



NIRSC: Guidance for Laser Labs for the Safety Pause

Austin Roorda (chair) and the Non-Ionizing Radiation Safety Committee, October 2022

Introduction: There were 5 laser exposure incidents on the Berkeley campus between 7/12/2021 and 9/25/2022. This is an unprecedented increase in exposures. One incident led to minor, but permanent, retinal damage in a student. For each incident, there were violations of Standard Operating Procedures (SOPs) and/or adherence to UC Berkeley's requirements on laser use. In response to this uptick, a special effort is being made by EH&S, VCR, and all the UC Berkeley safety committees to "*promote engagement by PIs and reset expectations around safety*". In addition to the mandatory laser use pause on November 9, a safety message from the VCR and chairs of the campus safety committees to all laboratory PIs will be sent in late November. NIRSC and EH&S are also preparing an update to the [Laser Safety Manual](#) that will mandate similar procedures that are listed in this guidance to be done yearly.

Action: All PI's who run labs that involve the use of lasers must hold an **in-person** meeting with the sole purpose of addressing laser safety issues in the lab. The meeting will be a formal opportunity for the PI to personally ensure that everyone is up to date on training, that all LUA's are in place and up to date and that all SOPs are complete and have been read and signed by all laser users in the lab. Importantly, the meeting will also involve identification, discussion and mitigation of specific laser hazards in the lab. These specific laser hazards are often not ones that general training outside of the lab can help the user identify. A representative EH&S laser safety specialist may attend the meeting. Each PI must prepare a detailed agenda for the meeting. The agenda must be distributed to each laser user in the lab in advance of the meeting. The meeting agenda must include an [attendance sheet](#) that each lab attendee can initial to acknowledge participation. After the safety meeting has been held, PIs should then submit the following [attestation form](#).

The minimum meeting agenda requirements are:

1. Roll call to ensure that all laser users are present.
2. Introduction of meeting by the PI who will express the purpose of the meeting and stress the importance of laser safety and maintaining a culture of lab safety.
3. Check that everyone in the meeting has completed [laser safety training](#).
4. Review of the inventory of all lasers in the lab and their locations. Check that all lasers have a LUA.
5. Review of all SOPs and check that all SOPs have been read and signed by specific laser users.
6. [Walk-through of each laboratory](#). This can include all lab members or, at a minimum, all those who use the lab and are therefore listed on the LUA for the lab. The walk-through should be led either by the PI or by the most experienced personnel for that lab (e.g., lab tech, senior postdoc, or senior grad student).

The walk-through needs to include the following (a longer and more specific checklist of the walk-through is included as an [appendix](#)):

i. Engineering Controls

1. Explanation and identification of the potential hazards in each lab by the PI or one or more of the expert users from that lab and what measures are taken to mitigate them.
2. Improvement of protection measures from potential hazards where appropriate.

ii. Administrative Controls

1. Identification where the laser safety signage is posted
2. Identification of where the SOPs are posted.

iii. Personal Protective Equipment (PPE)

1. Identification of where the PPE is located.
2. How to choose the appropriate PPE?

- Hearing of all questions or concerns from any member of the laser user group.
- Signing of an attestation by PI that (i) all laser users have participated in the meeting, (ii) all laser users, including PI, have read the [Laser Safety Manual](#), and (iii) that ~~DOODVHEM~~ will employ safe practices and adhere to the SOPs. The PI is responsible to keep signed attestations for review by LSO.

Rationale: Although the University provides support, basic training, policies and their enforcement for safe laser usage, the primary responsibility for running a safe lab and instilling a culture of safety has to come from the lab PI. These meetings will serve as an important reminder of the PI's responsibility.

Enforcement: We understand that not all PIs and all laser users will be able to complete these 'safety pause' requirements by the mandated '**Laser Free Day**'. Nevertheless, the NIRSC mandates that everyone participate in these activities and attest to that by the end of the Fall 2022 semester. **Each PI must [submit an attestation](#) that they have organized such a meeting before the end of the Fall 2022 semester.** Failure to provide proof of compliance with these requirements will result in suspension of lab activities.

Walk-through Appendix on next page >>

Walk-through Appendix



General Topics for Walk-through:

- How to power up and shut down the system safely
- Check around system for stray light
- Check that all optomechanical devices are firmly mounted to the table.
- Provide refresher training on the most effective and safe alignment methods (CCD cameras, IR cards etc.)
- Work with the group to identify specific danger spots: open beams, vertical beams, high power beams, high-voltage components (laser power supplies) near points that can develop water leaks.
- What changes have been made to the system (e.g., new laser systems, beam paths, ...)? Do they pose new hazards? Are they described properly in the SOP?

Specific Items for Walk-through:

Engineering Controls

- Laser blocks, curtains and their function in different modes of operation (alignment vs. regular operation)
- Interlocks
- Beam dumps
- Beam tubes
- For the above identify for different modes of operation or for specific experiments which parts can be altered vs. those who should never be altered
- Emergency shut-off switches

Administrative Controls

- Are the correct signs posted?
- Where are the signs posted?
- What signs are posted all the time, what signs are posted during alignment?
- Where are the SOPs kept? Are they up to date? Have they been signed by all laser users?
- What to do in the case of an emergency?
- What is the procedure in a group with multiple users to hand over responsibility between experiments?

Personal Protective Equipment

- Where is the PPE?
- Is the eyewear in good shape? Purchase new eyewear if needed.
- Are they sufficient for all lab personnel (i.e. can they fit over someone's glasses)?
- What do the numbers mean on the laser eyewear?
- What type of eyewear to use and when?
- When can eyewear be removed?
- Discuss relation of laser-specific PPE to other PPE, for example, how to handle laser-safety PPE when wearing a blast-protection face-shield or when handling chemicals that require chemical-safety PPE in addition.