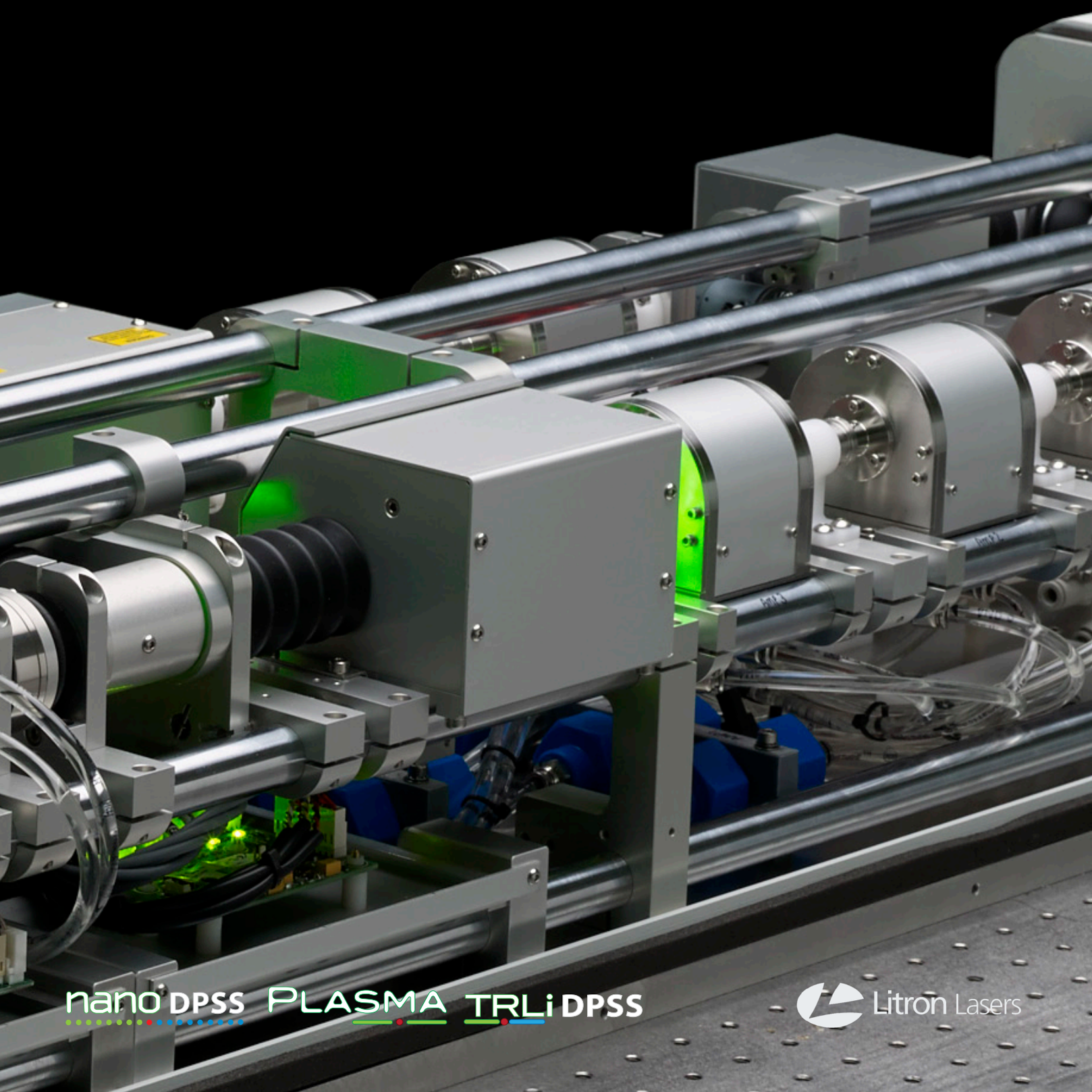
PULSED DIODE PUMPED SOLID STATE LASERS

2021



nano DPSS PLASMA TRLi DPSS

Litron Lasers

Nano DPSS
Ultra-compact DPSS Q-switched pulsed Nd:YAG lasers

The **Nano DPSS** is an ultra-compact pulsed Q-switched Nd:YAG laser with output energies up to 150mJ and repetition rates of up to 300Hz. A fully sealed head provides protection from external contamination and a free-standing PSU with separate chiller completes this ultra-compact, high-performance and reliable laser system. With typical pump diode lifetime of greater than 2 billion pulses and field replaceable diode modules, the Nano DPSS offers excellent performance with the lowest cost of ownership.

