LITRON Product Focus

Litron Lasers

High energy pulsed DPSS Nd:YAG lasers

• Pulse energies 1J to 5J • Repetition rates up to 200Hz

State of the art high performance diode pumped lasers require a multitude of complex parts working seamlessly together.

At Litron, we engineer superior laser performance by designing, manufacturing and controlling every one of these critical elements in-house.

High energy diode pumped nanosecond lasers combined with high repetition rates are sought for an ever growing range of new applications. Very high stability and robust specifications are required, with easy maintenance to ensure minimal downtime as well as customisation with the ability to incorporate an extensive range of options.

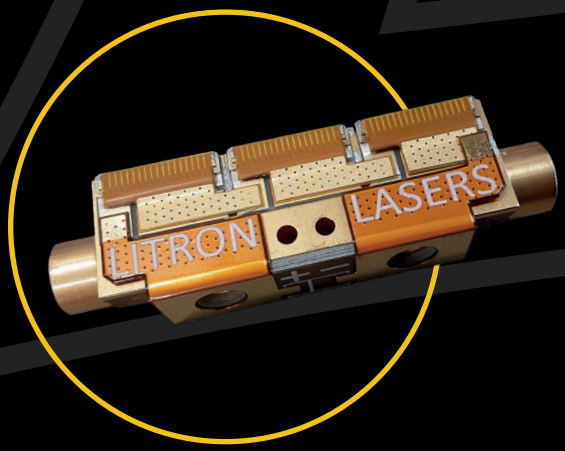
This note describes Litron's vertical integration, controlling each critical function in-house to produce a fully customisable Plasma+ Series laser system.

APPLICATIONS

- **Military & Defence**
- **Plasma Science**
- **LiDAR & Remote Sensing**
- **Thomson Scattering**
- **Laser Shock Peening**
- **Spectroscopy**
- **Ablation including Space Debris Clearing / Ablation**
- **Fusion Technology**
- **Laser Lift Off**

Pump Diodes

Litron has invested heavily in an in-house ISO Class 6 cleanroom facility to assemble and test a wide range of laser diode packages. Our diode packages have excellent performance characteristics and a high degree of reliability. We have developed advanced manufacturing and test processes to ensure ongoing quality and integrity. We offer a warranty of 4 billion shots or 2 years (whichever is sooner) and expected lifetimes in excess of 10 billion shots.

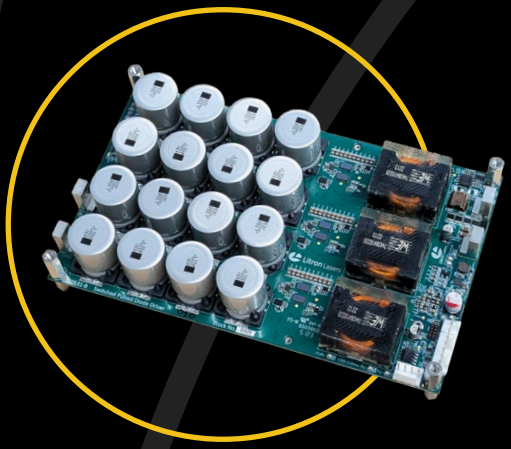


Pumping Chamber

Our mechanical engineering team designs both the diode packaging and pumping chambers in tandem to provide the most efficient and uniform pumping of the Nd:YAG rods whilst also giving Litron the ability to scale pulse energies of both the laser oscillators and amplifiers.

Chillers

In a DPSS laser the chiller is a critical component in the system. The emission wavelength of the pump diodes is temperature dependent, to keep the pumping and laser performance optimised it is essential that the chiller is high perfoming, stable and reliable. Our chiller design and production is performed entirely in-house at Litron with ± 0.1°C temperature stability. Free standing or rack mounted chillers with water-air-cooling or water-water options are available.



Electronics

Litron's advanced power electronics incorporates wide band-gap semiconductors, digitally optimised control and enhanced layout techniques maximising laser energy while boosting system efficiency. Our drive electronics are developed in tandem with the pump diodes to deliver peak stability and reliability. The development of in-house embedded electronics facilitates comprehensive monitoring for system diagnostics.

Software and Touchscreen GUI

Every laser comes as standard with the touchscreen Litron Universal Contoller (LUCi) which allows extensive control and parameter monitoring functions. Separate software is also supplied to control the laser from a PC. DLLs are available for integration into OEM front-end machine control software. All of the software is written by Litron, and full support is provided.

