The purpose of this newsletter is to keep laser operators on campus informed regarding laser safety news, bargains on laser safety equipment (including protective eyewear), methods for controlling laser hazards, lessons learned from laser accidents, and other tips to improve safety. These newsletters are distributed approximately every 6 months or whenever a laser safety issue with significant urgency arises. For past issues of this newsletter, please visit the UC Irvine Environmental Health & Safety website (www.ehs.uci.edu) and look under “Radiation & Laser Safety”.

Historically, the likelihood of having a laser accident occur in a research lab is strongly related to the frequency of laser use in the labs involved, but in a somewhat surprising way. It turns out that laser accidents are most likely to occur in labs using lasers very often (daily to several times a week) and in labs that use lasers very infrequently (for example, only a handful of times per year).

This pattern makes sense when you think about it. The more often potentially hazardous equipment is operated, the more exposure to it, and thus the likelihood of an accident increases. Adding to this is the problematic effect of complacency. Persons who have worked with lasers a lot in the past with no problems often assume that since they have gotten this far with no accidents, they won’t be having an accident, and they take down their guard. That can be very dangerous.

Persons who use lasers very infrequently can forget to perform safety-related steps in their procedures, thus increasing the hazard. In some cases so much time has gone by between laser experiments that laser safety equipment (such as protective eyewear) has been misplaced or buried in the lab, or the experienced laser users have graduated leaving relative novices behind to fend for themselves. This can also lead to serious safety problems.

Regardless of how often lasers are operated in a lab, lasers users need to maintain a healthy respect for their laser systems and the potential harm that they can do. If you operate lasers frequently, try to avoid complacency and remember that accidents can happen to anyone unless sufficient caution is exercised. If you use lasers rarely, and need assistance with safety or procedural questions, or if your safety equipment is missing, ask for help before launching into your experiments.
LASER SAFETY REFRESHER TRAINING

Once laser users at UC Irvine have completed the Laser Safety [Online] course, they are not required by EH&S to take the course again for 5 years. The reason for this re-training frequency is because graduate students normally finish up their experiments by 5 years into their graduate-level studies, and thus they would not be required to take the course a second time. However, it is a good idea to re-take the course as a laser safety refresher more frequently since the course is updated by EH&S periodically and sometimes people need to be reminded of the laser safety controls discussed in the course.

The Laser Safety [Online] course is currently available at the UC Irvine Training & Employee Development (TED) website (www.ted.uci.edu). However, sometime this summer the course will likely be shifted to a new learning management system (LMS) that the University of California has purchased for system-wide use. Once this change occurs, for a while those accessing www.ted.uci.edu will automatically be re-directed to the new LMS. Later, the web address for the new LMS will be widely publicized and the TED link will be removed.

FLASH BLINDNESS HAZARD

There are many low-power, visible beam, continuous wave lasers used at UC Irvine. These are mostly HeNe and diode lasers emitting red light with output power below 5 milliwatts (mW). There are also cases in which much higher power visible-beam lasers are operated with greatly reduced power, generally for beam alignments. This most commonly occurs with frequency-doubled Nd:YAG lasers emitting green light.

Exposure to continuous wave, visible laser radiation at power less than 5 mW is not likely to cause an eye injury due to the blink reflex/aversion response to bright light stimuli that terminates the eye exposure within about 0.25 second. However, eye exposures that brief can still cause momentary, disorienting flash blindness that can lead to tripping and falling hazards. This is especially the case when room lights are lowered or off during laser use (this occurs frequently on campus). If you do suffer flash blindness, avoid walking around the room until your vision has been satisfactorily restored. Then make sure the safety problem that produced the stray laser radiation off the optical table is corrected immediately.
Of course, flash blindness can also occur with eye exposures to dangerous, higher-power laser beams that are capable of causing eye injuries. If you are operating a hazardous laser (average output power > 15 mW) and notice a flash of light in your eye (this can even occur with invisible near-infrared beams, surprisingly), then immediately power-down your laser, label it as unsafe for use without corrective actions, and then seek medical attention in accordance with the UC Irvine Injuries and Medical Treatment poster (http://www.ehs.uci.edu/MedEmergPoster.pdf). Some eye injuries might not be readily apparent to you after the exposure (no pain, no apparent blind spot), but seek medical attention anyway just to make sure that no damage was done to your vision.

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REMOVE UNUSED SHINY ITEMS FROM THE OPTICAL TABLE!

Always remove unused mirrors and other unneeded reflective items from the optical table before operating a laser. At a minimum, make sure that the unused optics are well away from the beam area. This should be done in order to avoid any additional sources of stray laser radiation off the plane of the optical table.

Optics are not the only potential sources of unwanted reflections. Other sources can include shiny tools, shiny instruments, and even reflective items worn on hands such as wristwatches and rings. Always be alert to these sources of unwanted reflections!

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MEMORABLE QUOTE

“That theory is worthless. It isn’t even wrong!”
Wolfgang Pauli (1900–1958), Austrian Physicist
LASER CURTAINS

The use of laser curtains is an excellent means of optically isolating laser use areas from other areas of a laboratory, including other work areas and desk areas. Of course, it is necessary to remember to close the curtains before lasers are operated, and a laser warning sign needs to be posted on the curtains informing persons in the lab that laser work is underway and not to enter without protective eyewear. Laser curtains can be purchased from laser safety vendors, including the following:

http://www.wilsonindustries.com/laser_curtains.htm

http://www.beamstopr.com/

http://www.lasersafetyindustries.com/Laser_Safety_Banner_and_Curtains_s/2.htm


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If you have any questions concerning laser safety, please contact Rick Mannix from EH&S (949-824-6098; rcmannix@uci.edu).

BE SAFE!