



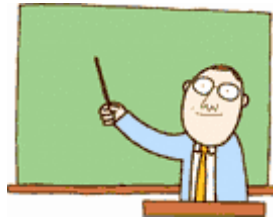
UC IRVINE LASER SAFETY NEWSLETTER

VOLUME V, #1

February 8, 2005

Editor: Rick Mannix; EH&S -- UCI Laser Safety Officer

The purpose of this newsletter is to keep laser operators on the UCI campus informed regarding laser safety news, bargains on laser safety equipment (including protective eyewear), novel/inexpensive methods for controlling laser hazards, lessons learned (laser accidents), tips to improve safety, etc. 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 Environmental Health & Safety website (www.ehs.uci.edu) and look under "Radiation & Laser Safety".



LASER SAFETY TRAINING

Currently, EH&S laser safety training is conducted through one-hour **Laser Safety Seminars** that are presented every 3 months at the EH&S Services Facility. The goal of this training is to inform UCI laser users about the general aspects of laser safety including the properties of laser radiation, biological effects, the laser classification scheme, laser hazard control measures (including protective eyewear), lessons learned from past laser accidents, and the behavioral aspects in laser safety. *This training class is not a substitute for the laboratory-specific/hands-on training needed by new laser operators in their laboratories.*

The analogy of driver education vs. driver training can be used to compare the relative contributions of EH&S laser safety training and the laboratory-specific/hands-on training. EH&S laser safety training is provided in a classroom setting without any hands-on activities. This seminar gives the laser user some very useful information about laser controls and hazards but includes nothing about laboratory-specific laser operation, such as the alignment procedure for the particular laser you will be using.

Novices who go directly from an EH&S Laser Safety Seminar into a laser laboratory believing that they are completely versed in the safety aspects specific to the laser procedures they will be performing are making a mistake.

Using the analogy mentioned above, nobody learns how to physically drive a car in classroom-type driver education training. Hands-on (driver training-type) instruction, presented by experienced personnel familiar with the specific lasers used in the laboratory, is the most critical element of laser use and safety training.

Sometime during the Spring Quarter of 2005 it is hoped that EH&S laser safety training will be available on-line via the EH&S website. All PIs who have lasers and their principal technicians will be notified once this training program is ready to roll out.



MEMORABLE QUOTE

"A subtle thought that is in error may yet give rise to fruitful inquiry that can establish truths of great value."

Isaac Asimov (1920 - 1992) US science writer, science-fiction writer



NEAR-INFRARED ULTRAFAST LASERS

We have had three laser accidents at UCI during the past 11 years that resulted in permanent eye injuries. These accidents had several things in common including the fact that all of the lasers involved emitted invisible near-infrared radiation and were repetitively-pulsed, ultrafast lasers (pulse durations on the order of nanoseconds to hundreds of femtoseconds).

Q-switched and mode-locked lasers, by their very nature, present the greatest risk to vision. When ultrashort laser pulses strike the retina, they can produce acoustic shock waves, bleeding and pain, often resulting in a permanent loss of vision.

There are a variety of ways that you can mitigate the risks associated with the operation of near-infrared ultrafast lasers. Some of those are listed below:

- 1) **Wear protective eyewear whenever the laser is operated.** Since you cannot see the beam, it becomes even more important to use protective eyewear! *[Sometimes with visible-beam lasers, the radiation must be visualized and protective eyewear is not worn for that reason. Other safety controls are implemented in such cases.]*
- 2) Use a low-power, visible-beam laser to align the optics for the invisible-beam laser system. This could be a HeNe laser or perhaps a diode laser. Laser pointers are inexpensive and have been used in some laboratories for beam alignment of invisible-beam lasers.
- 3) Always contain the beam on the plane of the optical table. **Never direct the beam upwardly or across walkways!**
- 4) During beam alignment, reduce the output power as much as possible. Use beam cards or infrared viewer scopes, when practical.
- 5) Enclose the beam to the greatest extent possible.
- 6) **Never leave the room when a laser is operating.** This is particularly true for invisible-beam lasers! People can happen upon the laser and become injured.



INAPPROPRIATE USE OF LASERS

I have received several reports in the past regarding the unsafe, misuse of lasers. In one case, persons in a laboratory were using a high-power laser to pop balloons. In another instance, a laser was used to light a cigarette. Several reports of laser light shows in research laboratories have been received. Lasers are also used as toys by children and teenagers. I purchased one such “toy” at my local Target. It includes a Class 3a laser labeled as a “*Laser Pointer in See-thru Jelly Bean Colors; No dot, more fun!*”.

It is never a good idea to use a laser for amusement. In such cases, laser safety normally goes out the window and accidents can easily occur. If you observe persons in your research group using a laser inappropriately, inform your PI or the laser supervisor immediately or contact me (949-824-6098; rcmannix@uci.edu) and I will address that issue for you.



MEMORABLE QUOTE

“The secret of creativity is knowing how to hide your sources.”

Albert Einstein (1879 - 1955) Physicist

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

 **BE SAFE!**