

Standard Operating Procedures

Class 3B 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. Andrew Grieco is responsible for the safety of this laboratory operation in conformance with this Standard Operating Procedure (SOP). In the absence of Andrew Grieco, Yeshaiahu Fainman shall assume these responsibilities.
- B. Only trained laboratory personnel listed on the Laser Use Authorization in the laboratory and maintenance personnel from manufacturers may energize the laser or laser system

III. Beam Alignments

- A. Secure all entrances 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 (labcoat, gloves, and UV face shield) to protect users from UV laser beam scatter.
- D. Intrabeam viewing must always be avoided. Whenever possible use a low power alignment laser (class 2 or 3a), if none is available, use the lowest beam power available.
- E. If there are others in the room, make sure they are aware of the alignment in progress.
- F. Keep optical table(s) clear of objects which may cause unwanted reflections. Close laser shutter if entering the beam path is necessary.
- G. Insure all beam blocks, enclosures, and beam barriers are replaced 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.
 - 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. It is the discretion of the laser operator to allow or deny entry into the laser area while the laser is energized.
- F. If there are windows in the laser area, they must be blocked with opaque material that is non-reflective and non-flammable.
- G. If possible position the laser so it is not at standing or sitting eye level.
- H. If the laser/laser system is key operated; do not leave the key in the laser when the experiment is finished.

V. Non-beam Hazards

- A. When working with high voltage, the "buddy" system should always be used. Trained CPR laboratory personnel are highly recommended.
- B. 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.

- C. Good general house keepings can greatly improve safety from physical hazards. Cables should be secured to keep trip hazards to a minimum.

VI. 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.

VII. Training

- A. All users who use this facility are required to attend a laboratory safety orientation where they are trained to recognize the intrinsic hazards, are aware of basic safety information that relates to their work, and know the safe operating requirement for this activity. This orientation will be followed by an exam which the users must pass to obtain access to the facility.
- B. Additionally, internal users who use these equipment are required to take the UCSD EH&S Laser Safety Seminar and provide the certificate of completion as evidence.
- C. All external personnel are required to show laser safety training certificate from the specific institution and will be trained in the intrinsic hazards of the intended laser system.
- D. All operating personnel shall read and understood 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.

VIII. 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

Standard Operating Procedure Signature Form

The responsible individual shall verify and document that personnel working under the direction of this SOP understand and agree to comply with the safety plan before beginning work.

All individual listed below affirm that they have read and agreed to comply with the attached SOP.

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