

# **Laser Standard Operating Procedures**

## **Class 3B and/or 4 Lasers**

### **I. Scope**

- A. This document provides safety guidance for laser operators and spectators within the laser-controlled area.
- B. Procedures reflected herein are in accordance with applicable regulation parameters impacting the operation of the laser laboratory.

### **II. Responsibilities**

- A. \_\_\_\_\_ is responsible for the safety of this laboratory operation in conformance with this Standard Operating Procedure (SOP). In the absence of \_\_\_\_\_, \_\_\_\_\_ shall assume these responsibilities.
- B. Only trained laboratory laser personnel listed on the Laser Use Authorization and laser certified personnel from manufacturers may energize the laser or laser system

### **III. Beam Alignments**

- A. Secure all entrance(s) into the laser area.
- B. Locate all equipment and materials needed prior starting alignment.
- C. Use laser protective eyewear with proper OD and wavelength for alignment. Use skin covers (lab coat, gloves, and UV face shield) to protect users from UV laser beam scatter.
- D. Intra-beam viewing must always be avoided. Whenever possible use a low power alignment laser (class 2 or 3R), if none is available, use the lowest beam power available. If the wavelength is tunable, use the visible spectrum.
- E. If there are others in the room/laser area, make sure they are aware of the alignment in progress and each must have the same level of protection as the user.
- F. Keep optical table(s) clear of unnecessary objects which may cause unwanted reflections. Close the laser shutter if entering the beam path is necessary.
- G. Ensure all beam blocks, enclosures, and beam barriers are installed when the alignment is complete.

### **IV. Laser Controlled Areas**

- A. The laser hazards associated with this laboratory have been analyzed, and the controls specified for these hazards will reduce the risk to employees and the environment to acceptable levels.

- B. All entries into the laser-controlled area must be posted with the proper warning sign.
  - 1. Do not rely on closed doors as adequate security. Use key locks or activated interlocks on doorways into the laser area whenever possible.
  - 2. When the laser is energized, all entrances into the laser-controlled area must be secured to prevent unauthorized access. If there is a “laser on” indicator it must be used.
- C. An emergency procedure sign must be posted inside the laser-controlled area along with this laser safety plan/standard operating procedures near the laser or laser system.
- D. The laser beam shall be contained in the immediate area using non-reflective and non-flammable beam blocks and/or partitions.
- E. If there are vertical beam path(s), it must have barriers to mitigate the additional beam hazards.
- F. It is the discretion of the laser operator to allow or deny entry into the laser area while the laser is energized.
- G. If there are windows in the laser area, they must be blocked with opaque material that is non-reflective and non-flammable.
- H. If possible, position the laser so it is not at standing or sitting eye level.
- I. If the laser/laser system is key operated; do not leave the key in the laser when the experiment is finished.

## **V. Routine Laser Operations**

- A. Do not turn on the laser.
- B. Inspect the laser system before starting work. If there is anything out of place, correct it before moving forward.
- C. Obtain all necessary samples and tools for the experiment.
- D. If beam path selection is an option, i.e. flip mirror..., ensure it is done.
- E. Put on the proper laser glasses/goggles.
- F. Place sample ensuring everything is secure for data collection.
- G. Energize the laser.
- H. When changing samples, always shutter the laser or put it into standby mode before changing samples.
- I. Do not leave the laser energized and unattended.
- J. Once all work is complete, shutdown the laser and remove the laser safety eyewear.
- K. Clean eyewear, COVID safety measure.
- L. Add additional steps if the language above does not address the routine laser operation, otherwise delete this line.

## **VI. Non-beam Hazards**

- A. Laser dyes should be handled with care and proper protective equipment must be use (lab coat, safety glasses and gloves). If dyes

are to be mixed, it must be done in a well-ventilated fume hood. Dye pumps and storage must be in secondary containers.

- B. When working with high voltage, the “buddy” system should always be used. Trained CPR laboratory personnel are highly recommended.
- C. Compressed gas cylinder must be secured properly, and staff should be trained with the proper hazards and handling of the various gases.
- D. Attention should be given to protect against fire, especially with class 4 laser/laser system. Flammable solvents may be used in laser dyes or to clean components. Fire extinguishers (charged properly) should be kept in the laser area and staff should know how to use them.
- E. Good general house keepings can greatly improve safety from physical hazards. Cables should be secured to keep trip hazards to a minimum.

## **VII. Laser Maintenance**

- A. Only properly trained and PI approved personnel may service laser systems.
- B. All enclosures, interlocks, and safety devices must be replaced and verified operational prior to returning the laser to regular use.

## **VIII. Training**

- A. Individuals who use these equipment are required to take the [UCSD EH&S Laser Safety Seminar](#), shall be trained to recognize the intrinsic hazards of the particular laser system, are aware of basic safety information that relates to their job duties, and know the safe operating requirements for this activity.
- B. All operating personnel shall read and understand this standard operating procedure (SOP) and all applicable references stated in this SOP. Signatures of all authorized operators are required at the end of this SOP.

## **IX. Emergency Procedures**

- A. In an event of a laser emergency refer to the [Laser Emergency Procedure](#) posted in the laser-controlled area.
- B. In an event of fire or other emergency, evacuate and notify the UCSD police department by dialing 534-4357 (534-HELP).

**XI. Additional Safety Measures**

---

---

---

---

---