TECHNICAL DATA

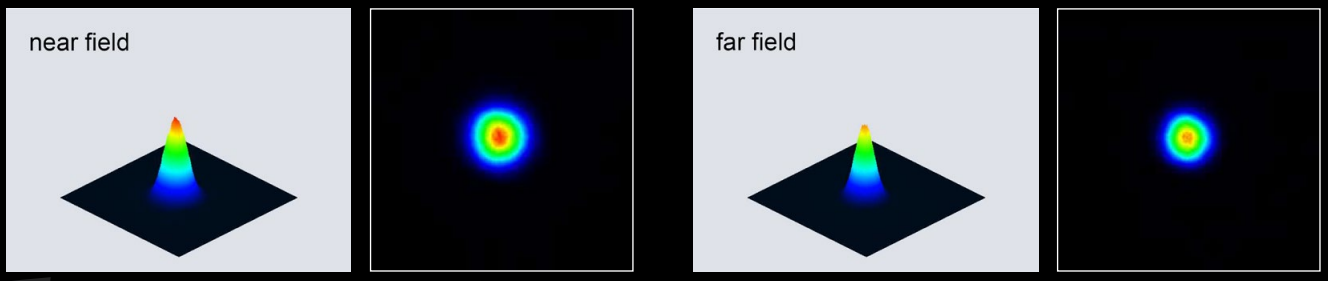
Model	Plasma+ 1000	Plasma+ 2000	Plasma+ 3000	Plasma+ 4000	Plasma+ 5000
Repetition Rate (Hz)	100/200	100/200	100/200	100/200	10-100
Output Energy (mJ)					
1064nm	1000	2000	3000	4000	5000
532nm	500	1000	1500	2000	2500
355nm	230	460	690	920	1150
Pulse Stability (%RMS)					
1064nm	0.3	0.3	0.3	0.3	0.3
532nm	0.5	0.5	0.5	0.5	0.5
355nm	1.0	1.0	1.0	1.0	1.0
Pulse Width (ns) (1)					
1064nm	<15	<15	<15	<15	<15
Beam Parameter					
Beam Diameter (mm) (2)	9.5	12.5	18.0	18.0	18.0
Beam Divergence (mrad) (3)	≤0.8	≤0.8	≤0.8	≤0.8	≤0.8
Pointing Stability (µrad) (4)	≤15	≤15	≤15	≤15	≤15
Timing Jitter (ns) (5)	≤0.5	≤0.5	≤0.5	≤0.5	≤0.5
External Cooling	Air or Water	Water	Water	Water	Water

All Models	
Operation	
Control (6)	RS232
Q-switch Trigger and Sync	TTL
Services	
Voltage (VAC)	230-250
Frequency (Hz)	50 or 60
Power	Single/3 Phase
Ambient (°C) (7)	5-35
Diode Warranty (shots)	4×10^9

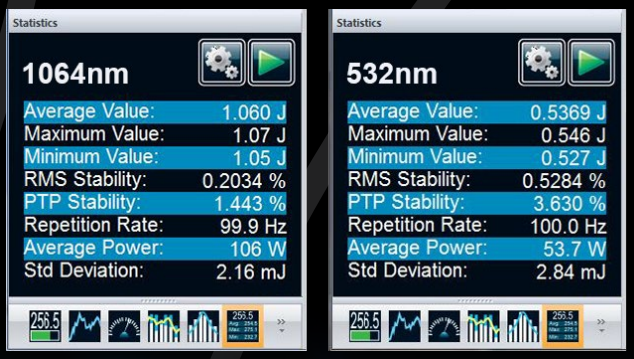
All specifications at 100Hz unless otherwise stated.

(1) FWHM.
(2) 100% beam diameter at laser exit port.
(3) Full angle at specified beam diameter.
(4) Half angle.
(5) RMS with respect to Q-switch trigger input.
(6) Full software suite and programming tools supplied.
(7) 0 to 80% non-condensing atmosphere.

