**A laser safety manual should be requested and placed in a clearly visible location in each lab**.

Inside the manual are two forms to be completed. One registers each laser (the first sheet only is to be completed). This should be forwarded to Thomas Haley ([THHaley@caps.usc.edu](mailto:THHaley@caps.usc.edu)), the USC radiation safety officer, and a copy kept in the manual. The second form defines the designated student or postdoc (there should be one per group charged with laser safety) and the contact information for the principal authorized laser operator (this should be the group P.I.)

**New students interested in joining a laser group should take the laser safety class.** Corey should poll students and then organize a laser safety training session with Thomas Haley to coincide with the normal incoming student safety orientations.

As part of the laser safety training, a baseline eye exam should be arranged.

**Current students** already have detailed training with respect to the specific laser system they will be using for research. Details of that training are attached. If an existing graduate student wishes to have a baseline eye exam, they should contact Corey Schultz to take the next basic training course which entitles them to an eye exam.

An **annual refresher course** should be conducted. This may be in the form of a written sheet, a discussion at a group meeting, or laser safety briefing delivered by Thomas Haley. There should be a form to record the presence of each student at this annual refresher class signed by each participant.

The policies that the department laser groups follow are given on the attached document. These attachments as well as this document are to be maintained on the department web site intranet.

**Laser Safety Guidelines for Department of Chemistry**

Appropriate laser goggles will be furnished for each laser system. They should be placed in a clearly visible location and made available to any visitor to the lab.

Back-reflections from optics and mounts are the principal hazard in a research laser lab. Students must familiarize themselves with any optical arrangement. Think carefully about directing each back reflection downward onto the table or preferably into a beam dump.

Near-infrared and mid-infrared radiation, invisible to the eye, presents a significant hazard. In addition to wearing laser goggles, students and postdocs working in labs with such lasers must be familiar with the optical set-up and beam paths to avoid exposure.

Infrared cards (laminated cards with a surface sensitive to IR radiation) should not be used. Reflections from the laminated surface can cause eye injury.

For high-power laser system, the hazard is not limited to eye exposure. Appropriate beam blocks should be used to stop the beam where needed. Skin burns may result from exposure, as well as potential fire hazard if flammable materials such as plastic or organic solvents are placed in the beam path.

Manufacturers’ laser manuals should be shelved with the USC laser safety manual. Each manual contains specific safety information relevant to that system.

A notice about laser safety should be posted on the laboratory wall. Signs indicating laser radiation (and the class) should be posted.

Each laser system is to be registered with the USC laser safety office.

There should be a designated student/postdoc for laser safety in each laser group. That person should follow these guidelines and inform the University Safety office of new or upgraded lasers, or the transfer of a laser to a different laboratory.

**Current procedures for training of students with respect to laser safety:**

Each student is trained as to the theory and practice of operation of specific lasers found in their laboratory. This training comes from the professor, postdocs and senior students within the group and from training provided by the laser manufacturers at the time of installation and system repair. In addition, laser manuals are required reading for new students.

A “refresher” training session is provided once a year. Laser safety is emphasized and possible eye injuries are described. Common scenarios that may lead to possible hazards are described. For example, all laser systems must be run with lids in place.

New students are told that visitors may not enter the laboratory.

Laser systems found in Seaver Science center are (i) *ns* pulsed Nd:YAG and Nd:YLF lasers, pulsed excimer lasers, tunable dye lasers, and tunable optical parametric amplifiers, (ii) continuous wave ring dye and Ti:sapphire lasers and (iii) *fs* Ti:Sapphire oscillators and regenerative amplifiers pumping *fs* and *ps* optical parametric amplifiers. The latter lasers involve CW and pulsed doubled Nd:YVO4 sources. Each of these system types have specific guidelines as to safe usage. Students are also trained in the use of non-linear optical frequency conversion devices such as doubling crystals, Raman shifters, and four-wave mixing apparatus.