The Nano DPSS offers the greatest flexibility to match each customer application without compromising performance. A full suite of accessories is available; harmonic modules, a fully motorised attenuator and an intra-cavity aperture for true TEMoo output.

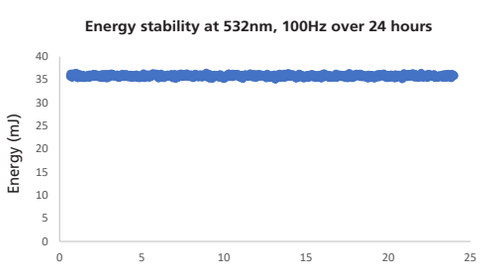
By miniaturising Litron's proven motorised harmonics, the Nano DPSS can be specified to the 5th harmonic with automated control. As standard, the harmonic module contains an integrated attenuator operated via the software to allow fast and precise control over the pulse energy. All harmonic generation crystals are automatically angled-tuned with high precision linear actuators and a diode-based energy monitor feedback loop, making Litron's unique mechanical angle-tuning much faster than traditional thermal tuning. This feature has the option of single, on-demand tuning or continuous automatic tracking of the crystals for guaranteed long-term stability.

FEATURES

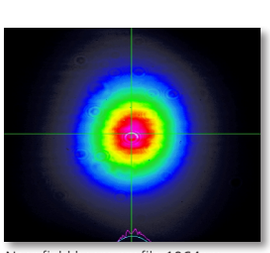
- ***Repetition rates up to 300Hz***
- ***Fully motorised attenuator and harmonics***
- ***Choice of resonator options***
- ***Ultra high stability***
- ***Exceptional diode life***
- ***Field replaceable diodes***
- ***Excellent beam quality***
- ***Compact PSU***
- ***Detachable, compact chiller***

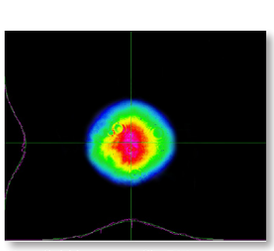
APPLICATIONS

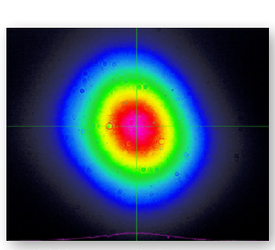
- ***Spectroscopy & LIBS***
- ***PIV, LIF & ESPI***
- ***LIDAR & Remote sensing***
- ***Laser flash photolysis***
- ***MALDI***
- ***Laser ultrasonics***
- ***Microscopy***
- ***Sample testing***
- ***Ablation***
- ***LCD repair***
- ***Thompson Scattering***
- ***PLD***



Beam pointing stability data


Near field beam profile 1064nm
(Stable)


Near field beam profile 532nm
(Stable Telescopic)


Far field beam profile 532nm
(Stable Telescopic)

