

HEAD OFFICE
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

NORTH AMERICAN OFFICE
Litron Lasers North America
2449 Arnica Drive
Bozeman
MT 59715
USA

T +1 (406) 522 7566
F +1 (406) 522 7567
E sales@litronlasers.com

www.litronlasers.com

PRODUCT OVERVIEW

S P R I N G 2 0 1 1

L
i
t
r
o
n

L
a
s
e
r

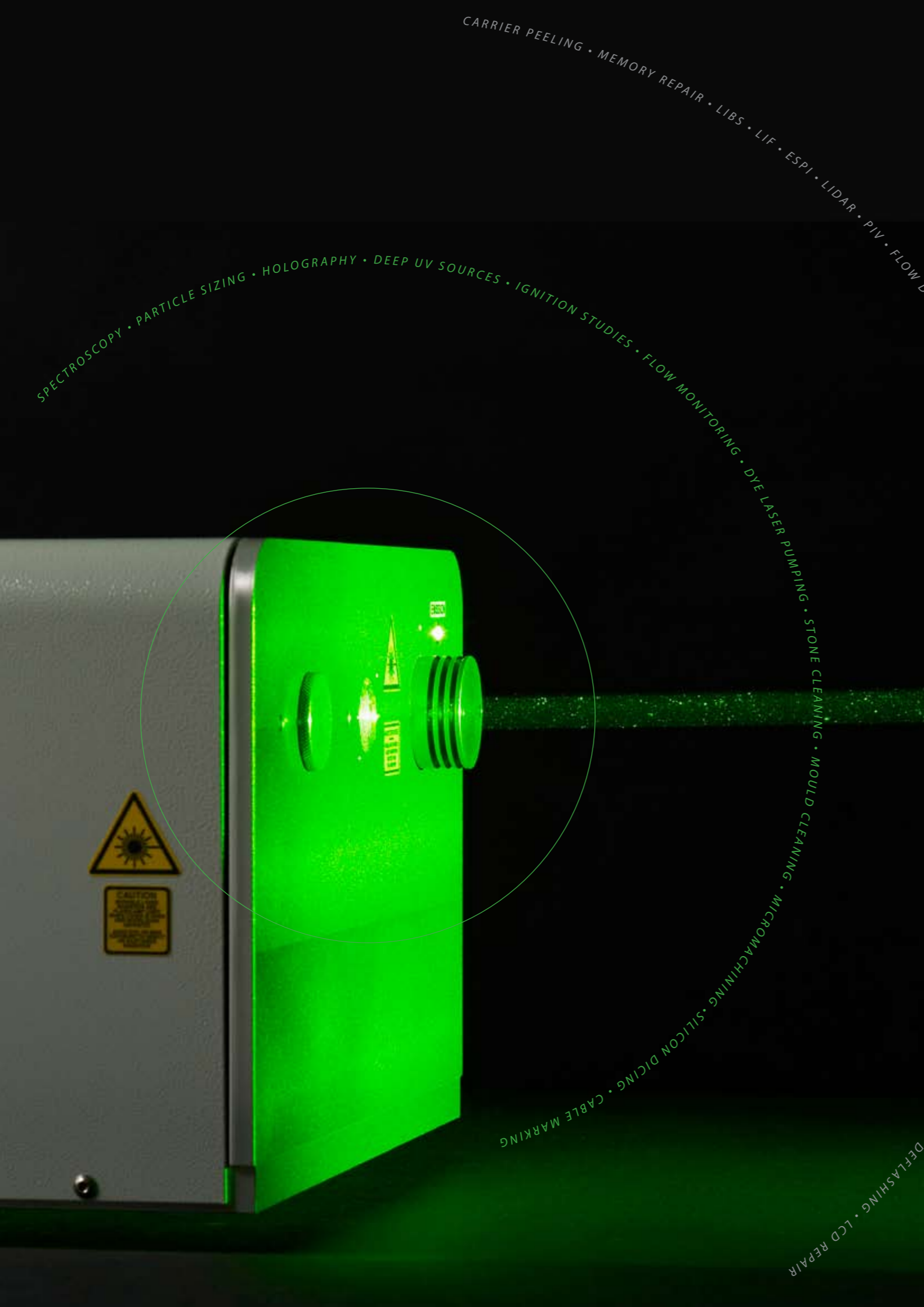
C
a
p
a
b
i
l
i
t
y



CE

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.

