

## Lesson Learned Briefing

**No.:** LL09-0039

**Title:** Rotating Polarizer claim another victim

**Event:** Other Facility Event

**Event Date:** 09/24/2009

**Category:** ES&H - Laser Safety

### Summary:

On Sept. 24, 2009, a graduate student working at a SLAC Ultrafast Laser Lab was struck in the eye by a beam from a rotating polarizer. The student had removed his laser protective eyewear to align an 800 nm beam through a series of optics. Upon completion of this task, he failed to replace his eyewear. Then, he decided to orient a polarizer rotation angle to match the 0-degree mark on a rotation mount. This was done without blocking the laser beam going through the polarizer or blocking the side exit windows. He loosened the polarizer and associated beam tube in the rotating mount. As he rotated the polarizer, both the escape windows of the polarizer and beam tube aligned, permitting the 0-ray to escape and strike him in the eye. (Refer to the Attachments for more information.)

This is not the first time a researcher has been injured by a beam leaving the horizontal plane of an optical table due to a rotating polarizer. In at least two cases, a vertical beam was not the primary focus of the intended work, but a secondary concern. In each case, awareness and planning would have called for a beam block or other means to stop the errant beam. Any optical surface or mount has the potential to be the source of a stray or back reflection. In particular, optics designed to split or rotate a beam need special user awareness and precautions.

Contributing to this incident was lack of user familiarity to the risk the polarizer presented, as well as a lack of on-the-job training and supervision. The interview with the graduate

student uncovered a lack of understanding of the biological hazard of 800 nm wavelength to the eye.

**Conclusion:**

All optical surface or mount have the potential to be the source of a stray or back reflection. In particular, optics designed to split or rotate a beam need special user awareness and precautions. Pre-planning and set up reviews by a second knowledgeable person should be a standard practice.

**Uploaded documents/attachments:**

[SLAC Polarizer.doc](#)

[MOKE Experimental set up.pptx](#)

[9-24-09 incident.doc](#)

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