



UC IRVINE LASER SAFETY NEWSLETTER

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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 substantial immediacy arises. For past issues of this newsletter, please visit the Environmental Health & Safety web site under "Radiation & Laser Safety".



SUPERVISOR JUDGEMENT IN LASER SAFETY

An intangible but critically important laser safety issue has to do with the mental readiness of laser operators to perform their studies. If a graduate student was awake the entire night studying for a final examination, that person would be a poor choice to operate a hazardous open-beam laser the following day. If a technician enters the laboratory very upset because another vehicle just side-swiped his new car, he would likely not be in a proper state of mind to perform operations in which a high level of concentration is needed. If a laser technician appears to have a health condition such that he/she may be on a drowsiness-inducing medication, then it would be best to have him/her do less hazardous work.

The common thread among these examples is that not all persons who show up at a laser laboratory are fit for duty. It is up to the judgment of the Principal Investigator or laser supervisor to prevent those who are temporarily impaired from operating hazardous lasers and possibly injuring themselves.



ON-LINE LASER SAFETY TRAINING

In the past, laser safety training at UCI has primarily been conducted via Rick Mannix's Laser Safety Seminars and during visits to laser laboratories. On-line laser safety training is presently under development and should be ready for viewing in about 6 months. It will consist of a series of slides and a short competency quiz. Persons who view the slides should have little trouble with the quiz. It is hoped that all laser operators will complete the on-line training within two months after it is made available on the EH&S website. You will be notified when it is ready for viewing.

A Microsoft Powerpoint® version of the slides has already been prepared. If any laser operators wish to view the training program prior to it being posted on our website, please contact Rick Mannix at (949) 824-6098 or rcmannix@uci.edu.



MEMORABLE QUOTE

"I think there's a world market for about five computers."

Thomas Watson, founder of IBM



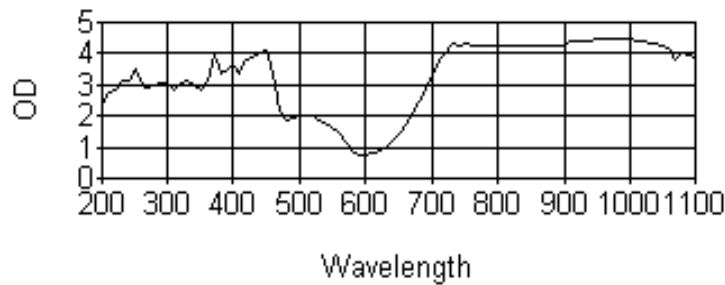
VISITORS TO LASER LABORATORIES

It is always a good policy to exclude casual visitors from laser laboratories while lasers are operating. While laser operators are cognizant of the hazards present and are trained to safely manage them, visitors often are not familiar with the hazards and can thus get into trouble. Casual visitors in this context include friends, family members and other laboratory personnel not schooled in laser safety and unfamiliar with the laser procedures being performed. It does not include persons whose visits are approved by the Principal Investigator or laser supervisor and who are escorted through the laboratory when conditions are safe enough to do so. *{Note: It is a good idea to have extra protective eyewear available for use by approved visitors, when needed.}*

A Laser Safety Officer from another institution reported the following unfortunate story of an unauthorized visitor to a laser laboratory. The laser operator was working with an open-beam Class 4 Argon laser at the time; he was wearing appropriate protective eyewear. He heard a knock at the locked door, and it was a friend of his asking if he wanted to go out to lunch. As bad luck would have it, the phone in an adjacent office rang at just that instant, and the laser operator permitted his friend to enter the laser laboratory while he answered the phone. Due to the “gee-whiz” factor regarding the pretty blue-green light, the friend moved in to get a closer look at what was going on. In so doing, his head entered a dangerous area (*due to considerably less than ideal beam control by the operator*) and he suffered an eye injury.

Always make sure that only persons who need to be in the immediate area during laser manipulations are present; there is no sense in putting other people potentially in harm’s way.

Nd:YAG-Diode-Harmonics Alignment



LASER ALIGNMENT EYEWEAR

It is beneficial to be able to see the laser beam when visible-beam lasers are aligned, and thus, protective eyewear capable of attenuating the full-power beam is often not worn. Ideally, the beam power should be reduced as much as possible during alignment, since it is during that process that the majority of laser accidents occur. However, even at relatively low average power, Q-switched and mode-locked laser radiation can still present significant eye hazards.

Many laser eyewear vendors sell *alignment spectacles and goggles*. That type of eyewear has a low enough optical density such that some protection is afforded to the wearer, but the beam will often still be visible. The optical density (OD) graph above is for one type of this eyewear, in this case, for aligning a doubled Nd:YAG (532 nm) beam. The optical density at 532 nm is on the order of 1.5, meaning that about 97% of the radiation at that wavelength is absorbed and about 3% is transmitted through the eyewear. That degree of transmission is often consistent with some visibility of the laser beam. [Protective eyewear that affords complete protection for 532 nm radiation normally has an optical density of 4 or greater {less than 0.01% of the light is transmitted}.]

If you would like information about alignment eyewear for your visible-beam laser (*normally this includes Argon, Krypton, Diode, Helium-Neon and frequency-doubled Nd:YAG lasers*), you can contact Rick Mannix as shown below.



MEMORABLE QUOTE

"Prediction is very difficult, especially about the future."

Niels Bohr

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

 **BE SAFE!!!**