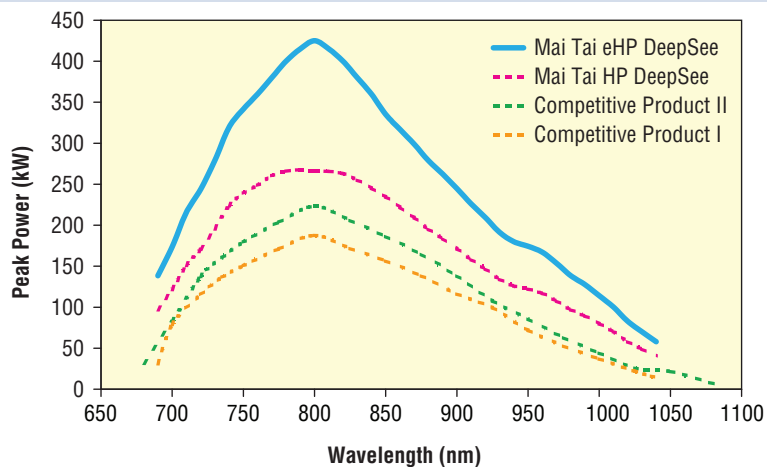
Mai Tai DeepSee Technical Advantage

With the Mai Tai DeepSee oscillator, deeper penetration depths can be achieved without the risk of sample damage from increased average powers. Whenever ultrafast laser pulses are transmitted through optical materials (i.e. windows, lenses, and non-linear crystals), the added dispersion lengthens the pulse width. This pulse lengthening has a negative affect on the fluorescence signal obtained. The Mai Tai DeepSee option corrects in advance for the optical setup dispersion through pre-compensation, which maximizes the observed fluorescence signals. If the danger of sample damage prevents the average power from being increased, then delivering the highest peak power is the only way to increase the fluorescence.

Mai Tai DeepSee Delivers More Fluorescence



Mai Tai DeepSee Delivers the Industry's Highest Peak Power



*calculated using specified values for average power and pulse width for each laser with dispersion compensation

Mai Tai DeepSee Specifications¹

	Mai Tai eHP DS	Mai Tai HP DS	Mai Tai BB DS	Mai Tai XF DS	Mai Tai XF-1 DS
Peak Power ²	>425 kW	>266 kW	>211 kW	>211 kW	>145 kW
Pulse Width ^{2, 3}	<70 fs ⁹	<100 fs	<80 fs	<80 fs	<70 fs
Tuning Range ⁴	690–1040 nm	690–1040 nm	710–990 nm	710–950 nm	710–920 nm
Average Power ²	>2.4 W	>2.1 W	>1.35 W	>1.35 W	>800 mW
Peak Power, Alternative Wavelengths ⁵	>56 kW at 690 nm >217 kW at 710 nm >217 kW at 920 nm >34 kW at 1040 nm	>56 kW at 690 nm >150 kW at 710 nm >150 kW at 920 nm >34 kW at 1040 nm	>91 kW at 710 nm >91 kW at 920 nm >35 kW at 990 nm	>91 kW at 710 nm >91 kW at 920 nm >56 kW at 950 nm	>64 kW at 710 nm >64 kW at 920 nm
Beam Roundness ²	0.9–1.1				
Astigmatism ²	<25%				
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 ²	>500:1 horizontal				
Beam Divergence ²	<1 mrad				
Beam Diameter (1/e ²) ²	<1.2 mm				
Standard Dispersion Compensation Range ¹⁰	690 nm: -22,500 fs ² to -41,700 fs ² 800 nm: -8,900 fs ² to -24,500 fs ² 1040 nm: 0 fs ² to -9,600 fs ²				
Physical Characteristics¹²					
Size (L x W x H)	35.44 x 13.79 x 5.78 in (90.02 x 35.03 x 14.68 cm)				
Weight	106 lbs (48 kg)				
Umbilical Length	10 ft (3 m)				
Utility Requirements					
Voltage	110 VAC ±10% / 220 VAC ±10%				
Current	Power Supply and Closed-loop Chiller: <10 A/<6 A				
Frequency	60 Hz/50 Hz				
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 ¹¹				

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. Measured after external pulse compression, or measured at the sample on a system configured with the DeepSee.

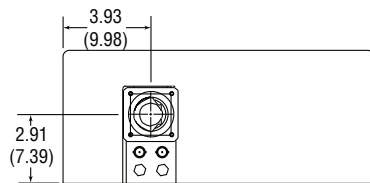
10. For optional range down to 0 fs², contact Spectra-Physics.

11. 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.

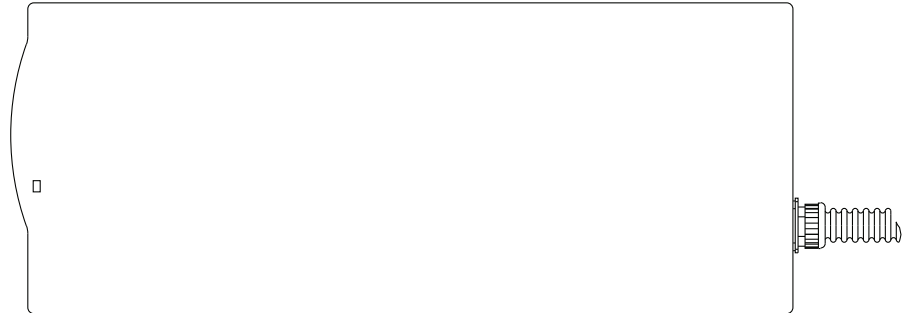
12. The Mai Tai DeepSee is a Class IV – High-Power Laser, whose beam is, by definition, a safety and fire hazard. Take precautions to prevent exposure to direct and reflected beams. Diffuse as well as specular reflections can cause severe skin or eye damage.

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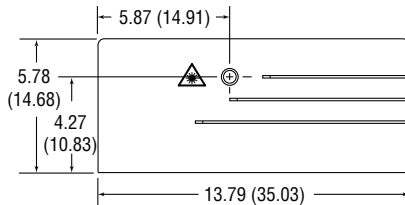
Mai Tai DeepSee Dimensions



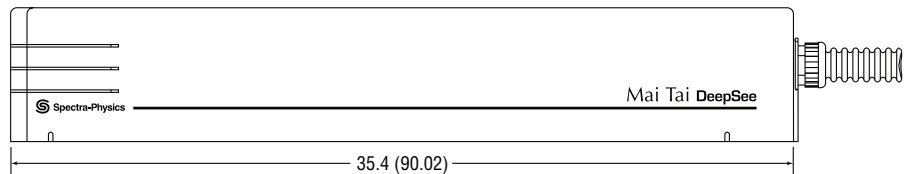
Umbilical End View



Top View



Output End View



Side View

Dimensions in inches (cm)



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Newport Corporation, Irvine and Santa Clara, California and Franklin, Massachusetts; Evry and Beaune-La-Rolande, France; Stahnsdorf, Germany and Wuxi, China have all been certified compliant with ISO 9001 by the British Standards Institution.

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