

## NarrowScan Dye Laser



### Features:

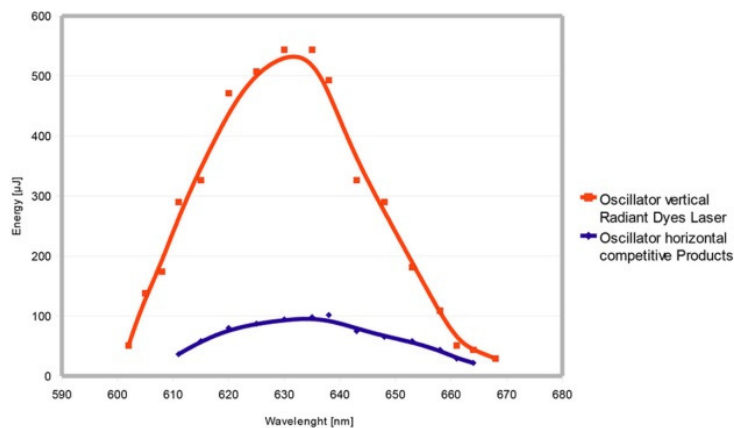
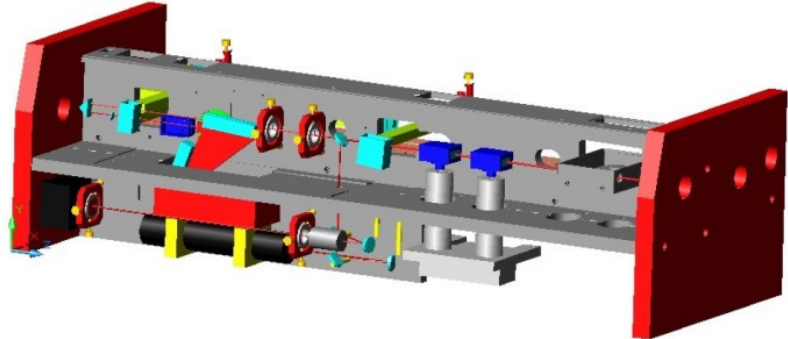
- \* 1 - 500 Hz repetition rate
- \* up to 1J pump energy @ 532 / 355 nm
- \* Oscillator with vertical design
- \* Linear scan
- \* Easy and fast dye change
- \* High-precision mechanical components
- \* Integrated frequency doubling, tripling and mixing
- \* Optical feedback option

# Radiant Dyes Laser Acc. GmbH

## NarrowScan Dye Laser

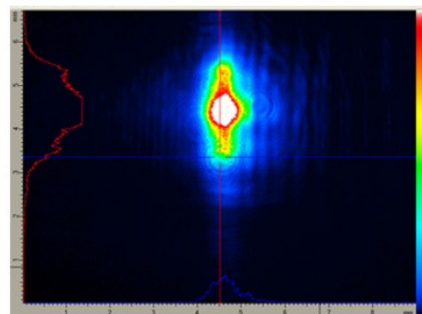
The NarrowScan pulsed dye laser series is based on a **vertical polarization matched grazing incidence resonator** design which achieves a higher efficiency from the oscillator. The vertical oscillator can be pumped smoother, leading to a **reduction of ASE**, a more **stable bandwidth** and a **larger tuning range** of the dyes, as the laser threshold is lower than in a horizontal resonator.

Due to the **high precision motor drive**, consisting of preloaded recirculating ball screw in connection with a preloaded, free from play slide module, it is possible to reproducibly go to the laser line with an accuracy of  $\pm 2$  steps. The noise of the linear scan is very low with  $\pm 3$  steps. The laser has very rigid and massive side and middle plates, ensuring a **very high stability** in the oscillator and pre-amplifier. In combination with the well-known high quality Radiant Dyes optomechanics and the solely excellent adjustment screws with 0,25 mm pitch, the laser offers a **reproducible, stable and easy alignment**. The dimensions of the laser housing as compact as possible, while still allowing space for integrated frequency doubling, tripling, separation and mixing units inside the laser.



