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LESSON LEARNED

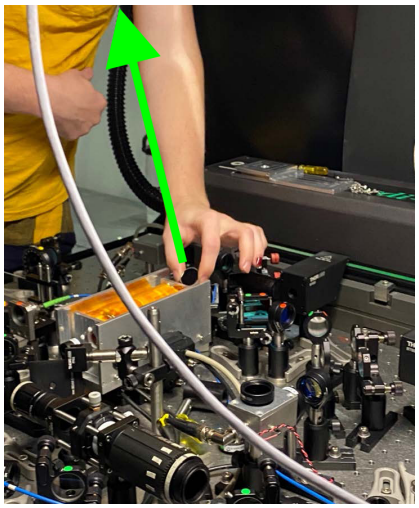
Berkeley UNIVERSITY OF CALIFORNIA EH&S OFFICE OF ENVIRONMENT, HEALTH AND SAFETY

Laser Eye Exposure from a 1 Watt Class 4 Laser Beam

What Happened?

A researcher was exposed to a 1 watt continuous wave beam from a Ti-Sapphire (852 nm) laser while visually inspecting a non-linear crystal on the optical table with a dielectric mirror. The researcher was unaware that the beam was present and it was directed into their right eye. The researcher was not wearing laser eye protection because they thought the laser was off.

Shortly after finishing the visual inspection, the researcher noticed a spot in their field of vision and realized that they had been exposed to the 852 nm laser beam. The researcher was seen at the Tang Center Optometry Clinic and a clinician confirmed a laser eye injury.



Beam Direction

What went right?

- The researcher was seen by an optometrist at the Tang Center Optometry Clinic within 24 hours of the incident.
- The researcher alerted their professor after they had been exposed to the laser beam.
- The professor contacted Environment Health & Safety (EH&S) Laser Safety to inform them that there had been a laser eye exposure incident involving one of their staff.

What should be done differently?

- The researcher should have verified that no beam was present on the optical table before performing any work. Presume lasers are on until you can validate that they aren't.
- Local laser in-use indicators should have been used to show whether the laser was active.
- The researcher should have worn laser eye protection.

What was the cause of the eye exposure?

The researcher was not wearing appropriate laser eye protection when they placed a dielectric mirror in the beam path of the 1 watt continuous wave beam (852 nm) to visually inspect the end of a non-linear optic component. The dielectric mirror directed the laser beam into the right eye of the researcher.

The root cause of this incident was researcher's lack of awareness that the Ti-Sapphire laser was in operation, that the 852 nm beam was present in the optical layout, and they were not wearing appropriate laser safety eyewear.

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What corrective actions will be taken?

- Installation of local laser in-use indicators to indicate what lasers are active or inactive on the optical table.
- Laser use procedure has been modified to include protocols for safety checks prior to working on the optical table.

Lessons Learned

- Install laser in-use indicators (e.g., light or signage) on optical tables to indicate if laser(s) are active or inactive. If you have multiple beam lines, a status board may work better.
- Verify laser and beam operational status prior to any optical table manipulation/work.
- Use remote viewing cameras to view or inspect optical beam paths. Selfie sticks are helpful to get to hard-to-reach places on large optical tables. Removing the infrared (IR) filters from digital cameras is a great way to make a near-IR viewer. For visible wavelengths, like 532nm, the color shift from what your camera sees to what is displayed on the screen will allow you to keep your laser safety eyewear on.
- Laser standard operating procedures (SOPs) shall be reviewed for operational accuracy and have detailed procedures on conditions when laser eye protection is required to be worn.

More information about Laser Safety can be found on the **EH&S Laser Safety web page**.

For additional assistance, contact the **EH&S Laser Safety Officer**.