

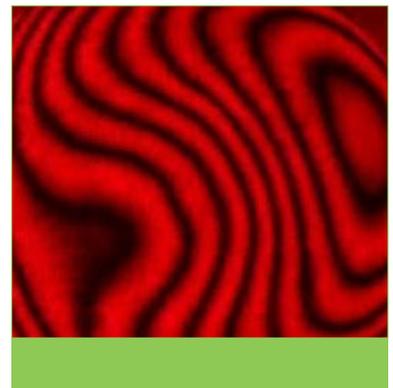


torus

single frequency CW lasers

- CW 532nm up to 750mW
- CW 660nm up to 200mW
- Extremely low noise
- Active frequency lock technology

TECHNICAL DATA SHEET





torus

single frequency CW lasers



Single frequency CW 532nm & 660nm lasers

Overview

The **torus** is the only actively locked single longitudinal mode laser commercially available. The unique active lock feature continually tracks the position of the longitudinal mode and corrects the cavity length to retain the central wavelength to within 5 picometers, eliminating mode-hop throughout its operating temperature range. The **torus** is available at 532nm (50mW to 750mW) and at 660nm (50mW to 200mW), making it ideal for applications such as holography, Brillouin scattering and high resolution Raman spectroscopy. The diode MTTF is manufacturer-specified as >40,000 hours at full power, but Laser Quantum de-rates the diode to further increase its lifetime, giving the **torus** itself industry leading lifetimes.

Single Frequency

The patented travelling wave cavity of the **torus** ensures that single frequency operation is native to the design. The photons resonant in the cavity form a travelling wave, removing mode competition and resulting in a laser supporting a single longitudinal mode. The figure shows a single shot of a **torus** beam using a 200MHz free-spectral range etalon with a finesse of 50. The 5 etalon peaks are clear and there are no other secondary modes visible.

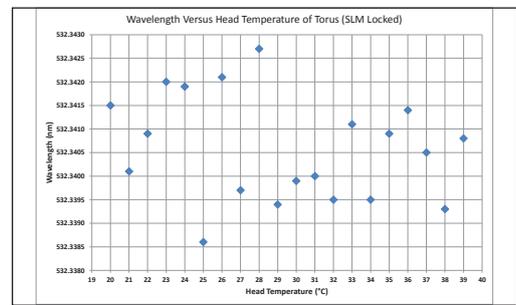
Active Feedback

Despite the inherent single mode operation of the **torus**, mode-drift and eventual mode-hop would occur if the cavity were allowed to change length. Using three PID temperature controllers, the effects of temperature change on the laser such as mode-drift and mode-hop are minimised. In addition, the digital power supply receives a signal from the laser which reports the exact position of the mode. The power supply then feeds back a control signal which maintains the position of the mode. This active feedback eliminates the risk of mode-hop and leads to a highly stable output.

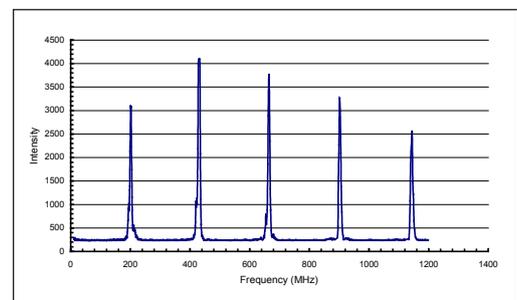
Construction

Laser Quantum builds all lasers to exacting standards, with quality the key focus of the company. The effects of shock and vibration in the **torus** are minimised by the use of zero-stress mounts throughout the cavity. The **torus** is capable of withstanding extreme shock and vibration without diminishing its performance.

Prior to shipment, each **torus** is subjected to rigorous quality assurance in line with ISO9001. The **torus** is purged and hermetically sealed, prior to a >300 hour burn-in procedure under user realistic conditions and a 1,200 g-shock test on 5 faces. Every single unit must pass through this procedure before it is released for shipment.



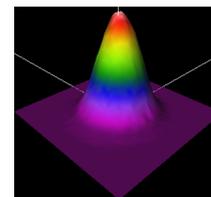
wavelength drift \pm 2pm across 20°C



single mode performance can be seen using a 200MHz free-spectral range etalon with a finesse of 50

Beam Quality

The **torus** beam has a pure spectral and spatial quality with a typical M^2 value of <1.1 , resulting in a near perfect and near diffraction-limited beam.



