



Laser System Standard Operating Procedures



All Principal Investigators are **required** to write standard operating procedures (SOP) for all laser operations involving Class3b and 4 lasers detailing alignment, operation, and maintenance procedures for each laser. The SOP should be available to all laser users in the laboratory and signed by each individual prior to the use of the laser.

This SOP shall address specific safety considerations during beam alignment, normal operations, servicing and any non-beam hazards that might exist. The key to any SOP is to keep it as simple as possible so that it can be used on a routine basis. Refer to the UCR laser safety manual and the laser safety training as well as ANSI Z136.1, which is available by contacting EH&S at 951-827-5748. This SOP does not take the place of site- specific laser safety training or the On-Line Laser Safety Training offered by UCR Learning Center <https://ucrllearning.ucr.edu> .

INSTRUCTIONS

Complete the SOP by first saving the file to your computer. Then fill in the information that is highlighted in yellow. Draft a layout of the laboratory showing the arrangement of lasers and beams within the lab. Use additional paper as needed. Write a detailed SOP for each registered laser and submit with form. You can tab throughout the cells of the table to automatically delete the instructions in these cells. *Do not change the information that is not highlighted in yellow.* After completing the SOP simply email it back to Radiation Safety ehsrad@ucr.edu .

LASER STANDARD OPERATING PROCEDURE (SOP)

SOP Date:

Laser Class ¹		Laser Type ²	
Laser Manufacturer		Laser Model	
Laser Serial / Id #			
Power Output(Watts or MilliWatts)		Wavelength(s) nm	
Location of laser			
Emergency Contact			

1. ANSI Hazard Class: See label on laser 2. Laser Type: Argon, HE-Ne, Dye

During Normal Operations of the Laser

Assure door remains closed and locked from the outside when laser is in use.

Note location of the following materials:

MATERIAL NAME	LOCATION (Building and Room)
Laser Safety Guidelines	
Copy of this SOP signed by all registered laser users	
Documentation of Laser Safety Training	
Manual for the Laser Listed Above	

<p>Assure the appropriate safety equipment is on hand. Specify the safety equipment needed (including any PPE).</p>

List the start-up procedure for the laser that will be used (including inserting the key, turning the power supply on, closing the shutter, activating the laser, etc. as specific to the laboratory).

Assure that a “Laser in Use” sign has been posted or turned on

How will the laser(s) be used in your experiments?

List emergency procedures (specific to the laboratory). Include procedures for evacuations, location of emergency procedure posting, location of safety equipment (eyewash, safety shower, fire extinguisher, etc.) and the location of the emergency shut-off switch.

List the emergency procedures (specific to the laboratory) here

List the shutdown procedure (specific to the laboratory laser). Include information on closing the shutter, turning the power supply off and turning the water off.

Insert the shutdown procedure (specific to the laboratory) here.

Remove laser activation key and store appropriately. Below list storage location of laser activation key (Building and Room).

Assure “Laser In Use” sign is no longer activated/posted when laser key has been removed and laser is off. Secure door to laser facility prior to leaving the area.

Non-Beam Hazards

Assure lasing media used, including laser dyes, have MSDS information in lab and personal protective equipment needed for handling lasing media or dyes (such as lab coat, safety glasses, and gloves).

Insert the name of any lasing media used with laser, the location of MSDS and the personal protective equipment needed for handling of laser dyes or media

Dyes should be mixed in a properly functioning fume hood and transported in sealed leak proof containers.