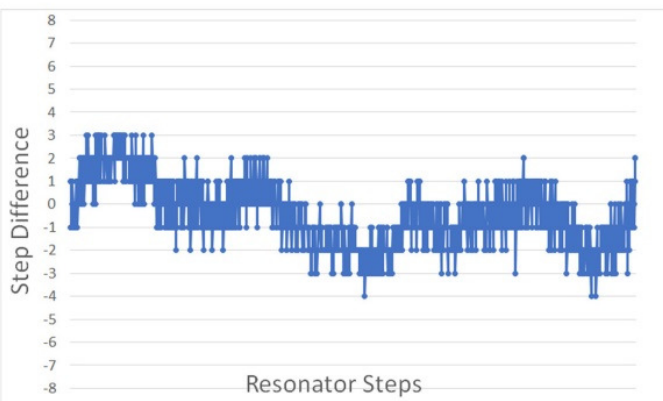
### Resonator Design

- Vertical grazing incidence resonator
- Polarization matched
- Higher efficiency
- Reduction of ASE
- Large tuning range and low bandwidth
- High pulse to pulse energy stability



### Dye Cells

- High precision dye cells
- Improved beam profile
- Easy and fast dye change
- No alignment after changing the dye cell



### Motor Drive

- High precision motor drive
- Reproducible and accurate wavelength selection
- Low noise of the scan

### Optomechanics

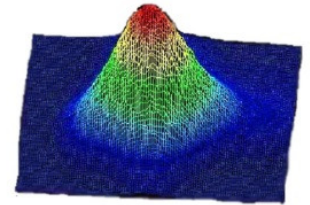
- High quality Radiant Dyes optomechanics
- Free of play adjustment screws with 0,25 mm pitch

# Radiant Dyes Laser Acc. GmbH

## Options of the NarrowScan Dye Laser

### Prismatic Cells:

The prismatic cells can be used with pump powers up to 1 Joule and deliver a high power output with an excellent beam profile. The inner tube can be ordered from 1.6 to 6 mm, depending on the power of the pump laser.

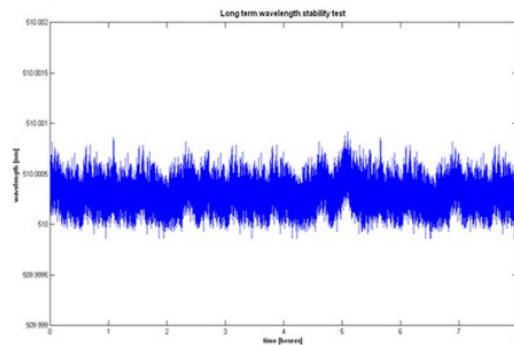


### Temperature Stabilization:

The NarrowScan can be provided with an active temperature stabilization to prevent instabilities of the cavity caused by changes of the envired temperature.

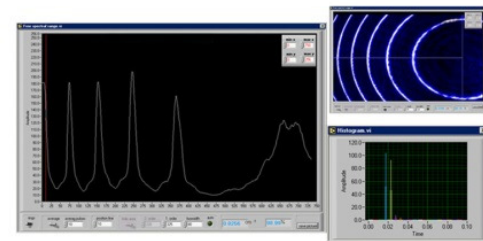
### Optical Feedback:

The software controlled coupling of the NarrowScan motor drive with a wavemeter allows a fully automated wavelength calibration and almost linear scanning. Active temperature control, online energy control and stabilization, as well as online bandwidth control are further advantages of the optical feedback.



### Integrated Etalon:

The integrated etalon is a low cost solution for the automatic bandwidth measurement and active frequency calculation. An etalon is used to generate interference rings which are monitored by a CCD-camera. The software calculates the laser bandwidth by fitting the interference maxima, allowing an online control of laser bandwidth during the measurement and a stabilizing of the laser frequency.



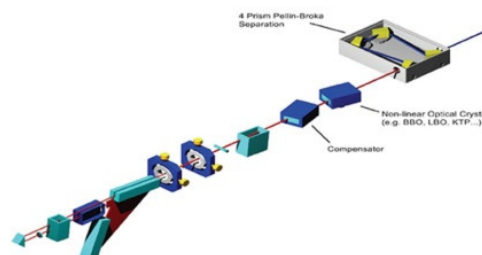
### Frequency Conversion:

The excellent beam profile, the correct polarization and the narrow bandwidth of the NarrowScan predestinate this laser for use in nonlinear processes. With our very precise positioning device, all common crystals for frequency doubling (220-400 nm), tripling (200-220 nm) and different frequency mixing (1500-4200 nm) or mixing after doubling (190-220 nm) can be installed inside the laser housing.

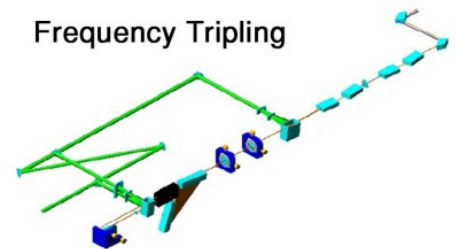
For difference frequency mixing the dye laser wavelength is mixed with the fundamental of the Nd:YAG-laser.

The necessary optomechanical components for the pump laser beam are also located inside the laser housing. All frequency units can be used independently, in lookup table or auto tracker mode.