TECHNICAL DATA

Model	Nano DPSS 80 - 100	Nano DPSS 70 - 200	Nano DPSS 60 - 300	Nano DPSS G 60-100
Type of Resonator	Stable	Stable	Stable	Super-Gaussian
Repetition Rate (Hz)	100	200	300	100
Output Energy (mJ)				
1064nm	80	70	60	60
532nm	40	30	25	25
355nm	25	20	15	15
266nm	10	8	6	6
213nm [1]				
Pulse Stability (%RMS) [2]				
1064nm	0.2	0.2	0.2	0.4
532nm	0.3	0.3	0.3	0.5
355nm	1.0	1.0	1.0	0.6
266nm	1.5	1.5	1.5	
Pulse Length (ns) [3]				
1064nm	<10	<10	<10	<10
532nm	<11	<11	<11	<11
355nm	<11	<11	<11	<11
266nm	<12	<12	<12	<12
Beam Parameter				
Beam Diameter (mm) [4]	5	5	5	5
Beam Divergence (mrad)	≤2	≤2	≤2	≤0.5
M^2				≤2
Pointing Stability (µrad) [5]	<20	<20	<20	<20
Timing Jitter (ns) [6]	≤0.5	≤0.5	≤0.5	≤0.5
Polarisation	Linear	Linear	Linear	Linear
Diode Life (pulses) [7]	$2x10^9$	$2x10^9$	$2x10^9$	$2x10^9$

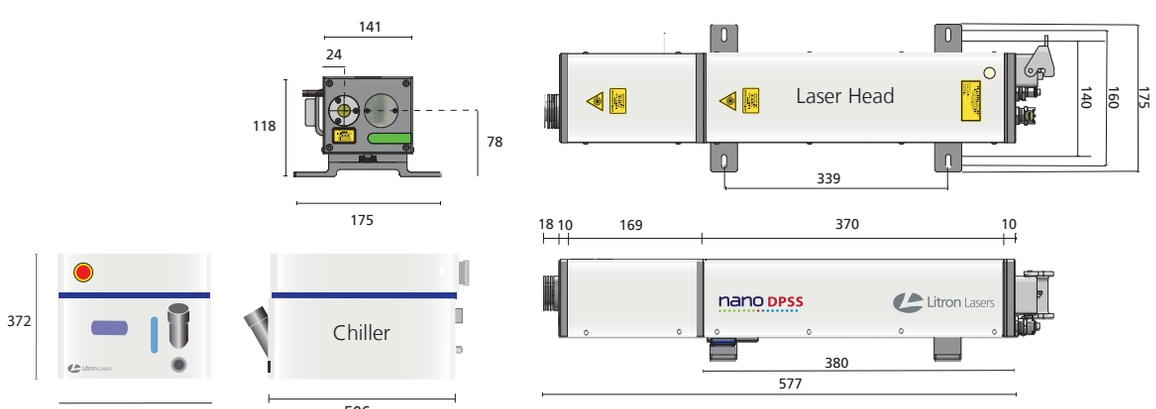
All specifications at maximum repetition rate unless otherwise stated.
*Stable telescopic resonator is available.
(1) Contact Litron for more information.
(2) 99% of pulses.
(3) FWHM – measured with a fast diode.
(4) 100% beam diameter at laser exit port.
(5) Half angle.
(6) RMS with respect to Q-switch trigger input.
(7) Diode warranty 2 years / 2 billion shots (whichever comes first).
(8) Full software suite and programming tools supplied.
(9) 100-200VAC operation - contact Litron.
(10) 0-80% non condensing atmosphere.
(11) Standard air-cooled chiller or optional water-cooled chiller.

All Models	
Operation	
Control [8]	RS232
Q-switch Trigger and Sync	TTL
Services	
Voltage (VAC) [9]	200-250*
Frequency (Hz)	50 or 60
Power	Single Phase
Ambient (°C) [10]	5-35
External Cooling [11]	Air

Free standing PSU and chiller (separate units)

MECHANICAL DATA

All dimensions shown in mm



TRLi DPSS

Fully modular system designed for flexibility and enhanced performance

The **TRLi DPSS** series lasers are compact high energy, diode pumped, Q-switched Nd:YAG lasers with output energies of up to 280mJ and repetition rates of up to 300Hz. Based around Litron's birefringence compensating twin-rod resonator design gives highly homogeneous output beams. The laser resonator is housed in a body machined from solid aluminum to ensure high mechanical and optical integrity.

State-of-the-art diode pump modules and electronics give rise to outputs with industry leading stabilities of better than 0.2% RMS at 1064nm over a six-hour period. A choice of stable, stable telescopic or super-Gausian resonator ensures the best configuration available to match each application. All accessories such as harmonics, beam expanding telescope or OPO are bolt-and-play and can be added and removed as required. The intelligent system controller automatically adapts to the pre-set configuration and allows seamless control in any application.