© 2011 Litron Lasers Ltd. Printed in England. PB 01092



CARRIER PEELING • MEMORY REPAIR • LIBS • LIF • ESPI • LIDAR • PIV • FLOW DYNAMICS • OPO PUMP SOURCE • SURFACE TREATMENT • IC CLEANING • ABLATION • SOLAR PANEL PROCESSING • HOLE DRILLING • DEFLASHING • LCD REPAIR

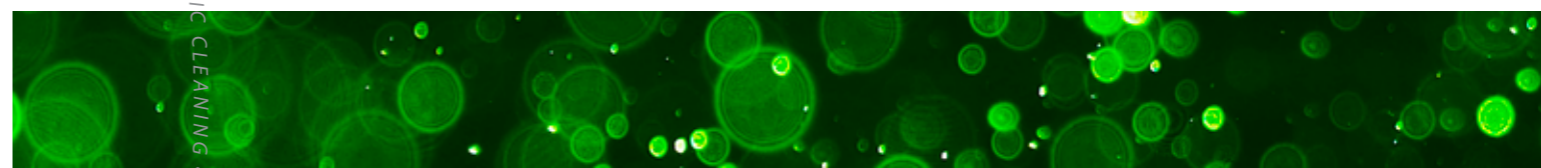
SPECTROSCOPY • PARTICLE SIZING • HOLOGRAPHY • DEEP UV SOURCES • IGNITION STUDIES • FLOW MONITORING • DYE LASER PUMPING • STONE CLEANING • MOULD CLEANING • MICROMACHINING • SILICON Dicing • CABLE MARKING

ABLATED • SURFACE TREATMENT • IC CLEANING • ABLATION • SOLAR PANEL PROCESSING • HOLE DRILLING • DEFLASHING • LCD REPAIR

TOTAL LASER CAPABILITY - GLOBAL REACH

Litron Lasers has enjoyed continued growth and development since its inception in 1997 and now sits firmly at the forefront of solid state laser technology. An installed product base of several thousand lasers spanning the globe is the result of many years development and interaction with our customers.

From the beginning Litron has developed lasers that can be operated 24/7 in the most demanding industrial environments. To supply a laser that is best suited to an application it is key to appreciate the process where it will be used and with an extensive knowledge of industrial and scientific applications, Litron provides lasers to match any customer requirements.



Litron's standard laser designs lend themselves to easy customisation, yielding fast, cost-effective solutions. For some highly specialised applications Litron can utilise its in-house machining capability to offer bespoke laser products to encompass the customer's key design constraints in a timely fashion. To this end Litron continues to invest in key areas to maintain long term industrial OEM partnerships.

Litron is continually improving and extending its product range. Please visit www.litronlasers.com or contact us directly for the latest information and developments.

