

## Lesson Learned Briefing

**No.:** LL18-0005

**Title:** Manual Insertion of Devices Into Beam At Angle Can Cause Reflections

**Event:** LBNL Event

**Event Date:** 03/06/2018

**Category:** ESH-Laser - All Laser Users

### Lesson Learned Statement:

- Low-power operation should not result in relaxation of vigilance. Most laser incidents occur during low-power operation. Consistent use of laser goggles can prevent injury if unexpected reflections occur.
- Changing the position of the lenses and optics should be discussed carefully before they are moved or tilted. Attention should be paid to tilted optics and possible beam change direction should be carefully considered. Laser users should avoid standing at the possible changed beam path.
- Prior to inserting any object into the laser beam path, nearby researchers should be notified and the laser should be blocked. After insertion and unblocking the laser beam, look for any stray beams and block if detected.
- Filters and other optics should be verified as undamaged, appropriate to the laser energy, and mounted before the beam is propagated. Lowering and raising filters into and out of the beam line by hand has a strong potential for unintentional reflection or redirection of the beam by the filter. Introducing filters by hand should be discussed with the Laser Safety Officer and performed

only when determined to be necessary based on unique configuration of the experiment.

- Suspected exposures or concerns must be reported to the supervisor, Laser Safety Officer, and Division Safety Coordinator at the first occurrence. All researchers have the authority to stop work when an incident such as observation of unexpected laser light occurs. Immediate investigation and discussion can prevent additional incidents.
- Persons experiencing known or suspected laser exposures must report immediately to Health Services. LBNL Health Services must immediately direct the potentially injured person to appropriate medical evaluation by onsite or offsite optometrist, ophthalmologist, or Emergency Room physician.
- Laser users must read, understand and accept the hazard controls of all Work Planning and Control Activities for which they are listed and complete On-the-Job Training, including observation of laser use techniques and following procedures. Experienced workers should continue to observe the work of new people, and pause work to provide guidance when needed.

### **Discussion:**

#### Incident Details:

On March 6, 2018, a visiting researcher was aligning an 810nm beam at low power (8mW average power, 1kHz frequency) in Argon gas under 1.5-2 Bar pressure. Two LBNL researchers were observing the alignment. All three researchers were wearing laser goggles appropriate to the wavelength and beam power. The visiting researcher inserted an absorptive filter, holding it by hand, to attenuate the beam. The filter was tilted at an angle during introduction into the beam. The LBNL researcher standing at 2 meters on the other side of the table saw a bright white beam through his goggles. Work was paused and the researchers discussed the incident.

A similar event occurred on March 13, 2018. The visiting researcher was manipulating a 20 degree tilted Plano Convex 250 mm lens in a beam. The LBNL researcher standing at the short length of the table observed a beam reflection.

On March 15, the incident was reported to the Principle Investigator. Work was stopped, the Laser Safety Officer was contacted and performed an investigation, and the researcher who observed the unexpected light received medical evaluation. No injury was detected.

Lessons Learned are part of the ISM Core Function 5, Feedback and Improvement. Applicable Lessons Learned are to be considered during working planning activities and incorporated in work processes, prior to performing work.

Please contact the following subject matter experts if you have any questions regarding this briefing.

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