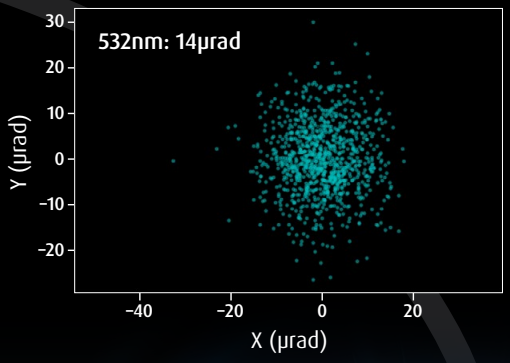
Beam profiles



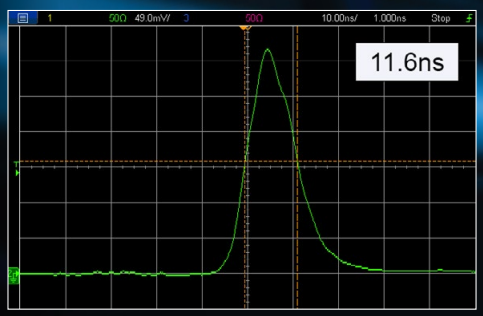
Pulse stability



Pointing stability



Pulse width



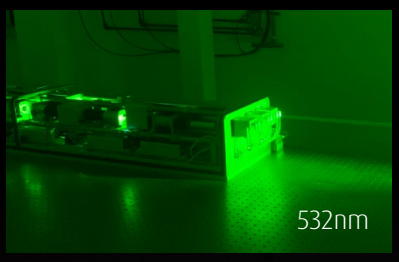
CUSTOMISATION

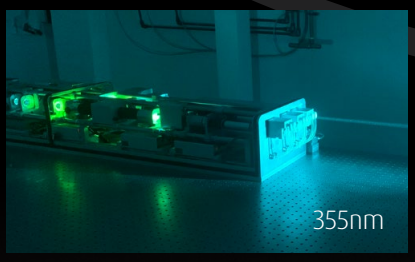
Constructing the Plasma+ on an industrial grade Invar-rail design offers many advantages over conventional base-plate solid state laser designs. Most notably Invar provides excellent mechanical and thermal stability, which is critical to ensure constant and reliable alignment. Moreover, the rail-based modular design allows for complete customisation to fit each user's exacting requirements. The following extensive range of options are available.

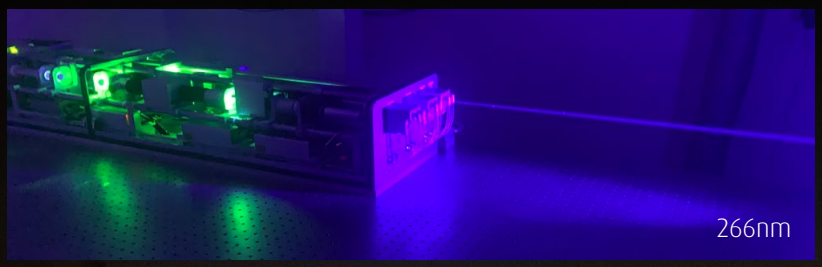
Choice of Resonator

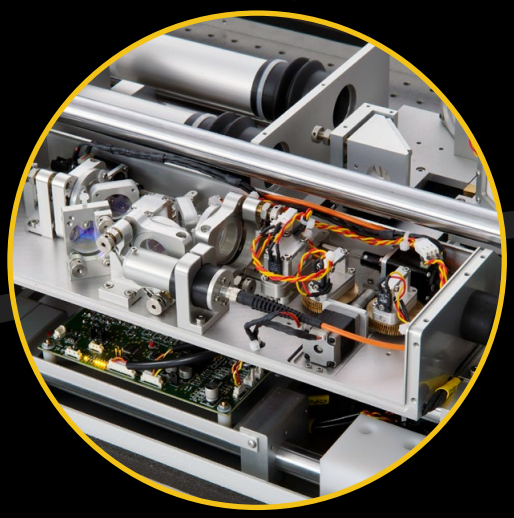
Litron offers more resonator options to best match each application requirement. The Plasma+ systems are offered as stable, stable-telescopic and Gaussian-coupled unstable.

Motorised harmonic generation with closed-loop diode feedback







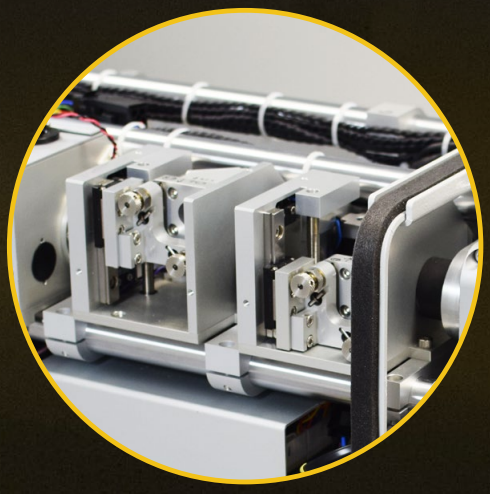


Tunable OPOs and extended range UV

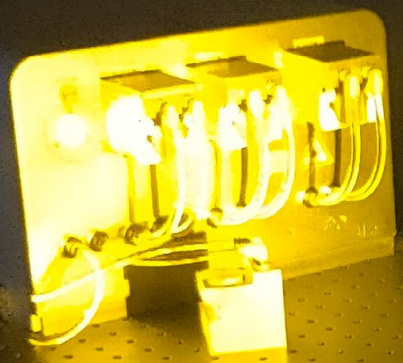
Diode pointer

ADDITIONAL OPTIONS:

- **Motorised optical attenuators for hands-free energy control**
- **Injection seeder for SLM operation**
- **Beam expanding or collimating telescopes**
- **Process shutters and on-board energy monitoring**



Motorised beam switching units for hands-free wavelength selection



Our policy is to improve the design and specification of our products. The details given in this document are not to be regarded as binding.

CE UKCA

ACT ISO 9001 : 2015 ISO 14001 : 2015 UKAS MANAGEMENT SYSTEMS 0273

Litron Lasers Ltd
8 Consul Road, Rugby,
Warwickshire CV21 1PB
England.

T +44 (0)1788 574444
F +44 (0)1788 574888
E sales@litron.co.uk

Litron Lasers

www.litronlasers.com