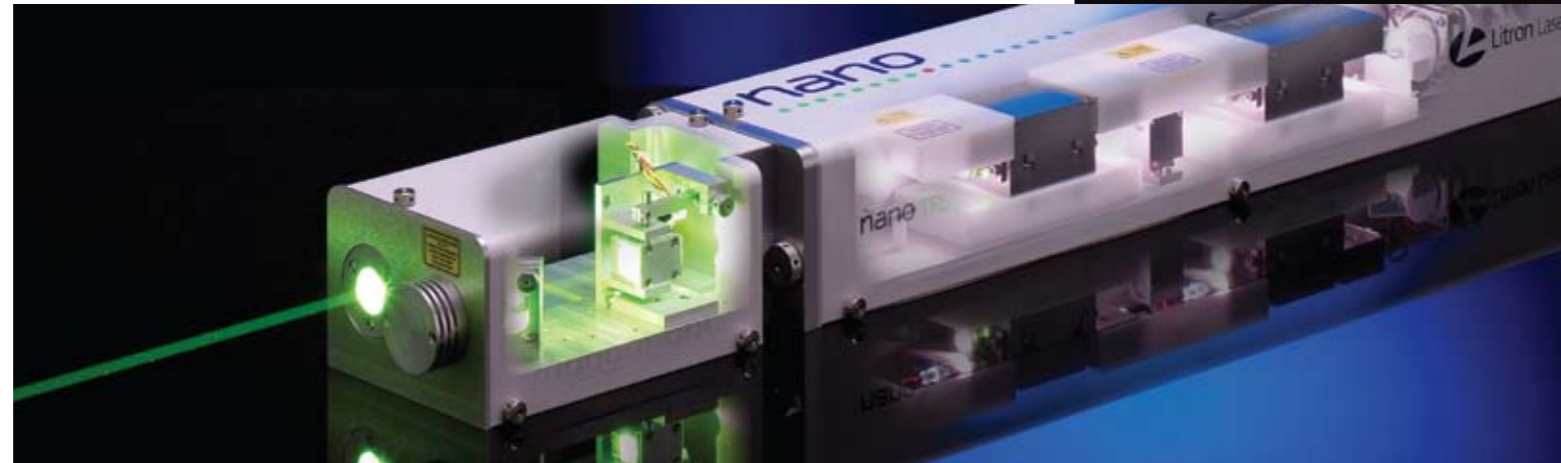
Compact Pulsed Nd:YAG Lasers The Nano Series - TRL Highlight

SERIES FEATURES

- Output Energies up to 850mJ
- Repetition Rates up to 200Hz
- Twin-rod Architecture for Birefringence Compensation
- Rugged Industrial Design

APPLICATIONS INCLUDE

- OPO Pumping
- Ti:S Pumping
- Dye Laser Pumping
- Deflashing
- Cleaning
- Spectroscopy
- LIBS



The Nano TRL Series High Energy Lasers in a Compact Package for Research & Industry

The Nano TRL offers energies up to 850mJ or repetition rates up to 200Hz.

The unit is totally sealed against the ingress of moisture and dirt and, thanks to the latest advances by Litron in mechanical design, is also extremely field rugged.



The Nano TRL is a natural development extending Litron's Nano group of products giving more power in a compact package.

Building on the success of the Nano series of compact pulsed Nd:YAG lasers, the Nano TRL is a fully birefringence compensated pulsed laser system offering both high energy and high repetition rate outputs.

Its twin-rod architecture ensures high beam homogeneity even at very high average power outputs. The Nano TRL is designed to suit demanding industrial applications with a sealed laser head machined from solid aluminium, ultrastable mirror mounts and industry leading lamp lifetimes.

Resonator options include unstable Gaussian coupled, stable, and stable-telescopic configurations, allowing for a multitude of applications. Harmonic wavelengths are realised by 'bolt-on' modules that can be added or removed as required.

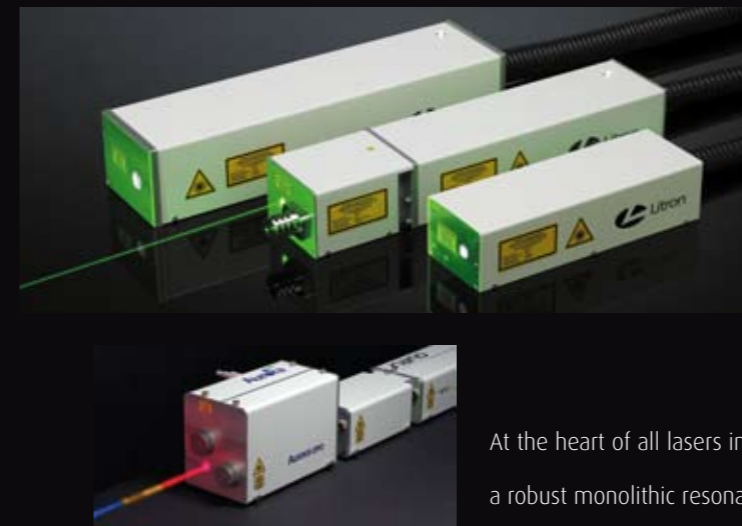
Power supplies for the range include state-of-the-art IGBT switching into the flashlamp, giving increased efficiency and stability as well as significantly prolonging lamp life due to the much lower currents.

