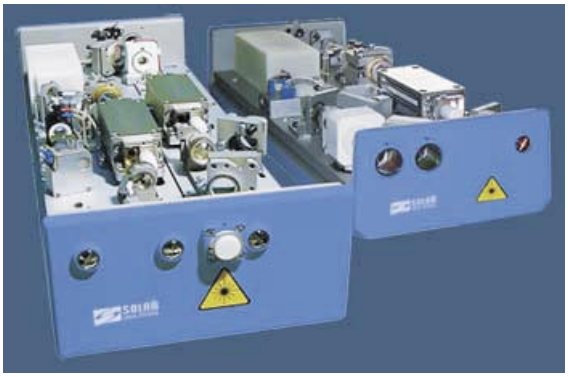
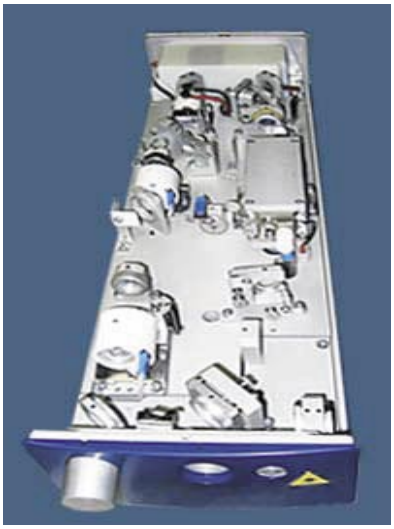
Compact Pulsed Nd:YAG Lasers



Del Mar Photonics, Inc offers a commercially available model which uncompromisely combines beam quality, high energy/efficiency and possibility of efficient PRR changes with no significant degradation of the output beam parameters. Original and innovative concept of the laser (LQ529) provides all the advantages of complicated and expensive high performance Nd:YAG lasers in a compact and reliable design which excludes most of typical problems occurring while operating complex laser systems. Time proven ring cavity design of the LQ529 ensures perfect balance of energy, beam quality and reliability.

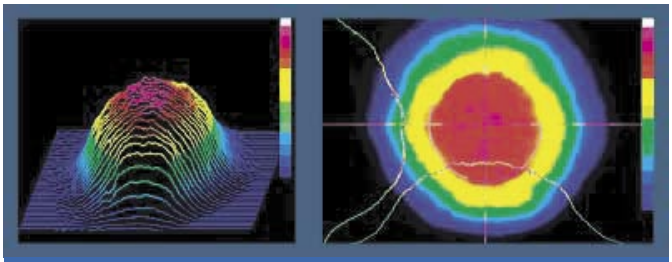
Features

- Excellent beam quality and stability
- All harmonics up to 213 nm
- High pumping efficiency
- Turn-key operation
- Remote controller and RS232 interface as standard
- No external water, single phase mains operation
- Low maintenance



Excellent Beam Quality

Compensation of depolarization over the Nd:YAG rod cross-section together with traditional advantages of ring cavities ensures excellent beam profile quality. Unique optical design of the LQ529 not only makes losses and distortions caused by induced birefringence almost negligible, but also minimizes thermal lensing effect. The above allows the user to vary pulse repetition rate within a wide range and requires no further cavity alignment to preserve high beam quality and output energy. This constitutes a great advantage over lasers using expensive and difficult to align Gaussian optics and thus demanding realignment and sometimes even replacement of optical components in order to avoid dramatic worsening of their output parameters if PRR has been changed. LQ529 lasers provide smooth beam profile for all harmonics.



Figures show beam profile at 355nm/50Hz.

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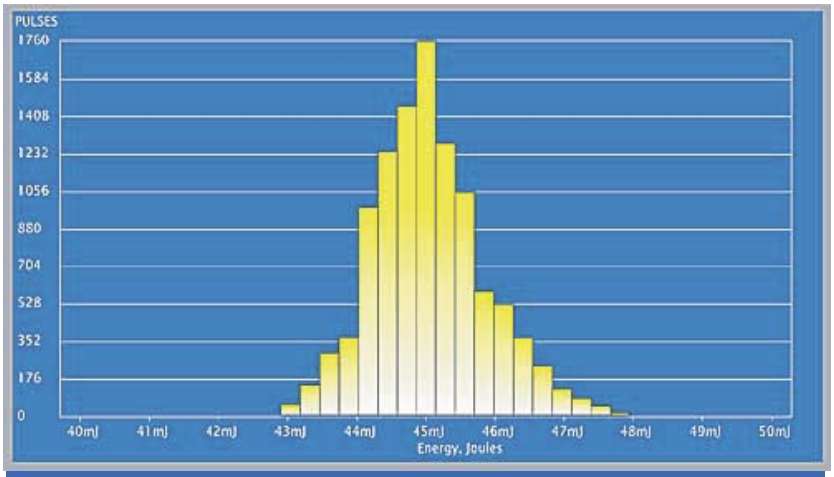
Energy through Efficiency

