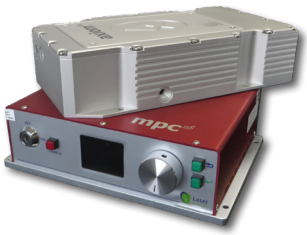
axiom
Integrated, high power CW laser

Laser QUANTUM
A Novanta Company

- Continuous wave 532 or 660 nm laser
- Integrated diode-in-head
- Extremely compact power supply unit
- Market-leading power, up to 6 W in red



Overview

The **axiom** laser family is in a new architecture that delivers high continuous wave power whilst incorporating all of the active optics within the laser head. This design lends itself to easy integration into equipment, without the complexities associated with fibre delivery of the pump light. The **axiom** range comprises a high power red laser providing a market-leading output of 6 W at 660 nm with excellent noise and stability, and a green wavelength with exceptionally low noise. Along with the ultra-compact power supply unit, both form small-scale laser systems ideal for Raman imaging, particle image velocity (PIV), fluorescence imaging for the red, or Ti:Sapphire pumping and microscopy for the green. The **axiom** design features our innovative stress-free cavity architecture. Both the **axiom 532** and **660** nm have integrated water-cooling channels.

Applications

The **axiom 660** is suitable for a range of applications, particularly PIV, Raman imaging and a wide range of fluorescence imaging techniques. PIV is an optical technique used to visualise flow and direction of a fluid. The high-power intensity, and the ability to shape the beam, enables a 2-dimensional light sheet to be created and form a canvas of the image. Therefore, a high powered 660 nm laser, such as the **axiom** with power up to 6 W, will enable visualisation of a larger flow cross-section or a brighter image. Also, the excellent beam pointing stability of the **axiom** minimises any corruption of velocity tracking within the light sheet.

The **axiom** can also be used for Raman imaging, generating detailed chemical images (see figure 1) based on a sample's Raman spectrum. The wavelength of 660 nm is commonly used for Raman spectroscopy and the high power allows imaging of Raman emission over a large area, not possible with lower powers. With its high power, excellent beam characteristics and size, the **axiom 660** addresses several fluorescent dyes including Atto 647N and Atto 655 for fluorescence imaging and super resolution microscopy.

The **axiom 532** is especially suitable for Ti:Sapphire pumping in addition to semiconductor inspection, optical trapping and PIV. With beam pointing stability below 2 µrad/°C, typical noise values around <0.03% and typical power stability of <0.1%, the **axiom** delivers exceptionally high-quality light. The low noise, low temperature control requirements are key attributes in Ti:Sapphire pumping where the pump laser noise is directly transferred to the noise of the Ti:Sapphire laser.

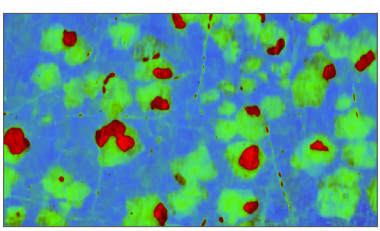


Figure 1. Hyperspectral Raman image of monolayer graphene with bilayer islands produced by chemical vapour deposition on copper substrate. Data obtained with Photon etc's RIMA system Courtesy of Prof. Richard Martel, Department of Chemistry, University of Montreal.

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

The **axiom** can be controlled across the internet via our RemoteApp™ software that also allows connection to the Laser Quantum support team for monitoring laser performance, diagnosing opportunities for and carrying out laser optimisation.

axiom

Integrated diode pump in head laser

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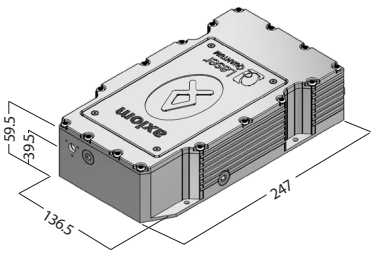
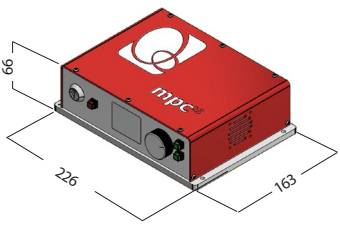
Dimensions (mm)

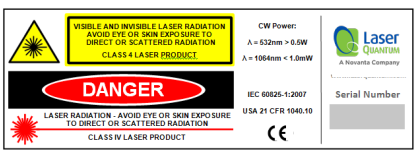




Drawings are for illustrative purposes only. Please contact Laser Quantum for complete engineer's drawings.

Other information

- Laser head weight: 3.9 kg
- Integrated water cooling
- 2 years unlimited hours warranty for scientific users
- LabView drivers available



Specifications*

	axiom 532	axiom 660
Wavelength	532 nm	660 nm
Power	4 - 12 W	3 - 6 W
Spectral bandwidth	50 GHz	60 GHz
Beam diameter[1]	2.25 mm ± 0.25 mm	0.85 mm ± 0.2 mm
Spatial Mode	TEM00	TEM00
Ellipticity	<1:1.15	<1:1.15
Divergence	<0.4 mrad	<1.6 mrad
M^2	<1.1	<1.2
Power stability (RMS)[2]	<0.1% (<10 W) <0.05% (10 W- 12 W)	<1.0%
Noise (RMS)	<0.03% (<10 W) <0.02% (10 W- 12 W)	<1.0%
Noise bandwidth	10 Hz to 100 MHz	10 Hz to 50 kHz
Pointing stability	<2 urad/°C	<2 urad/°C
Polarisation ratio	>100:1	>100:1
Polarisation direction	horizontal	horizontal
Coherence length	~6 mm	~5 mm
Beam angle	<1 mrad	<1 mrad
Umbilical length	1.5 m	1.5 m
Laser class	Class IV	Class IV
Operating temperature	20 to 30 °C	20 to 29 °C
Weight	3.9 kg	3.9 kg
Warm-up time	<10 minutes	<10 minutes

* 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 15 cm from exit port, at specified power.
[2] Test duration >100 hrs at constant temperature.

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