

# Coherent Verdi V-10 Diode pumped Laser

Standard Operating Procedure

*Shu-Zee Lo*

Photonics Research Laboratory  
Department of Electrical and Computer  
Engineering University of Maryland at College Park

Last edited: 02/09/2007

## 1 Emergency Contact Information

Name and Description	Contact Information
UM Emergency (Fire-Police-Rescue) - 24 hour Call Immediately for any Emergency Including Injured or Sick Person Chemical Spill or Fire	#911
Environmental Safety(Main Office) Biosafety, Environmental Affairs, Occupational Safety and Health, Radiation Safety, Risk Managemen	301-405-3960
Laser Safety Officer (Steve Hand) Program Consultation and Administration	301-405-3985
University Health Center Occupational Health Medical Consultation and Evaluation	301-314-8172
Workers' Compensation Office	301-314-8171
Facilities Management, Work Control Repair of Facility Equipment Deficiencies, e.g. fume hoods, emergency eyewashes, ventilation, etc	301-405-2222
Professor Thomas E. Murphy Laboratory P.I.	301-405-3602 tem@umd.edu

## 2 Basic identification

- Vendor: Coherent
- Model: Verdi V-10 Diode-pumped laser
- Serial Number: To be Available
- Optical power: 10W @ 532nm
- Beam diameter: 2.25 mm  $\pm$  10%
- Laser Classification: Class IV
- Location: 5'x12' optical table 3 at the back of the laboratory(Fig. 1)
- Beam propagating direction: along the long side of the optical table at a height of 14.5cm above the optical table, reflected by a routing mirror toward the inner file cabinet and then reflected again by another routing mirror to Spectral Physics Tsunami Laser

## 3 Laser Safety

The Coherent Verdi V-10 laser is a solid state diode pumped frequency doubled laser system that is capable of generating 10 W CW optical power at 532nm. Direct and scattering light of the laser beam is capable of causing permanent

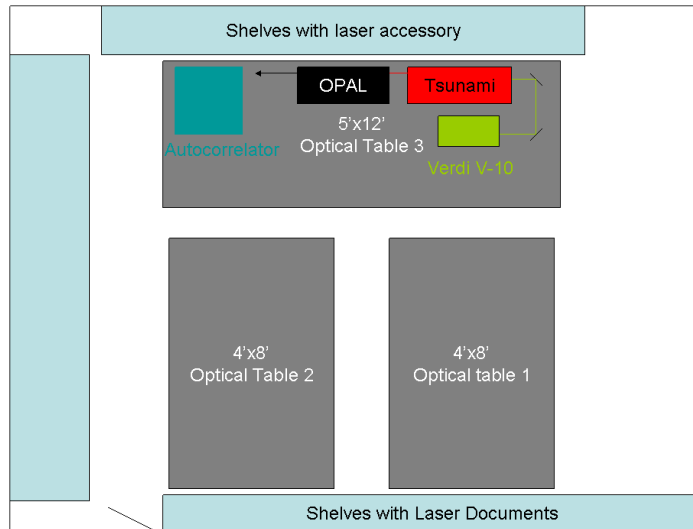


Fig. 1: Location of Lasers and documents

damage to eye if unprotected. The laser is also capable of causing fire hazard if direct or scattered beam hit a combustible material. To ensure the safety of the user and other coworkers in the laboratory, the following precaution is highly recommended:

- For alignment purpose, always wear the proper eyewear(OD 4@532nm), and give proper warning to everyone with access to the laboratory
- For normal operation at full power without enclosure, an eyewear of OD>7@532nm is required
- Enclose the laser beam path if possible
- Use low power(0.1W) for alignment
- Maintain the beam height at the current height if possible. If it is necessary to adjust the beam height for any reason, ensure that everyone with access to the laboratory knows the beam path of the laser.
- Always use beam stop for any unneeded beams
- Move any combustible material away from the beam path
- Close laser shuttle or set laser to standby mode if not in use
- Maintain a designated rapid egress
- Caution when using combustible gases or liquids in the area of the laser

- Avoid direct exposure to the laser light. The intensity of the beam can easily cause flesh burns or ignite clothing
- To reduce possibility of eye damage, maintain a high ambient light level in the laser operation area during normal operation.
- Avoid wearing reflective objects such as watch and jewelry while using the laser

#### 4 Locations of protective eyewear, documents and related accessories

- Laser eyewear “Laser Gard LGB” OD4@530nm, kept in shelf next to laser
- Printed manual at the file cabinet at the other side of laboratory.
- High power photodetector: Spectral Physics Thermocoupler Photodetector
  - On table 3, next to laser
- Autocorrelator, oscilloscope and function generator
  - on table 3

#### 5 Operating Authorization

To access this laser, one needs to take the Laser Safety Online Training program available on [http://www.des.umd.edu/risk\\_comm/edu/guide.html](http://www.des.umd.edu/risk_comm/edu/guide.html), obtain training from an experienced user of the laser and obtain the approval of the Laboratory PI.

#### 6 Maintenance

It is recommended to replace the distilled water in the chiller once every 6 months. Be certain that the water is replaced with distilled water only. Deionized water will cause metal in the heat sink to dissolve into the water. Clean the power supply air filter if it is dirty (refer to pg 6-31 on the manual for detail).

If laser output power cannot reach 10W or if the diode current is higher than nominal (<25A), run the LBO temperature optimization as described on Section Six of the manual (pg 6-29).

If there is an expected power outage or if the laser will be moved, be sure to cool down the LBO crystal as described on Section four of the manual (4-5). The process would take about 1 hour. When turning the power supply on again, the power supply will heat up the LBO crystal again. This process will take another 1 hour.

Unless for power outage or temporally disabling the laser for relocation , the laser power supply should remain on. Failing to do so could result in permanent damage to the LBO crystal.

## 7 Operation

Before turning on the laser, it is required that the water in the chiller is set to circulating at a temperature of 20°C, turn on the laser with the key at left side of the power supply and open the shutter. On the display, you should be able to see that the diode current ramp up as the laser warmed up and a message saying “Laser Seeking”. When the output power reaches 10W, the diode current should be around 24A and the “Laser Seeking” message will disappear. The whole process should takes no more then 10 minutes. It is recommended that you turn off the laser if you do not need to use it for more than 1 hour.

If it is necessary to adjust the output beam direction, for example during alignment process of the Tsunami laser, reducing the laser output power is strongly recommended. The laser output power can be reduced by turning the knob on the power supply counterclockwise. For your convenience, it is possible to save two output power on the power supply. To set a power setting, press “power level 1” or “power level 2” on the power supply. You should see the corresponding LED lit up, then turn the knob to the desired power and press the button again. After this setting is set, you can return to this output power quickly by pressing the corresponding button.