

## **Lasers**

### **Introduction**

The Lab uses several Laser in our various locations of varying power ratings. All Lasers should be considered dangerous and caution shall be taken when in use. No person should be operating any lab Laser system unless trained to do so and they have completed both the DRS training and tem specific training.

### **General**

Only trained personnel shall operate the laser systems they have been specifically trained on.

### **Precautions**

NEVER put yourself into any position where your eyes approach the axis of a laser beam (even with eye protection on). Do not direct laser emission towards other people. Do not damage laser protective housings, or defeat the interlocks on these housings. Never use viewing instruments to look directly into a laser beam or its specular reflection. Keep ambient light levels as high as operations will permit. Do not work alone when performing high power laser operations. Visitors should not be permitted to observe a laser experiment without first receiving a laser safety briefing and being issued laser eye protection.

### **Special Precautions**

Follow any pertinent safety precautions listed in the laser manufacturer's published owner's manual.

### **General Safety Practices**

Wear laser eye protection. Set up a temporary controlled area that restricts access to the nominal hazard zone. Post warning signs as required. When access cannot be adequately restricted, use partitions or curtains to prevent the beam from leaving the area. Work carefully. Take the time needed to service the laser properly. Remove only the minimum number of protective housings required to do the work. Replace the housings promptly when done. Use the lowest possible laser power. Use indirect viewing instruments or targets to align the beam. Do not look directly at a potentially hazardous beam or specular reflection. After servicing, reactivate all safety features.

### **Personal safety**

Eyewear must be of the correct optical density and offer protection at the wavelength(s) of the laser(s) being used. Eyewear will only protect your eyes for short time periods, depending on the laser power. Therefore, do not look directly into any laser beam, even with laser eye protection

on. Periodically inspect and replace damaged or defective eyewear. Check the Laser safety goggle checkoff sheet to see if this has been done recently. Check goggles yourself and initial and date the sheet.

## **Safety Practices**

Remember that some Laser wavelength used at NPL are no visible to the eye and therefore due caution should be taken to verify that the laser system is off before performing any maintenance or moving of components. If you must do alignment while the system is running use the lowest possible power, use protective goggles and use a device such as an IR laser card to locate the beam. Ask others to leave the area while working with optics during initial alignment but have one other person with goggles with you as a backup.

## **Emergency Procedures**

In case of accident turn off the system immediately and verbally indicate this for others. Secure the system and help anyone who may need assistance. Call 911 and stay in the area until help arrives. Do not dispose of protective gear in particular goggles as they may help determine the direction and level of beam during the incident.

## **First Aid**

Seek medical attention if you suspect Laser contact with your eye or in the case of high power systems with your skin.

## **Training**

Training will be provided by university personnel as needed.

## **Laser Alignment Procedure room 471**

- Make sure laser warning light on the door outside is turned on.
- Put on appropriate laser safety glasses and ensure that they have been inspected in the past 6 months for scratches.
- Clear optical table of shiny obstructions that can cause reflections.
- Work with an attenuated laser beam while aligning.
- Use beam blocks wherever appropriate. In most experiments with diamond defects, beam block should be placed behind diamond.
- Ensure correct dichroic mirrors are being used when performing confocal experiments on diamonds. Reflected light from dichroics must be isolated.
- Make sure all laser beam paths are terminated at the appropriate places before turning up the laser power.