Auto-tracking

Continuous auto-tracking is possible due to the fast response of the motorised mechanical angle tuning, as opposed to conventional thermal tuning. This feature maintains the set energy over long periods of continuous operation; effectively removing any long-term drift.

Motorised automatic harmonic tuning

Stepper motor driven angular adjustment mechanics are used to tune the harmonic crystal relative to the incoming beam. Combined with the temperature-stabilised diode-based energy monitor, a complete scan is carried out in under 20 seconds. Auto-tuning is a start up or on demand function using a simple software command.

Integrated motorised optical attenuator

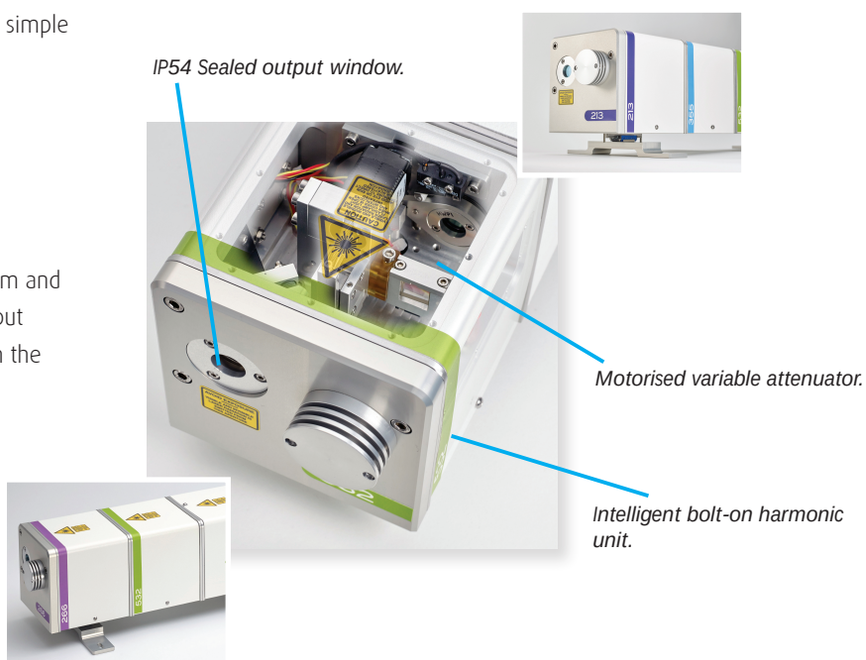
The second harmonic module contains a motorised half waveplate for precise control of the generation of 532nm and all subsequent harmonics. Attenuation of harmonic output does not cause the beam properties to be altered when the pulse energy is varied.

FEATURES

- ***Choice of resonator options***
- ***Ultra high stability***
- ***Exceptional diode life***
- ***Field replaceable diodes***
- ***Homogeneous beam profile***
- ***Compact PSU***
- ***Detachable, compact chiller***
- ***RS232 control***

APPLICATIONS

- ***LIDAR***
- ***Remote Sensing***
- ***Si wafer inspection***
- ***LIBS & LIF***
- ***Laser cleaning***
- ***LCD repair***
- ***Ti:Sa pumping***
- ***Laser Lift-Off LLO***
- ***MALDI***
- ***Thompson Scattering***
- ***PLD***



