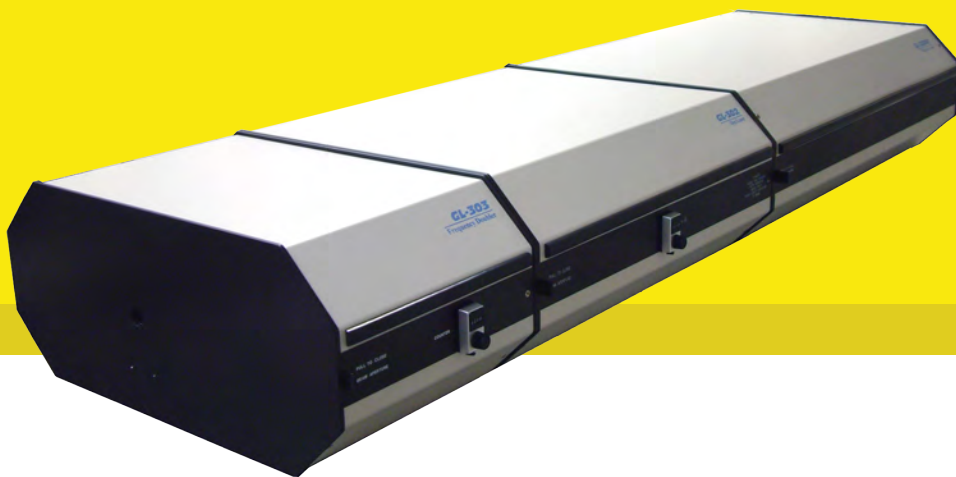




# Nitrogen & Dye Lasers

*Tunable Nanosecond Pulsed Lasers for Research and Teaching*



# Nitrogen Laser

## General Information

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Since their commercial introduction in the mid-1970's, nitrogen and dye lasers have established themselves as powerful tools for applications that require high-energy, pulsed, monochromatic radiation. Unlike most lasers, the nitrogen laser offers simple, trouble-free operation at an affordable price, and it is an excellent source for UV light at 337 nm with high peak power.

Nitrogen lasers are excellent sources for general spectroscopy, laser-induced fluorescence and photochemistry, as well as in teaching laboratories. Because of their tunability, dye lasers may be used for a large variety of applications in the UV-visible region. For experiments in the life science laboratory, nitrogen and dye lasers can easily be fiber-optically coupled to a microscope.

When pumped by nitrogen lasers, dye lasers are tunable over a wide spectral range from 360 to 990 nanometers. Dye lasers equipped with frequency doublers are even tunable in the deep UV region from 235 to 345 nm.

We at OBB Corporation have been involved in the development of commercial nitrogen and dye lasers since 1987, and this technology has undergone continual improvement since that time. OBB Corporation has pioneered a whole new laser technology that provides high power and trouble-free operation at a low price. There simply is no other tunable pulsed nanosecond laser commercially available that is this easy to use or affordable!

### OBB QUICK FACT #1

Unlike most lasers, the nitrogen laser offers simple, trouble-free operation at an affordable price!

## The Finest Nitrogen and Dye Lasers in the Industry

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Nitrogen and dye lasers from OBB have excellent performance specifications, they are remarkably reliable, and they are extremely easy to use!

A dye laser is always used with a nitrogen laser and a frequency doubler is always used with both a dye and a nitrogen laser. Many assume that the precise optical alignment of such high performance components would be a frustrating process. Quite to the contrary: the OBB laser family is made to fit together easily. The construction of the cabinets of the nitrogen and dye lasers and the frequency doubler are identical, and the acceptance criteria are very forgiving. By simply placing the cabinets together, optical alignment is assured. It couldn't be simpler.

How rugged are OBB's lasers? The Naval Ocean Systems of the Public Works Center in Jacksonville, Florida, has one in their portable laboratory. This sophisticated lab on wheels is used to probe soil for petrochemicals and other pollutants, and it has been traveling all over the country for several years.

OBB's family of lasers include:

**Model OL-4300 Nitrogen Laser** — The pulsed gas laser that set the industry standard is extremely reliable, economical and easy to use, and it requires only an inexpensive tank of nitrogen gas to operate—no costly cartridges to replace, no frequent servicing or fine-tuning.

**Model OL-401 Dye Laser** — High power output, continuously tunable from 360 to 900 nm, at an economical price.

**Model OL-402 Dye Laser** — High power and ultra-high resolution tunable output.

**Model OL-403 Frequency Doubler** — Extend laser output into the deep UV region, from 235 to 345 nm.

## Model OL-4300 Nitrogen Laser

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OBB's Model OL-4300 Nitrogen Laser delivers a crisp pulse at 337 nanometers with a hefty 2.4 megawatts of peak power. With a pulse width of 1 nanosecond, that results in a pulse energy of 1.45 megawatts. As an excitation source or a pump for a dye laser, the OL-4300 has no peer. And you don't have to be a "laser expert" to use the OL-4300—you'll get the specified power with the specified pulse characteristics the first time and every time. No tweaking is needed to coax the expected performance from the OL-4300.

