Laser Safety

Laser is an acronym that stands for **L**ight **A**mplification by **S**timulated **E**mission of **R**adiation. Lasers emit radiation in the infrared, visible, and ultraviolet light spectrums, and they pose unique hazards that require the use of specialized safety equipment and procedures.

What are the Classes of Lasers?

Lasers are classified based on their potential to cause eye/skin injury. Lasers are classified into five types. Before operating a laser, it is critical to understand its class. Even Class 2 lasers (e.g., laser pointers) can be hazardous if the manufacturer's instructions are not followed. The following are the main classes of lasers:

- **Class 1:** Class 1 lasers are not hazardous to the eyes under normal circumstances. However, when viewed under magnification, class 1 lasers can cause eye damage (e.g., DVD devices and laser printers).
- **Class 2 (Low Power Lasers):** Class 2 lasers have more power than a class 1 laser, but the normal blink reflex should protect your eyes (e.g., range finding equipment).
- **Class 3R (Medium Power Lasers):** Class 3R lasers emit up to 5 times more power than a class 1 invisible laser and up to 5 times more power than a class 2 visible laser. Class 3R can cause spot blindness, eye injuries, and/or skin burning.
- **Class 3B* (Medium Power Lasers):** Class 3B lasers can cause serious damage to the eye if the beam is viewed directly.
- **Class 4* (High Power Lasers):** Class 4 lasers are the most powerful lasers. Class 4 lasers can damage eyes, burn skin, and start fires (e.g., lasers used in surgery, research, and industrial applications).

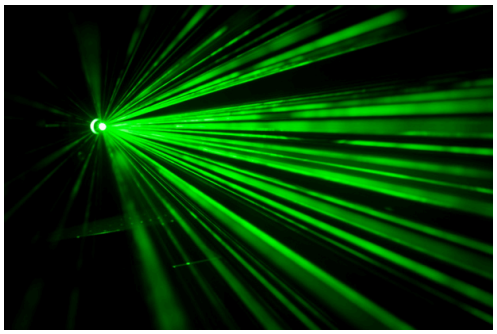
***Approval from the Laser Safety Officer must be obtained before purchasing Class 3B and 4 lasers.**

How Can I Protect Myself When Working with Lasers?

- Complete the laser SOP and laser safety training.
- Wear the proper PPE including laser safety eyewear, a lab coat, and clothes made from non-flammable materials. Additional PPE may be required depending on other hazards present.
- All areas where lasers are used must be pre-approved by the laser safety officer and inspected to ensure it does not contain any reflective surfaces.
- Post proper signage in and around the laser operation area and ensure access to laser area is secured.
- DO NOT operate a laser if you are fatigued, tired, or have impaired judgment.
- Once the use of a laser is complete, the user must turn the unit off and remove the key. The key should be placed in a secure and controlled location.
- Remove any unnecessary clutter and trip hazards before operating a laser.
- Practice good housekeeping to ensure the safest possible work environment.

Key Safety Precautions for Working with Lasers

- Review the procedures before operating the laser and ensure that control measures are in place.
- Conduct an inspection to ensure that there is no physical damage or missing parts.
- Ensure that the beam path is clear of anything except the intended target.
- NEVER aim the laser beam anywhere except the intended target.
- NEVER look directly into the laser beam.
- Make sure that your laser safety eyewear has the appropriate optical density.
- DO NOT bring potentially reflective equipment or tools into the laser room.
- Only personnel that have the required training may operate lasers.



References

- OSHA: Technical Manual - Section III: Chapter 6 - Laser Hazards
- OSHA: Laser Hazards
- SJSU Laser Safety Plan

Need Help?

- **Ask the lab/shop supervisor**
- **Ask the Laser Safety Officer: skye.kelty@sjsu.edu 408-924-1978**
- **Ask SJSU Environmental Health & Safety ehs@sjsu.edu**