TECHNICAL DATA

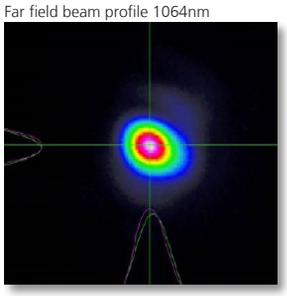
Model	TRLi DPSS 170 - 100	TRLI DPSS G170 - 100	TRLI DPSS 130 - 200	TRLI DPSS 100 - 300	TRLI DPSS G130 - 200
Type of Resonator	Stable	Super-Gaussian	Stable	Stable	Super-Gaussian
Repetition Rate (Hz)	100	100	200	300	200
Output Energy (mJ)					
1064nm	170	170	130	100	130
532nm	85	85	65	50	65
355nm	45	45	25	23	25
266nm	15	15	10	5	10
213nm [1]					
Pulse Stability (%RMS) [2]					
1064nm	0.2	0.2	0.2	0.2	0.2
532nm	0.3	0.3	0.3	0.3	0.3
355nm	0.8	0.8	0.8	0.8	0.8
266nm	1.5	1.5	1.5	1.5	1.5
Pulse Length (ns) [3]					
1064nm	8-10	8-10	9-11	9-11	9-11
532nm	7-9	7-9	9-11	9-11	9-11
355nm	6-9	6-9	8-10	8-10	8-10
266nm	6-9	6-9	8-10	8-10	8-10
Beam Parameter					
Beam Diameter (mm) [4]	5	5	5	5	5
Beam Divergence (mrad)	≤2	≤2	≤2	≤2	≤0.5
M^2 @ 1064nm	≤8	≤2	≤8	≤8	≤2
Pointing Stability (µrad) [5]	≤15	≤15	≤15	≤15	≤15
Timing Jitter (ns) [6]	≤0.5	≤0.5	≤0.5	≤0.5	≤0.5
Polarisation	Linear	Linear	Linear	Linear	Linear
Diode Life (pulses) [7]	$2x10^9$	$2x10^9$	$2x10^9$	$2x10^9$	$2x10^9$

All Models	
Operation	
Control [8]	RS232
Q-switch Trigger and Sync	TTL
Services	
Voltage (VAC) [9]	200-250
Frequency (Hz)	50 or 60
Power	Single Phase
Ambient (°C) [10]	5-35
External Cooling [11]	Air

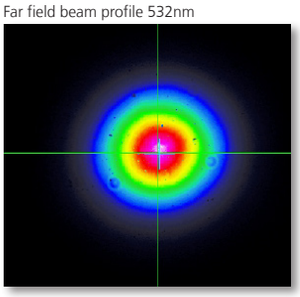
All specifications at maximum repetition rate unless otherwise stated.

(1) Contact Litron for more information.
(2) 99% of pulses.
(3) FWHM – measured with a fast photodiode.
(4) 100% beam diameter at laser exit port.
(5) Half angle.
(6) RMS with respect to Q-switch trigger input.
(7) Diode warranty 2 years / 2 billion shots (whichever comes first).
(8) Full software suite and programming tools supplied.
(9) 200V to be specified at order.
(10) 0-80% non condensing atmosphere.
(11) Standard air-cooled chiller or optional water-cooled chiller.