Compact Pulsed Nd:YAG Lasers The Nano Series - True versatility

A family of compact and rugged Q-switched lasers suited to a multitude of applications including mask repair, LIBS, LIDAR, PIV, pump sources and spectroscopy.

The Nano series of pulsed Q-switched Nd:YAG lasers have been designed to satisfy the demands of customers today. With industry leading performance in every respect, and

unsurpassed design and build quality, the Nano series sets the new benchmark for laser systems today.



Nano Series Total Versatility

Above, a Nano TRL is shown pumping the Litron Aurora Broadband OPO.

Below, a Nano TRL linked to an articulated arm.

At the heart of all lasers in the Nano range is a robust monolithic resonator machined from a solid piece of aluminium leading to a solid and stable platform on which the systems are built. Ultra-stable mirror mounts, a stainless steel pumping chamber with close coupled

ceramic reflectors, and proprietary long-life flashlamps result in homogeneous, stable outputs.



Nano Series Models

Nano S/SG

Small, rugged, reliable and efficient. Conventional stable/Gaussian coupled resonator with electronically verified intra-cavity safety shutter. Repetition rate: up to 100Hz. Energy: up to 130mJ at 10Hz.

Nano L/LG

Rigid, stable construction through elegant design lends itself to use in demanding industrial applications. Repetition rate: up to 100Hz. Energy: up to 320mJ at 10Hz.

Nano T

As the Nano L but with telescopic stable resonator for very low beam divergence and excellent uniformity. Repetition rate: up to 50Hz. Energy: up to 320mJ at 10Hz.

Nano TRL

Twin rod oscillator with birefringence compensation for excellent beam quality. Extra rugged industrial design. Repetition rate: up to 200Hz. Energy: up to 850mJ at 10Hz.

Nano O

Smallest head in the range, designed specifically for incorporation into customers' equipment. Fully air cooled option available where water is not desired such as portable LIBS applications. Repetition rate: up to 100Hz. Energy: up to 130mJ at 10Hz.

High Energy Pulsed Nd:YAG Lasers Ultra High Energy - LPY7000 Highlight

FEATURES

- Rugged Industrial Build
- Up to 3.5J @ 1064nm
- Telescopic or Gaussian Resonators
- Optional Seeder Package
- All Harmonics to 5th Available
- Full Energy in <5 Minutes at All Wavelengths
- Full RS232 Software Control
- Custom Systems up to 10J



Superior Performance Through Superior Design

The LPY7000 lasers offer extremely high Q-switched outputs up to 3.5J and repetition rates of up to 50Hz. Based around our proven self-supporting invar frame their robust build quality suits them to both industrial and scientific applications. Energies up to 10J are also available at 1064nm with extra amplification.



10J output stage

The lasers are provided in an oscillator, pre-amplifier, main-amplifier arrangement.

The oscillator may be configured as a stable-telescopic resonator offering a low order multimode output with a

smooth spatial and temporal profile, or as an unstable Gaussian-coupled resonator offering a single transverse mode output with slightly higher peak powers.

Lamp change is performed in a matter of minutes with no need for any re-alignment at all. An optional IP54 sealed case ensures that the laser is protected against the ingress of dirt and moisture when used in industrial environments.



An LPY7000 outputting 1J of 532nm at 30Hz.

APPLICATIONS INCLUDE

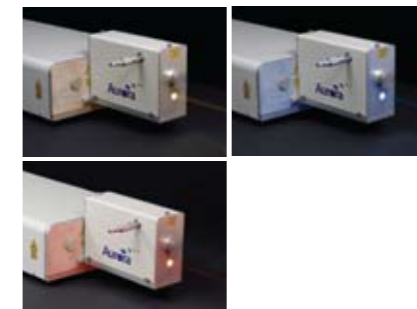
- Dye laser pumping
- OPO pumping
- Spectroscopy
- LIBS
- LIDAR
- PIV

High Energy Pulsed Nd:YAG Lasers LPY600/700 Series - Energy & versatility

Rugged, invar stabilised, pulsed Nd:YAG lasers with high energy and high Performance for industrial and scientific applications.