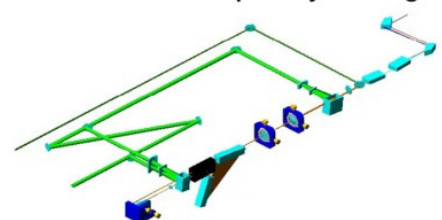
### Frequency Doubling with Pellin Broka Separation Box



### Frequency Tripling



### Difference Frequency Mixing



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## Configurations:

NarrowScan	Grazing Grating	Tuning Element	Tuning Range	Bandwidth [cm-1]
Single Grating	1800 l/mm	Mirror	370 – 900 nm	≤ 0,07 @ 580 nm
Single Grating	2400 l/mm	Mirror	370 – 740 nm	≤ 0,06 @ 580 nm
Single Grating	3000 l/mm	Mirror	370 – 610 nm	≤ 0,05 @ 580 nm
Double Grating	1800 l/mm	1800 l/mm	370 – 850 nm	≤ 0,05 @ 625 nm
Double Grating	2400 l/mm	2400 l/mm	370 – 710 nm	≤ 0,04 @ 580 nm
Double Grating	3000 l/mm	3000 l/mm	370 – 580 nm	≤ 0,03 @ 570 nm

## Beam and wavelength specifications:

Wavelength reproducibility @ 580 nm  
 Absolute accuracy of the wavelength @ 580 nm  
 Wavelength stability  
 Divergence  
 Polarization  
 ASE-background

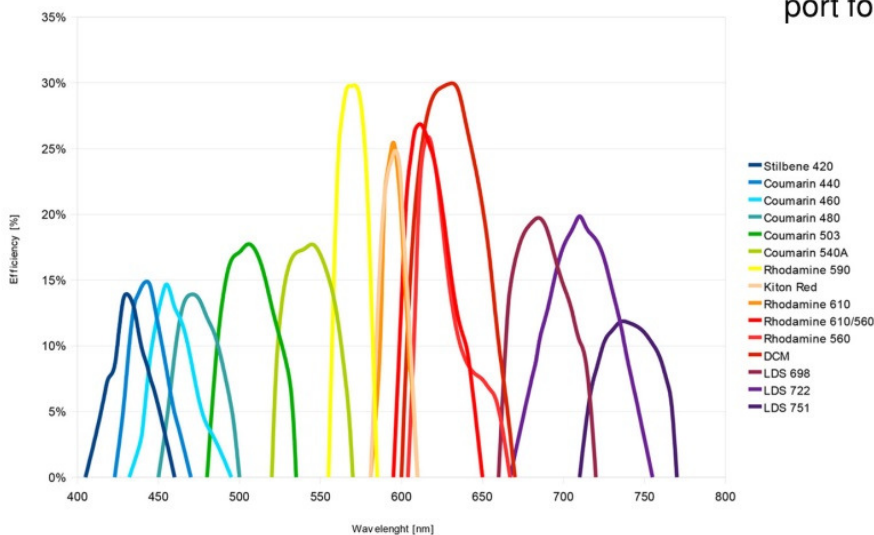
< 0,0025 nm (typically < 0,0009 nm)\*  
 < 0,02 nm (typically < 0,01 nm)\*  
 < 0,001 nm/°C  
 0,5 mrad  
 > 98 %  
 < 0.5 %

\* temperature stabilized

## Requirements:

Pump laser power  
 Voltage  
 Computer

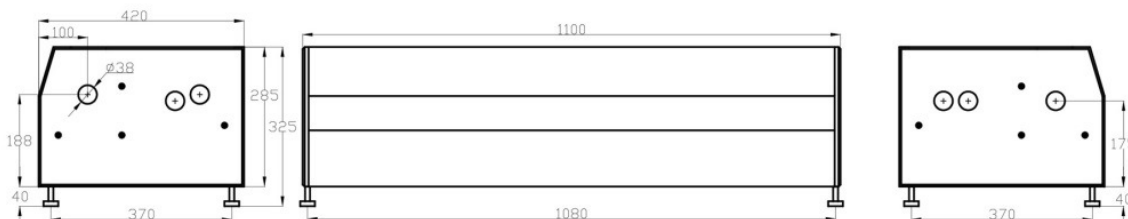
20 mJ - 1000 mJ @ 532 nm and 355 nm  
 110V 6A/ 220V 3 A, 50/60 Hz, single phase  
 Windows (all versions), or Mac, one free USB  
 port for communication with control unit



Dye Tuning Curves and  
 Dye Efficiency of the  
 NarrowScan Dye Laser  
 Nd:YAG pumped  
 by 355 nm and 532 nm.

## Dimensions

1100 x 420 x 325 mm



All specifications are subject to change without notice

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