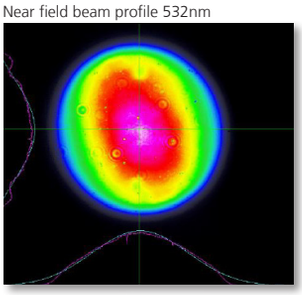
Far field beam profile 1064nm

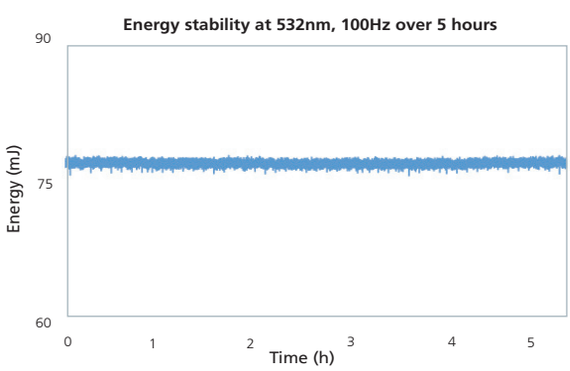


Far field beam profile 532nm



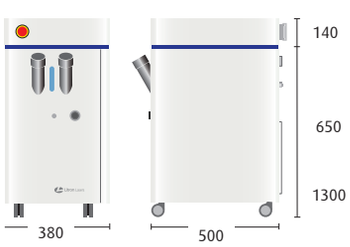
Near field beam profile 532nm

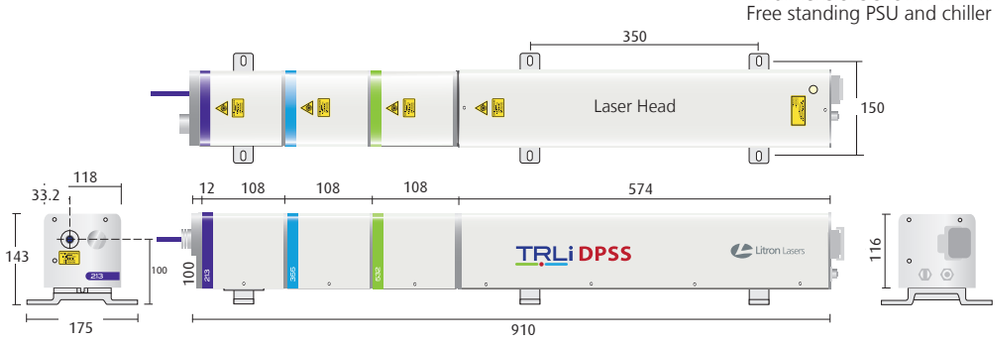




MECHANICAL DATA

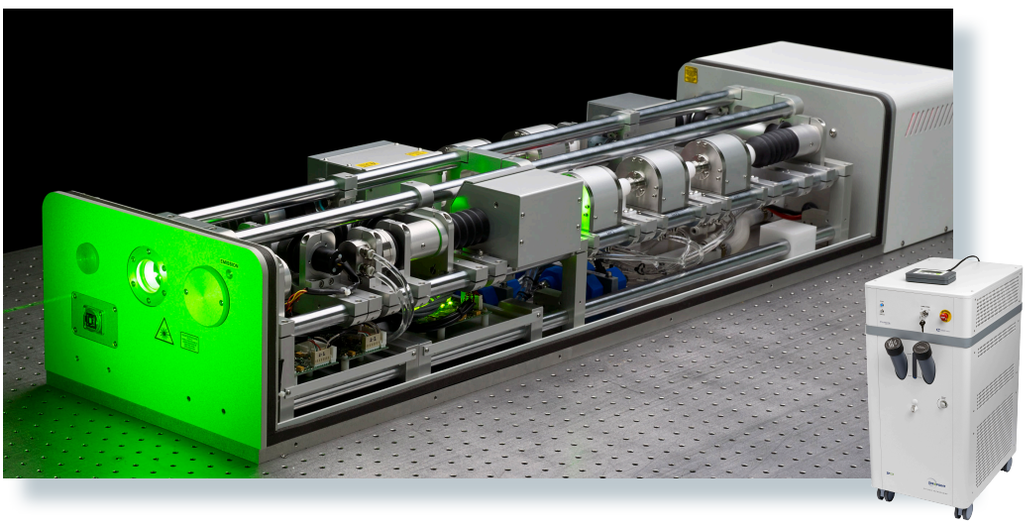
All dimensions shown in mm
Free standing PSU and chiller





The Plasma Series

High Energy Pulsed DPSS Nd:YAG Lasers at up to 200Hz



FEATURES

- ***Output energies up to 1J***
- ***Repetition rates up to 200Hz***
- ***Fully diode pumped lasers***
- ***Super-Gaussian resonator $M^2 \leq 2$***
- ***Stable resonator $M^2 \leq 8$***
- ***Ultra high stability***
- ***Exceptional diode life***
- ***Homogeneous beam profile***
- ***Compact PSU***
- ***Detachable chiller***
- ***Field replaceable diodes***
- ***RS232 control***

The Plasma DPSS series lasers are pulsed diode pumped, Q-switched Nd:YAG lasers which use the very latest in high efficiency fully diode pumped technology to replace traditional flashlamp pumping. The Plasma series DPSS lasers use Litron's sealed, mechanically robust diode pump module to ensure stable output, high reliability, easy diode replacement and long diode lifetime of more than 2 billion pulses.