The LPY series of pulsed lasers have been designed to suit almost any industrial or research application in which a high-energy or high-specification Nd:YAG laser is required. Based around a fully self supporting invar rail the LPY series exhibit both exceptional mechanical and thermal stability.

An LPY700 pumping a Litron Aurora Broadband OPO.



A 'no-compromise'

Injection seeding is an option that can be added to any of Litron's high energy LPY series lasers.

With the addition of an SLM seed laser and appropriate control electronics output linewidths of 0.003cm^{-1} for gaussian-coupled resonators and 0.0016cm^{-1} for true TEM_{00} resonators are achieved.

design approach is evidenced in the build quality, a parameter that sets these lasers well apart from any of their competitors.

The modular design of the laser head allows a wide variety of resonator configurations to be offered, from single rod oscillators to fully bi-refrignce compensating twin-rod-oscillator, twin-rod-amplifier systems. Furthermore, a choice of stable, stable-telescopic or unstable Gaussian-coupled resonators is available, allowing the customer to specify a system that suits their requirements.



With Litron's ultra-stable mirror locking electronics extremely stable high energy SLM outputs are realised. All options such as harmonic generation, attenuation, etc. are available.

Pulsed Nd:YAG Lasers for PIV

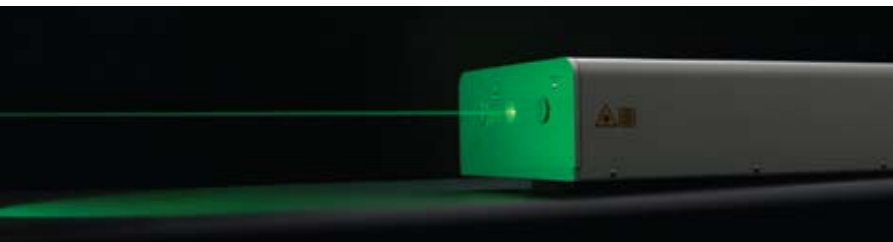
High Energy PIV - LDY300PIV Highlight

LDY300 Series Diode Pumped Q-switched Nd:YLF Lasers.

Up to 30mJ, 527nm, 1kHz



High repetition rate lasers for time-resolved PIV applications.



The LDY300 series are diode pumped, dual cavity, Nd:YLF laser systems ideally suited to imaging applications such as PIV and to pump applications. Output energies of up to 30mJ, 527nm per cavity at 1kHz are available.

The lasers are built around a rugged self supporting invar rail that bestows excellent mechanical and optical stability. This, coupled with the proprietary resonator design, leads to excellent output beams that are spatially and

temporally extremely smooth and stable, giving rise to light sheets that offer almost identical shot to shot illumination.

The robust design of these lasers suits them to the harshest of industrial applications and research applications alike.

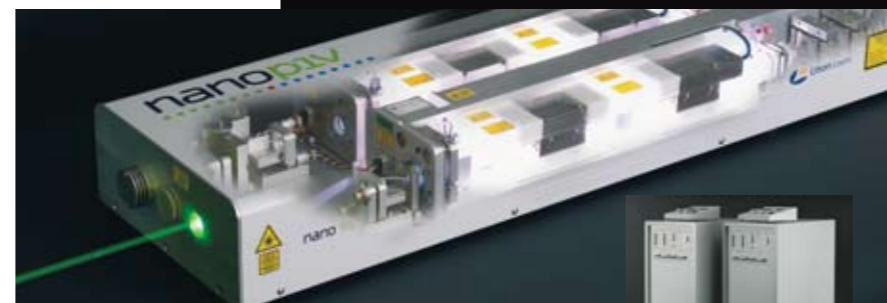
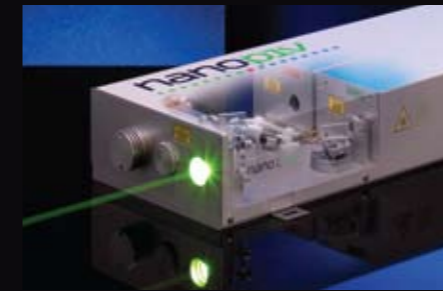
The power supply and closed-circuit chiller are all housed in a compact rack. The system can be controlled either by the in-built LCD interface or via RS232 with the supplied software suite or dll. External



triggering of the lasers is accessible via a TTL interface.