One of the main reasons for moderate efficiency of conventional Q-switched lasers is birefringence induced in the Nd:YAG rod leading to depolarization of laser output. Each time the beam passes through the cavity, depolarized lasing is filtered by various polarization units and is dropped out of the cavity what leads to decrease in laser operation efficiency. Optical design of the LQ529 laser cavity allows to practically eliminating energy losses caused by depolarization and provides laser energy output with more than 2% efficiency with respect to electrical power consumed by the laser. Such a high efficiency allows the LQ529 to provide up to 600mJ output energy without using an amplifier. Single rod and single flash lamp design is the determining factor for reduction of the laser price and maintenance costs.

Supplementing the basic model with a one-pass amplifier allows to provide up to 1500mJ output energy in the fundamental (model LQ929) while preserving all the advantages of the LQ529 model.

Stable And Reliable Operation

One of the obvious advantages of the laser is its absolute mechanical stability and rigidity.



Pulsetopulse energy stability of LQ529C laser at 355nm (THG)

Rigid optical bench to which all the optical components are mounted is mechanically and thermally isolated from the laser housing. This ensures exceptional alignment stability even under most arduous conditions of transportation and operation. All the nonlinear crystals and Pockels cell are temperature stabilized. Optical bench with cavity components is also temperature stabilized. High-precision termostabilization ensures minimal pulsetopulse and longterm instability. Heating of optical components to the temperature exceeding ambient totally eliminates any risk of condensation. This feature along with dustproof housing protects the optics from damage and minimizes the necessity in service. It should also be noted that the LQ529 laser design eliminates the necessity of any laser alignments after the flash lamp has been replaced, while the replacement procedure itself takes less than 10 minutes.

All Harmonics Available

All harmonic options — 532nm, 355nm, 266nm and 213nm — are available as standard. High-efficiency Harmonic Generators can be either built-in (except for the FiHG) or supplied as separate units upon the customer's request. For this reason all the harmonics can be ordered with the laser or at later date.

DEL MAR PHOTONICS

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Compact Intelligent Power

A power supply unit and a self-contained watertoair cooling system are integrated into one compact package. Compact size and closed loop cooling system which requires no external water, allow to place the power supply under the optical bench or wherever convenient. Computer control using the optional RS232 interface allows integration into laboratory or industrial automated systems. High power cooling system and automatic temperature control with 0.5°C precision ensure stable laser operation at up to 30°C ambient temperature. A heater built into the cooling system reduces warm-up time to several minutes even at 15°C ambient temperature.

ACCESSORIES AND OPTIONS

· Built-in and External Harmonic Generators up to 5th Harmonic
· Solid State Raman Converter
· High Power Attenuator for All Harmonics
· Custom Configurations
· Solid-state Raman Converters

Applications

- Nonlinear optics
- Spectroscopy
- Velocimetry
- Pump source
- Material processing
- Mobile laser systems

Specifications

1) Harmonic generators are buit in the laser head
2) When operated with harmonic generator model LG105
3) When SHG is optimized
4) When THG is optimized
5) At 1064 nm
6) With respect to external trigger

MODEL	LQ529A		LQ529B		LQ529C	LQ829	LQ929
Configuration	Oscillator only					Oscillator + Amplifier	
Pulse repetition rate, Hz	5	10	10	20	50	10	10
Output energy, mJ at 1064nm at 532nm [1),3)] at 355nm [1),4)] at 266nm [1),3)] at 213nm [2),4)]	 500 280 110 100 25	 500 280 100 70 20	 350 190 90 60 15	 350 190 90 40 12	 150 80 40 16 5	 1000 550 270 120 40	 1500 800 350 180 50
Pulsewidth, nsec [5)]	10…13						
Beam diameter, mm	8		6		5	8	9
Divergence, mrad	~1						
Stability, ±%, better than [5)]	2.5						
Cooling	self-contained water-air cooling system						
Power consumption, (single phase, 220V ±10%, 50/60Hz), VA, less than	400	600	600	800	1000	900	1000
Dimensions, mm Laser Head Power Supply	575 x 180 x 100 650 x 290 x 650					600 x 220 x 115 770 x 340 x 670	

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