TECHNICAL DATA

Model	Plasma 450-100	Plasma 400-200	Plasma 1000-100	Plasma G 400-100
Type of Resonator	Stable	Stable	Stable	Super-Gaussian
Repetition Rate (Hz)	100	200	100	100
Output Energy (mJ)				
1064nm	450	400	1000	400
532nm	225	200	500	200
355nm	100	90	200	100
266nm	45	35	90	45
213nm [1]				
Pulse Stability (%RMS) [2]				
1064nm	0.2	0.2	0.2	≤0.8
532nm	0.3	0.3	0.3	≤1.0
355nm	1.0	1.0	1.0	≤1.5
266nm	1.5	1.5	1.5	≤2.0
Pulse Length (ns) [3]				
1064nm	11-14	9-11	11-14	8-10
532nm	10-13	9-11	10-13	8-10
355nm	9-12	8-10	9-12	7-9
266nm	9-12	8-10	9-12	7-9
Beam Parameter				
Beam Diameter (mm) [4]	6.5	5	6.5	6.5
Beam Divergence (mrad) [5]	≤2	≤2	≤2	≤0.5
M^2 @ 1064nm	≤8	≤8	≤8	≤2
Pointing Stability (µrad) [6]	≤15	≤15	≤15	≤15
Timing Jitter (ns) [7]	≤0.5	≤0.5	≤0.5	≤0.5
Polarisation	Linear	Linear	Linear	Linear
Diode Life (pulses) [8]	$2x10^9$	$2x10^9$	$2x10^9$	$2x10^9$

All Models	
Operation	
Control [9]	RS232
Q-switch Trigger and Sync	TTL
Services	
Voltage (VAC) [10]	200-250
Frequency (Hz)	50 or 60
Power	Single Phase
Ambient (°C) [11]	5-35
External Cooling [12]	Air

All specifications at maximum repetition rate unless otherwise stated.

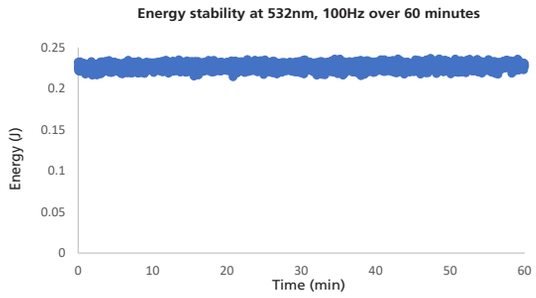
(1) Contact Litron for more information.
(2) 99% of pulses.
(3) FWHM – measured with a fast photodiode.
(4) 100% beam diameter at laser exit port.
(5) Full angle at specified beam diameter.
(6) Half angle.
(7) RMS with respect to Q-switch trigger input.
(8) Diode warranty 2 years / 2 billion shots (whichever comes first).
(9) Full software suite and programming tools supplied.
(10) 200V to be specified at order.
(11) 0-80% non-condensing atmosphere.
(12) Standard air-cooled chiller or optional water-cooled chiller.

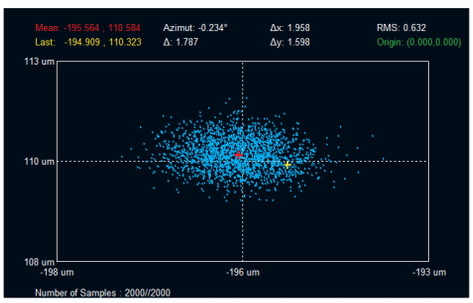
APPLICATIONS

- ***Semiconductor annealing***
- ***LIDAR & Remote Sensing***
- ***Thompson Scattering***
- ***Laser shock peening***
- ***Si wafer inspection***
- ***Ti:Sa pumping***
- ***Laser cleaning***
- ***Laser lift-off***
- ***LCD repair***
- ***LIBS & LIF***
- ***LIDT***

