



# gem

## High specification OEM CW lasers



- 473nm, 532nm, 561nm, 660nm & 671nm lasers
- Exceptional lifetimes
- Internet connectivity and optimisation
- Long full specification warranty
- Designed for easy OEM integration



## Overview

The **gem** range is a compact series of lasers designed for easy OEM integration. With a wide power range and multiple wavelength offerings, the **gem** is ideal for system designers wanting a reliable, robust laser with excellent beam quality. The **gem** lasers are high specification single transverse mode CW lasers, ideal for many applications such as Raman and fluorescence spectroscopy, DNA sequencing, cell sorting and super-resolution microscopy. Our pump diodes are specified as having an MTTF of >100,000 hours at full power, but Laser Quantum de-rates them to further increase their lifetime. This gives the **gem** industry leading lifetimes that allow it to be treated as a black box; to be installed and forgotten (fig.1)

The **gem** family is controlled by an smd12 intelligent controller that provides an interface using the RS232 port, allowing the **gem** to be operated through simple commands from LabView, DOS or a DOS emulator. The smd12 also monitors component temperatures, automatically maintains laser output power and provides diagnostic analysis.

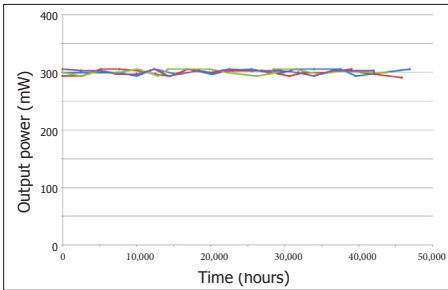


fig.1 Output power from 4 **gem** lasers kept in Laser Quantum test facility, showing stable output over 45,000 hours, with minimal increase in required diode current.

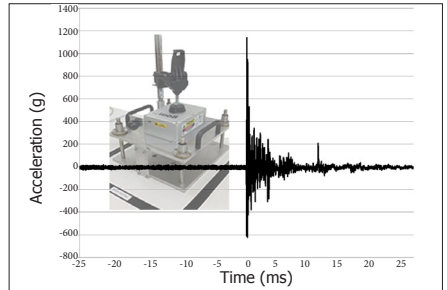


fig.2 Accelerometer trace showing the 1200g shock experienced by all Laser Quantum lasers prior to testing

**Fibre coupling:** Like most of Laser Quantum lasers, the **gem** is available with multi or single mode fibre delivery options which allows the beam to be delivered to the point of need.

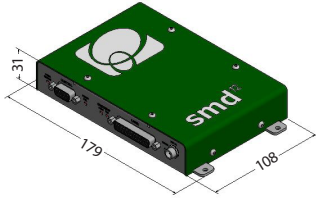
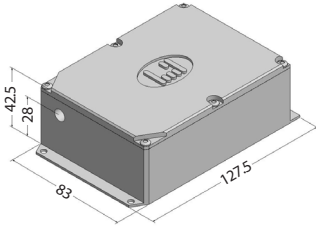
The **gem** laser range features an intelligent control unit that allows easy setting and monitoring of the laser parameters. Incorporating PowerLoQ™ technology, the **gem** lasers show extreme power stability over long periods of use.

Every **gem** laser has been subjected to a 1200g drop-test (fig.2) to check that all components are correctly fitted prior to its extended 300 hour test period. This rigorous testing regime ensures long operational lifetimes.

The **gem** can be used with the RemoteApp™ software that allows the laser to be controlled locally, over the internet and connected to the Laser Quantum support team for monitoring laser performance, diagnosing opportunities for and carrying out laser optimisation.

Available in a range of wavelengths and powers, the **gem** family lasers are designed for integration into instruments as a fit-and-forget laser source, with exceptionally long operation lifetimes.

## Dimensions (mm)



## Other information

- Weight: 0.75kg
- Umbilical length: 1.5m
- Cooling options available
- System can be modulated
- Vertical polarisation is available on request
- Fibre coupling available
- LabView drivers available
- 2 years unlimited hours warranty for scientific users



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

## Specifications\*

	gem 473	gem 532	gem 561	gem 660	gem 671
Wavelength	473nm	532nm	561nm	660nm	671nm
Power	50mW to 500mW	50mW to 2W	50mW to 500mW	50mW to 1W	50mW to 750mW
Beam diameter <sup>1</sup>	0.9mm±0.2mm	0.9mm±0.1mm	1.0mm±0.2mm	0.75mm±0.15mm	0.75mm±0.15mm
Spatial Mode	TEM <sub>00</sub>				
Ellipticity	<1:1.2				
Bandwidth	40GHz	30GHz	40GHz	30GHz	30GHz
Divergence	<1.5mrad	<0.8mrad	<1mrad	<1.5mrad	<1.5mrad
M-squared	<1.2	<1.1	<1.2	<1.2	<1.2
Power stability <sup>2</sup>	<1.0% rms	<0.8% rms	<1.0% rms	<1.0% rms	<1.0% rms
Beam pointing stability <sup>3</sup>	<10µrad/°C				
rms noise	<1.0%	<0.8%	<1.5%	<0.6%	<0.6%
Noise bandwidth	10Hz to 10kHz	10Hz to 6MHz	10Hz to 50kHz	10Hz to 10kHz	10Hz to 10kHz
Polarisation ratio	>100:1				
Polarisation direction <sup>4</sup>	horizontal				
Coherence length	~7.5mm	~1cm	~7.5mm	~1cm	~1cm
Beam angle <sup>5</sup>	<1mrad				
Operating temperature	15°C to 40°C				
Warm-up time	10 minutes	10 minutes	10 minutes	15 minutes	15 minutes
Applications	Lithography, optogenetics, Raman and fluorescence spectroscopy	Ophthalmology, PIV, Raman spectroscopy, DNA sequencing, Ti:Sapphire pumping	Raman and fluorescence spectroscopy, Cytometry, optogenetics, superresolution microscopy	Raman and fluorescence spectroscopy, biomedical imaging, superresolution microscopy	Raman and fluorescence spectroscopy, biomedical imaging, superresolution microscopy

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

<sup>1</sup> Beam diameter defined as the average of major and minor 1/e<sup>2</sup> beam diameters measured at 25cm from exit port, at specified power.

<sup>2</sup> Test duration >100 hrs at constant temperature.

<sup>3</sup> Measured over 36 hours at 22 to 28°C.

<sup>4</sup> Vertical polarisation available on request

<sup>5</sup> Tolerance relative to head orientation.

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