RemoteApp™

The intelligent **RemoteApp™** software is unique to our systems, allowing complete remote access to all laser functions, either locally or through an internet connection. Additionally, our remote-service facility allows a connection to our engineers, who have the ability to monitor laser performance, diagnose opportunities for and carry out optimisation tasks, all without the laser moving location and with minimal disruption to the user. This service is free of charge for the lifetime of the laser.

mpc3000 power supply and controller

The **mpc3000** controller provides an interface with the **torus** both directly via an intuitive, user friendly menu displayed on the LCD screen, navigated using just 2 buttons and a dial, and remotely using the RS232 port. Remote use can be through simple commands from DOS or a DOS emulator, or our user friendly software simplifies this further. In addition to acting as a user interface, the **mpc3000** monitors component temperatures in the **torus** laser head, ensures single mode operation, automatically maintains laser output power and provides diagnostic analysis. Alternatively, the **torus** can be equipped with an **smd9000** OEM power supply. The switch mode technology enables a completely silent mode of operation and no fan cooling is required. The **smd9000** is streamlined for OEM integration with no screen or integral controls, making it an ideal solution for integration with the torus laser. Supply voltage: 100, 120, 240V AC, frequency: 47-63 Hz.

Technical Specifications*

	torus 532	torus 660
Wavelength	532nm	660nm
Power	50 to 750mW	50 to 200mW
Beam diameter ¹	1.7mm±0.2mm	
Spatial Mode	TEM ₀₀	
Ellipticity	<1:1.1	
Bandwidth	1MHz	
Divergence	≤0.4mrad	
M-squared	<1.1	
Power stability ²	<1.0% rms	
rms noise	<0.25%	<0.5%
Noise bandwidth	10Hz-100MHz	
Polarisation ratio	>100:1	
Polarisation direction	vertical	
Coherence length	>100m	
Beam angle ³	1mrad	
Operating temperature	15-35°C	
Warm-up time	30 minutes	
Applications	Raman spectroscopy, holography, interferometry, Brillouin scattering	

* Laser Quantum operates a continuous improvement programme which can result in specifications being improved without notice.

¹ Beam diameter defined as the average of major and minor $1/e^2$ beam size measured at 25cm from exit port, at specified power.

² Test duration 100hrs at constant temperature.

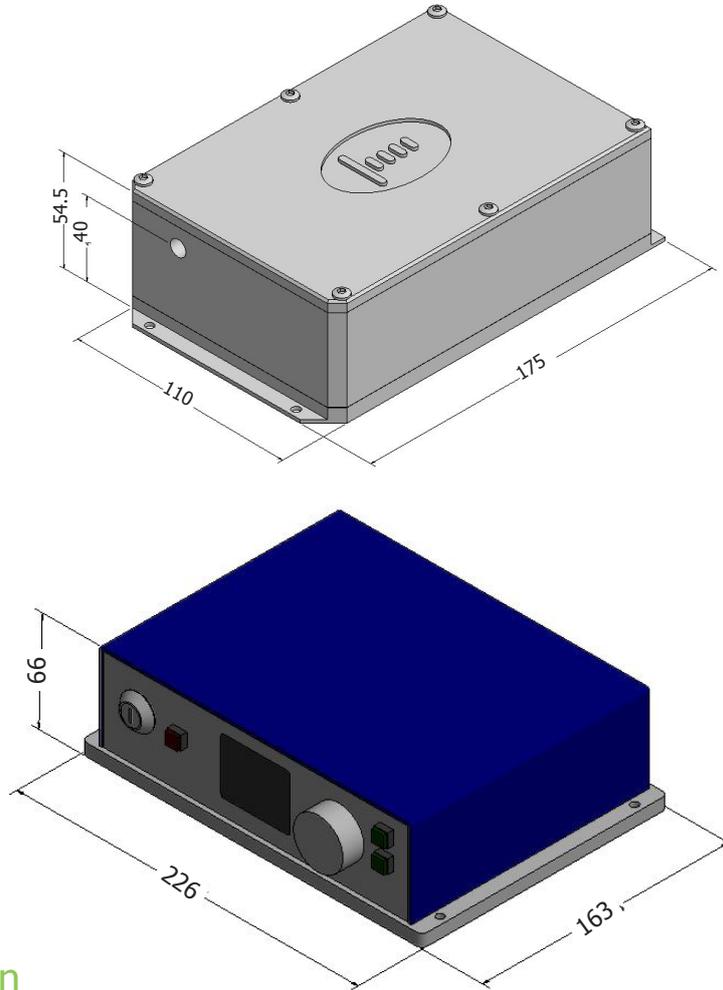
³ Tolerance relative to head orientation.



torus

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Dimensions (mm)



mpc3000

Other information

Umbilical length: 1.5m

Laser head weight: 1.2kg

Cooling options available

Fibre coupling available

Please contact us for further details

- INNOVATIVE
- RELIABLE
- INTELLIGENT



Drawings are for illustrative purposes only. Please contact Laser Quantum for complete engineer's drawings.

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INNOVATIVE RELIABLE INTELLIGENT

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