Litron offers an extensive range of flashlamp pumped and diode pumped PIV laser systems.

Output energies of up to 1J per pulse and repetition rates of up to 20kHz are all available within the Litron PIV range.



All of Litron's PIV laser systems are twin head devices, meaning that the PIV system contains two totally independent lasers.

The range of PIV systems is based around the compact Nano series, the invar stabilised LPY series and the diode pumped LDY series.

The overriding factor that sets Litron's products apart is quality. This is evidenced not only in the design and construction of the product, but also in its performance. In any imaging application the beam quality is of paramount importance as this completely determines the light sheet quality.

By choosing a suitable resonator configuration the output beam quality can be controlled to give a very smooth spatial profile which remains homogeneous as it propagates right into the far field.

It is our philosophy to provide a laser system that suits an application. A 'one system fits all' approach, as offered by most manufacturers, does not allow the customer to optimise their process. For applications such as PIV Litron has developed resonators that will yield extremely uniform light sheets whose pulse to pulse structure and stability remains constant. These are all based around our stable or stable- telescopic resonators.

Nano Series Models

Nano S PIV

The smallest in the series. Two Nano S lasers mounted onto an aluminium gauge plate to provide robustness. Beam combination optics and any harmonic generation units are mounted onto this plate for increased stability. Both lasers share the same integral power supply and cooling unit.

Nano L PIV

Exceptional industrial robustness. The Nano L laser can be run at 100Hz enabling results to be taken at 200Hz. Industry-leading specifications are achieved from a very compact laser head.

Nano T PIV

Like Nano L but with telescopic resonators for low divergence, enabling light sheets up to four times thinner or longer than most other systems.

Nano TRL PIV

High energies from a compact package. Dual head high energy laser systems with output energies up to 425mJ at 532nm per laser head.

LPY PIV Also Available

LPY PIV

Invar stabilized PIV lasers for high average power PIV and other double pulse applications. Twin rod birefringence compensation provided for stability and beam homogeneity.

Power supplies for the range include state-of-the-art IGBT switching into the flashlamp, giving increased efficiency and stability and significantly prolonging lamp life due to the much lower currents. Up to 1.2J at 15Hz and 50mJ at 200Hz, 532nm.

Industrial Nd:YAG Laser Systems

OEM Lasers for Most Applications

Litron offers many OEM systems designed for use in industrial applications.

Both Diode Pumped and Lamp Pumped systems are available.

Fundamental to the design of all of these systems is their ability to operate on a continuous basis in the harshest of industrial environments. Optical stability is achieved only through mechanical stability and based around either a self-supporting invar frame or monolithic aluminium resonators the laser heads are extremely rugged.

The unique design of Litron's close coupled, diffuse ceramic, pumping chambers keep the laser rod and lamp cooled evenly and provides industry-leading levels of efficiency and pulse to pulse stability.



Electrically the flashlamp pumped pulsed lasers incorporate direct switching into the flashlamps with an IGBT giving rise to industry leading lamp lifetimes of up to one billion shots in some systems.

LCY20 TEM₀₀

Compact laser head where space is a premium. Power: up to 20W TEM₀₀.

LCY35/45 Series

Available as multimode, TEM₀₀ or as multimode and TEM₀₀. All variations available with or without Q-switch. Power: up to 35W/45W MM and 6W TEM₀₀.

LCY70/90/100 Series

The most advanced range of lamp pumped, continuous wave laser sources available today. Pure CW output, Q-switched. CW output and optional TEM₀₀ versions. Power: up to 90W MM and 18W TEM₀₀.

LDY Series CW Diode Pumped Lasers

Sealed, rugged industrial design. Q-switched up to 100kHz or true CW.

