



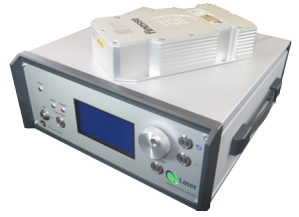
finesse

Ultra-quiet CW 532 nm lasers



Laser QUANTUM

- CW 532 nm laser
- pure™ technology producing <0.02 % noise
- CEPLoQ™ feedback for CEP stabilisation
- Internet connectivity optimisation
- Field replaceable diodes



Overview

Trusted by Nobel Prize winners and adopted by the research industry worldwide, the **finesse** is an industry leading 532 nm CW laser available up to 16 W. Features include RMS noise below 0.02 % (Fig. 1) and a CEP (carrier envelope phase) feedback loop to modulate directly the 532 nm output power using the error signal of an f-to-2f interferometer. Widely integrated in the ultrafast laser, semiconductor and defence industries to name but a few, the **finesse** range is highly compact, extremely rugged and requires minimal cooling due to its high efficiency; in most Ti:Sapphire pumping applications, the waste water from the Ti:Sapphire chiller is more than sufficient to cool the laser head.

There are three versions of the **finesse** laser: The standard model has RMS noise of <0.1 %; for noise critical applications the **finesse pure** reduces the RMS noise to <0.02 % and for CEP and frequency comb applications, the **finesse pure CEP** (Patented technology) features CEPLoQ™ which negates the requirement for an Acoustic Optic Modulator (AOM) (Fig. 2) by modulating the 532 nm amplitude, covering a range of dc-1 MHz, with better than 90 degrees phase behaviour up to 700 kHz. Removing the AOM from a CEP Ti:Sapphire oscillator has the added advantage of reducing the complexity of the system, thereby making alignment simpler and less sensitive to environmental changes, reducing noise due to external effects and increasing the stability of the entire system.

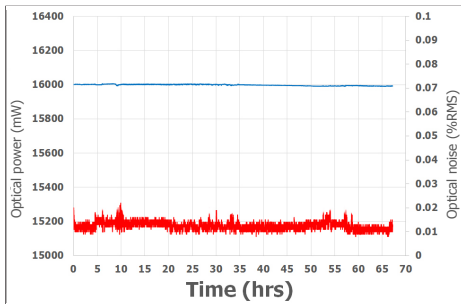


Fig. 1 Typical power and noise stability of the **finesse pure** laser. Power stability (blue) <0.05 % and the noise (red) ~0.01 % shown over a 70 hour period.

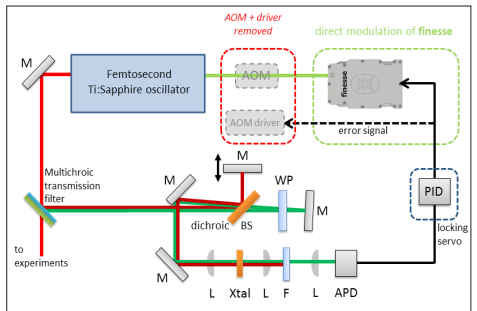


Fig. 2 **finesse pure CEP** removes the need for an AOM, offering simpler setup design and lower integrated CEP phase noise.



The **finesse** laser range benefits from pump diodes situated in the intelligent power controller. This not only facilitates heat management, but also allows field replacement by local engineers.



CEPLoQ™ technology that directly modulates the pump power to maintain phase stabilisation without the use of an AOM. This leads to faster and more stable responses than the traditional method.



The **finesse** laser range features an intelligent control unit that allows easy setting and monitoring of the laser parameters. Incorporating PowerLoQ™ technology, the **finesse** lasers show extreme power stability <0.1 % RMS over long periods of use.

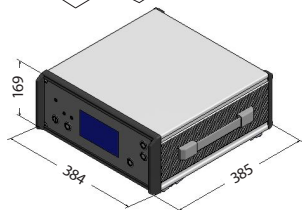
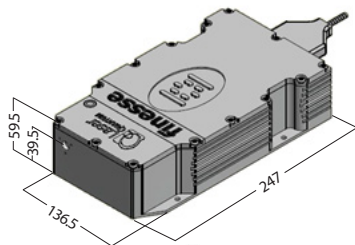


The **finesse** can be controlled across the internet via our RemoteApp™ software that also allows connection to the Laser Quantum support team for monitoring laser performance, diagnosing opportunities for and carrying out laser optimisation.



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

Dimensions (mm)



Other information

- Umbilical length: 2 m
- Laser head weight: 3 kg
- Vertical polarisation available on request
- Capable of pumping any commercial Ti:Sapp oscillator
- Fibre coupling available
- LabView drivers available
- 5 years/15,000 hours warranty for scientific users



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

Specifications*

	finesse	finesse pure	finesse pure CEP
Wavelength	532 nm	532 nm	532 nm
Power	Up to 16,000 mW	Up to 16,000 mW	Up to 16,000 mW
Beam diameter ¹	2.25 mm ± 0.25 mm	2.25 mm ± 0.25 mm	2.25 mm ± 0.25 mm
Spatial Mode	TEM00	TEM00	TEM00
Ellipticity	<1:1.15	<1:1.15	<1:1.15
Bandwidth	50 GHz	50 GHz	50 GHz
Divergence	<0.4 mrad	<0.4 mrad	<0.4 mrad
Modulation depth	N/A	N/A	± 1%
Modulation behaviour	N/A	N/A	<1 MHz
Phase behaviour	N/A	N/A	~90° for 750 kHz
M-Squared	<1.1	<1.1	<1.1
Power stability (RMS) ²	<0.10 %	<0.050 %	<0.050 %
Noise (RMS) ³	<0.10 %	<0.020 %	<0.020 %
Noise bandwidth	10 Hz to 100 MHz	10 Hz to 100 MHz	10 Hz to 100 MHz
Pointing stability	<2 urad/°C	<2 urad/°C	<2 urad/°C
Polarisation ratio	>100:1	>100:1	>100:1
Polarisation direction ⁴	horizontal	horizontal	horizontal
Coherence length	6 mm	6 mm	6 mm
Beam angle ⁵	<1 mrad	<1 mrad	<1 mrad
Operating temperature	20 to 40°C	20 to 40°C	20 to 40°C

* 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/e² beam size measured at 25 cm from exit port, at specified power.

² Test duration >100 hrs at constant temperature.

³ Measured at specified power.

⁴ Vertical polarisation is available upon request.

⁵ Tolerance relative to head orientation.

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