Operation is simple and convenient. Turn on the power, purge with nitrogen for 5 seconds, and OBB's OL-4300 will activate. An inexpensive cylinder of nitrogen is connected to the rear panel. Everything needed to control the nitrogen flow and pressure is built into OBB's OL-4300. Since the nitrogen pressure is low, there is no need for any special safety precautions.

Because higher repetition rates require higher nitrogen flow, gas usage is dependent on the rep rate. With a rate of 10 Hz and a use time of 4 hours per day, a typical tank of nitrogen will last about five weeks. There is even a built-in gas-flow interlock that automatically shuts the laser down if the gas supply is interrupted.

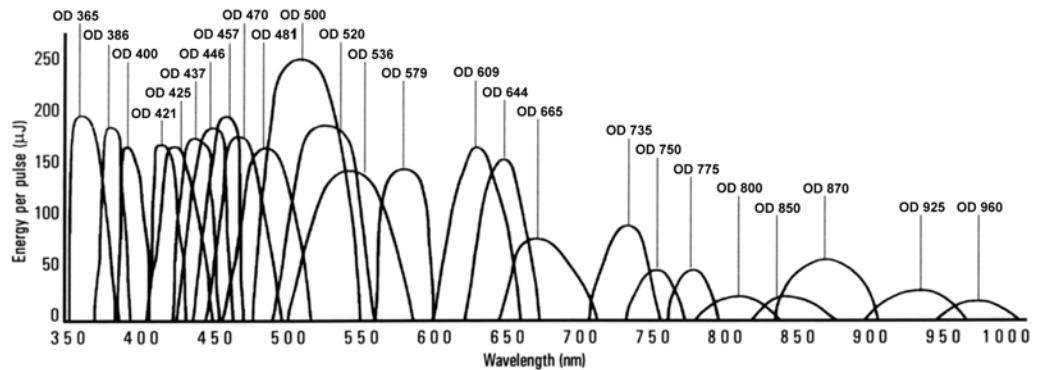
The repetition rate may be varied from 1 to 20 Hz; OBB's OL-4300 may also be fired manually for a single laser pulse. OBB's OL-4300 can be synchronized to external instruments in a variety of ways. A sync pulse is available 1 microsecond before the laser fires. OBB's OL-4300 can also be triggered by an external signal. For precise event triggering, OBB provides an optional Optical Trigger which consists of a beam splitter and fast-rise-time photodiode.

## Model OL-401 High Intensity Dye Laser

OBB's OL-401 Dye Laser is built around a single stage Littrow configuration cavity, providing continuously tunable output from 360 to 900 nm. The pulse energy at 500 nm is 250 microjoules. With a pulse width of 1 nanosecond and a bandwidth of 1 to 3 nm, OBB's OL-401 is perfect for general spectroscopy.

After placing the dye in the cuvette holder, set the desired wavelength on the digital readout. There are no optical elements that ever need to be adjusted to get this laser to operate throughout its entire tuning range. The dye is contained in 1 cm laser cuvette, and there is no need for stirring or mixing of the dye. There really is no dye laser that is easier to use than this! For computer control of the output wavelength, a motorizing option can be purchased.

NOTE: OBB's Model OL-401 Dye Laser ships with one cuvette and a vial of OD-500 dye (500 nm peak wavelength), which is used for factory calibration.



