



# finesse

## Ultra-quiet CW 532nm lasers



# Laser QUANTUM

- CW 532nm laser
- 7 power configurations up to 16W
- pure™ technology producing <0.02% noise
- CEPLoQ™ feedback for CEP stabilisation
- Internet connectivity optimisation



## Overview

Trusted by Nobel Prize winners and adopted by the research industry worldwide, the **finesse** is an industry leading 532nm CW laser available up to 16W. Features include rms noise below 0.02% (fig. 1) and a CEP (carrier envelope phase) feedback loop to modulate directly the 532nm 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** (Patent pending) features CEPLoQ™ which negates the requirement for an Acoustic Optic Modulator (AOM) (fig. 2) by modulating the 532nm amplitude, covering a range of dc-1MHz, with better than 90 degrees phase behaviour up to 700kHz. 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.

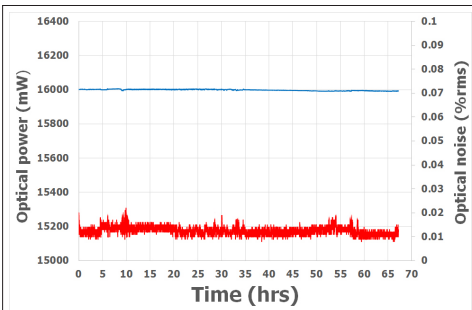


fig.1 Typical power and noise stability of the **finesse pure** laser. Power stability (blue) <0.05% and the noise (red) ~0.01% shown over a 70 hour period.

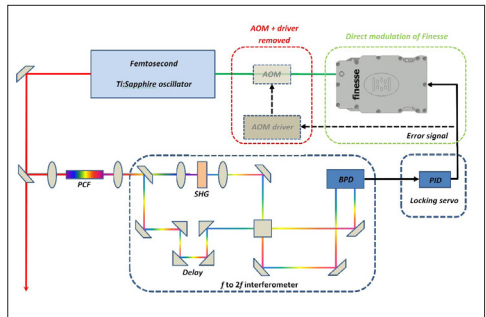


fig. 2 **finesse pure CEP** removes the need for an AOM, offering simpler setup design and lower integrated CEP phase noise.



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.

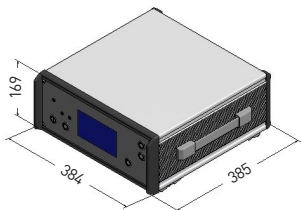
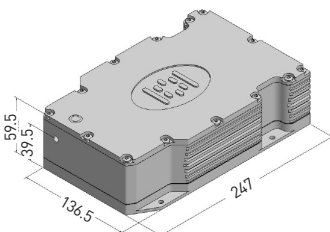


The **finesse** can be controlled across the internet via our RemoteApp™ software that also allows connection to the Laser Quantum support team for monitoring laser performance, diagnosing opportunities for and carrying out laser optimisation.



Every **finesse** laser has been subjected to a 1200g 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: 2m
- Laser head weight: 3kg
- 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		532nm	
Power		4W to 16W	
Beam diameter <sup>1</sup>		2.25mm ±0.25mm	
Spatial mode		TEM <sub>00</sub>	
Ellipticity		<1:1.15	
Bandwidth		50GHz	
Divergence		<0.4mrad	
Modulation depth	N/A	N/A	±1%
Modulation bandwidth	N/A	N/A	~1MHz
Phase behaviour	N/A	N/A	~90° for 700kHz
M-squared		<1.1	
Power stability <sup>2</sup>	<0.1% RMS	<0.1% RMS (<10W) <0.05% RMS (10W+)	<0.1% RMS (<10W) <0.05% RMS (10W+)
Beam pointing stability		<2μrad/°C	
RMS noise <sup>3</sup>	<0.1%	<0.03% (<10W) <0.02% (10W+)	<0.03% (<10W) <0.02% (10W+)
Noise bandwidth		10Hz to 100MHz	
Polarisation ratio <sup>4</sup>		>100:1	
Polarisation direction		horizontal	
Coherence length		~6mm	
Beam angle <sup>5</sup>		<1mrad	
Operating temperature		20°C to 40°C	
Warm-up time		<10 minutes	
Applications	Ti:Sapphire pumping, CEP stabilisation, military, ITO marking/etching, semiconductor inspection		

\* 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 size measured at 20cm from exit port, at specified power.

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

<sup>3</sup> Measured at specified power.

<sup>4</sup> Vertical polarisation available with external wave plate upon request.

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

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