Insert location of fume hood used here

Dye pumps should sit in a secondary

Insert notation of any dye pumps or

<p>containment tray gases (greater than 5%) should be stored in a properly functioning gas cabinet.</p>	<p><i>concentrated halogen gases used here</i></p>
<p>All compressed gas cylinders shall be secured with two restraints at 1/3 and 2/3 from the bottom. Staff must be trained in the hazards associated with the specific compressed gases being used and have completed compressed gas safety training here: UC online Compressed Gas Safety</p>	<p><i>Insert any compressed gases found in the laboratory or used with the laser here along with date of compressed gas training for all personnel using the laser</i></p>
<p>Is any equipment under pressure (ie vacuum chambers) used as part of the laser set-up? If so, please list and address in: How the lasers will be used in your experiments on page 3 of the SOP. All pressure vessels over 125 gallons must be inspected. Contact EH&S Safety Engineer for information.</p>	<p></p>
<p>Pay special attention to flammable solvents that are often used with laser dyes and to clean optical components. Assure these solvents are kept out of the direction of the laser beam.</p>	<p><i>List storage of any flammable solvents used with laser dyes or to clean optical components.</i></p>
<p>Remember that poor housekeeping can create physical hazards</p>	<p><i>Insert any equipment or physical hazards that need addressing along with the control measures taken to remove any hazards from the working area here</i></p>

Notice: Only properly trained personnel shall work on high voltage systems (Electricians should be trained in CPR as a safety precaution). The “buddy” system should always be used when working on electrical systems.

Note the placement of fire extinguishers and assure the laboratory staff knows how to use extinguishers and the fire alarm system.

Safety interlocks shall not be permanently disabled.

Any servicing of lasers or laser equipment shall be performed according to the manufacturer’s information or by a vendor service staff. Prior to any servicing of the laser the appropriate ANSI warning sign stating “NOTICE – Laser Repair In Progress – DO NOT ENTER – Eye Protection Required” must be posted.

All enclosures, interlocks and safety devices must be replaced and verified operational prior to returning the laser to service. Removal of the ANSI warning sign stating

“NOTICE – Laser Repair In Progress – DO NOT ENTER – Eye Protection Required” must be removed after returning the laser to service

During Beam Alignments

Assure lab is secured and to avoid distractions mark the door with the following sign:

“NOTICE

– Laser Alignment in Progress – DO NOT ENTER – EYE PROTECTION REQUIRED.”

Prepare and locate all equipment that is needed to perform the alignment. A list of the equipment that will be used is listed below, along with the way the equipment will be used.

NAME OF EQUIPMENT NEEDED FOR ALIGNMENT	LOCATION OF EQUIPMENT TO BE USED	THE WAY THE EQUIPMENT WILL BE USED FOR ALIGNMENT

Answer the following questions:

Is the beam visible or invisible?	
Is special equipment needed to view the beam?	
Is the beam pulsed or continuous?	
If the beam is pulsed, can a single pulse be used to limit exposure hazard during alignments?	

Note: Use a low power alignment laser or the lowest beam power with appropriate laser protective eyewear.

Insert the requested information below:

List beam power or the type or low power alignment laser that will be used.	
List personal protective equipment (PPE) to be used during alignment. (Locate and inspect all PPE prior to use including lab coat, gloves, face shield, laser safety eyewear, etc.)	

Use the buddy system when performing alignments or let someone else know your location and check in with this individual on a regular basis.

Assure the optical table remains clear of obstructions during alignments.

Always close beam shutter when adjusting optics or entering the beam path. Make sure all optics are secured to the table prior to opening the shutter.

List Specific Steps To Be Taken During the Alignment of the Laser

Insure all beam blocks, enclosures, and beam barriers are in place when the alignment is complete.

When alignment is complete remove the “NOTICE – Laser Alignment in Progress – DO NOT ENTER – EYE PROTECTION REQUIRED” sign from the room entrance and assure the appropriate ANSI laser warning sign is in place and correct.

By filing this form you are acknowledging that the information represented in the Standard Operating Procedure above is completed to the best of your knowledge and you believe this information to be true, accurate, and complete. This SOP should be reviewed prior to each use of the laser or laser systems.

Operator Review

I have read and understood this procedure and its contents and agree to follow this procedure each time I use the laser or laser system.

Name (print)

Signature

Date

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