OL-401 Tuning Curve

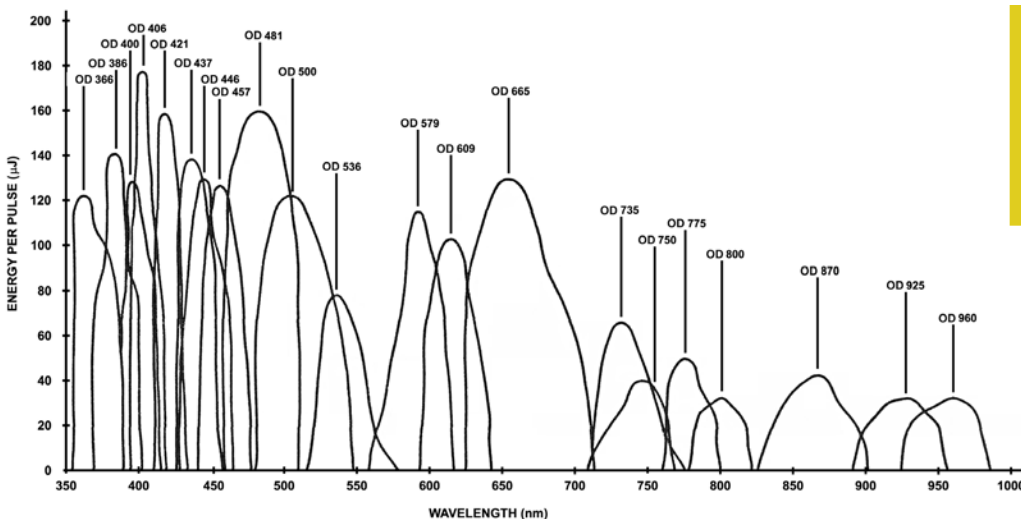
### OBB QUICK FACT #2

For experiments in the life science laboratory, nitrogen and dye lasers can easily be fiber-optically coupled to a microscope.

## Model OL-402 High Resolution Dye Laser

OBB's OL-402 Dye Laser incorporates a grazing incident design laser cavity for high resolution followed by a secondary amplifier cell to boost the power. The result is a very narrow 0.04 nanometer output from 360 to 900 nm, a pulse width of 1 nanosecond, and an energy of 220 microjoules per pulse at 500 nm. With the addition of OBB's OL-403 Frequency Doubler, tunable wavelengths from 235 to 345 nm can be attained.

Like OBB's OL-401, the OL-402 is amazingly simple to align and operate. After placing the dyes in the cuvette holders, set the desired wavelength on the digital readout. There are no optical elements that ever need to be adjusted to get this laser to operate throughout its entire tuning range. The dyes are contained in two 1 cm laser cuvettes, and there is no need for stirring or mixing of the dye. There really is no dye laser that is easier to use than this! For computer control of the output wavelength, a motorizing option can be purchased.



OL-402 Tuning Curve

### OBB QUICK FACT #3

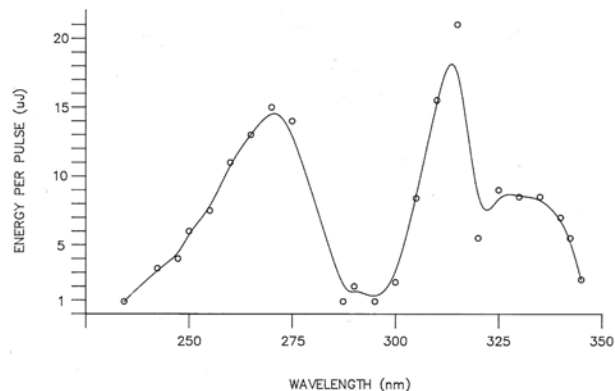
Nitrogen lasers are excellent sources for general spectroscopy, laser-induced fluorescence and photochemistry

# Nitrogen Laser

## Model OL-403 Frequency Doubler

OBB's OL-403 Frequency Doubler is used in conjunction with the OL-4300 nitrogen laser and the OL-402 high resolution dye laser. The Beta Barium Borate crystal allows continuous tuning in this wavelength range without the inconvenience of changing crystals.

The OL-403 makes wavelengths in the UV possible by doubling the frequency of the input, thereby halving the wavelength. The output is controlled by adjusting the crystal incidence angle. For computer control of the output, a motorizing option can be added.



OL-403 Tuning Curve pumped by the OL-4300 and OL-402

### OBB QUICK FACT #4

When pumped by nitrogen lasers, dye lasers are tunable over a wide spectral range from 360 to 990 nanometers. Dye lasers equipped with frequency doublers are even tunable in the deep UV region from 235 to 345 nm.

## Nitrogen & Dye Laser Applications

- Fluorescence Lifetimes
- Time Resolved Spectroscopy
- Photochemistry
- Pump Probe
- MALDI TOF-MS
- PChem Teaching Labs
- Caged Compound Release
- Detector Calibration

Class IIIb lasers.  
Specifications subject to change without notice.

## Compatible Optical Building Blocks

Fiber optic cartridge. Single 40 meter long, 400 microns, UV fiber, coiled into a cartridge for easy use in any lab configuration. Includes laser focusing lens and single fiber turret to connect single fiber to the laser output.

Fiber to OBB microscope adapters. Coupling adapters available for virtually any upright or inverted fluorescence microscope. Contact OBB for a list of compatible microscopes.

Fiber to OBB sample compartment adapter. Couples the single fiber from the fiber optic cartridge into the OBB sample compartment for laser delivery to the sample holder. Includes adapter block and fiber output collection lens.

Optical Trigger. If you need to synchronize the laser with other equipment very accurately, less than a nanosecond (input or output) then you require our optical trigger. Includes fast photodiode and quartz beamsplitter.

Analog output detector. To measure the output of the laser (non calibrated).

Laser dye cells. Quartz cuvettes to pre-load laser dyes for quick change of dye laser output.

Premixed laser dyes. 50 cc pre-mixed laser dyes from 365 nm to 960 nm.



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