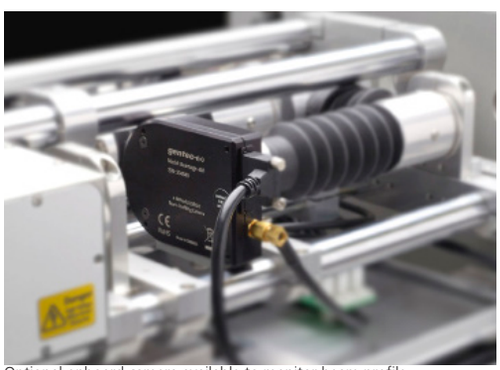
All Plasma models employ a true birefringence-compensating twin-rod resonator that gives a circular and highly homogeneous beam profile with a low M². A super-Gaussian coupled twin-rod birefringence compensating resonator is also available (M² <2) for applications requiring a highly focusable beam.

The Plasma series options include motorised auto-tuning and auto-tracking of the harmonics modules. Litron has developed industrially proven, hands-free tuning to obtain the maximum energy output from a given harmonic module in <20 seconds. The additional auto-tracking function significantly reduces long term energy drift, often prevalent at UV wavelengths.

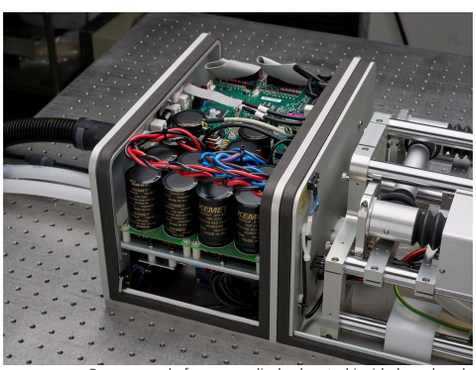




On-board beam pointing stability data

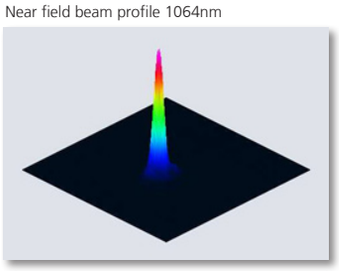


Optional onboard camera available to monitor beam profile, pointing and pulse to pulse stability

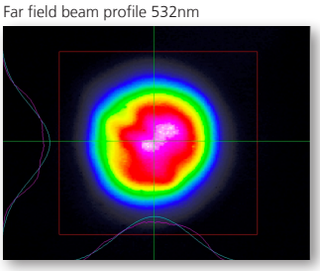


Power supply for pump diodes located inside laser head

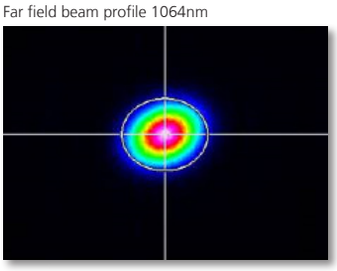
Near field beam profile 1064nm



Far field beam profile 532nm

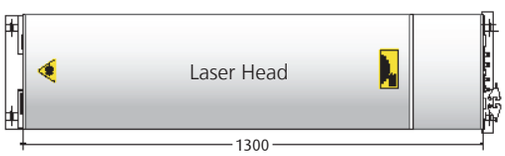


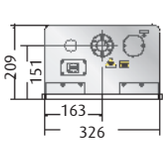
Far field beam profile 1064nm

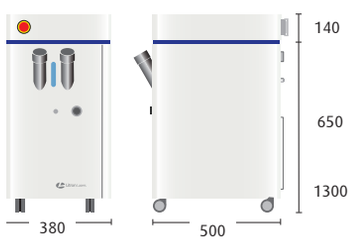


MECHANICAL DATA

All dimensions shown in mm
Free standing PSU and chiller







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.

ADVANCED CERTIFICATION
ISO 9001:2015
UKAS MANAGEMENT SYSTEMS
0872

CE

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

© 2019 Litron Lasers Ltd. Printed in England. PB0223:02.