Up to 60W multimode or 16W TEM₀₀. Compact single phase power supply and self contained cooling system.

Nano DP OEM Series

The new Nano DP Series from Litron is a Q-switched pulsed excited diode pumped laser system. Constructed with Litron's hallmark quality with a resonator machined from solid aluminium and our industry leading high stability optical mounts the new Nano DP is truly industrially rugged. The control and power electronics is contained

within the laser head. The laser is controlled either via the supplied LCD control interface, RS232 or USB.

LPY700 Series

Q-switched pulsed birefringence compensated oscillator/amplifiers. 100mj, 200Hz at 532nm ideal for deflashing applications.

LPY800 Series

Micromachining lasers. Repetition rates of 1kHz and 2kHz, and can be configured to give a true TEM₀₀ output with a resulting M² of <1.2, allowing cuts to near micron precision. Energies of up to 50mj at 1064nm multimode with pulse widths of 10-50µs.

GLASS LASERS

Can be made to special order.

RUBY LASERS

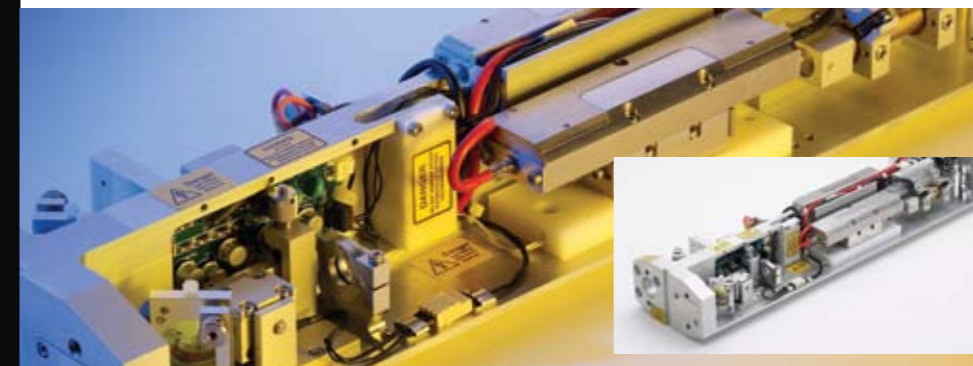
Custom lasers available with up to 1J Q-switched, 10J normal mode.

Er:YAG LASERS

2.94µm output, ~200µs pulse length. Up to 1J output. Q-switched option available.

Custom Laser Systems

Flexibility and Expertise



Custom Laser Head



Custom 10J Q-switched Laser

Litron's flexible approach and expertise in laser design means custom lasers are a natural part of our production.

In addition to its standard range, Litron produces a great variety of custom systems, both based on standard modules and, where

necessary, offers a complete design to fit your needs.

The high degree of modularity in the design of Litron's lasers, both mechanical and electrical, yields a platform ideally suited to non-standard bespoke systems. Mechanically the invar rail structure and associated optical and mechanical mounts form a set of components whose placement within the rail are largely variable. Due to this almost any optical configuration can be achieved with absolutely standard components. This is a significant advantage when adapting an existing design to a specific requirement or when producing an entirely new type of system.

Non Laser Products

Complimentary to all Litron Products

Energy Monitoring

Litron manufactures a comprehensive range of laser energy monitors. These are photodiode based instruments and allow extremely accurate analysis and measurement.

Litron's range of monitors can measure every pulse from the laser system,

rather than averaging the energy as many calorimetric devices do. This leads to unrivalled accuracy and flexibility of measurements. Typically the pulse to pulse repeatability is better than 0.2%.

The Aurora Broadband OPO

A brand new product from Litron. Based around BBO, it is initially offered as a broadband (5-20 cm⁻¹) device pumped with the third harmonic of an Nd:YAG laser. It is continuously tunable from 410nm to 680nm and the corresponding idler output to 2400nm is also available. Designed to be fully integrated with either the Nano series or the larger LPY series of systems the OPO is a modular attachment designed specifically for use with Litron's lasers.



LCY•90
LDY•350
nanodp

Aurora