

Laser investigation safety report lists failures

By Public Affairs Office

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LANL Investigation of a Laser Eye Injury

The Laboratory recently published a final investigation safety report (LA-UR-04-6229) involving an undergraduate student who was injured while performing work with a class IV (neodymium) Nd:YAG laser on July 14.

The undergraduate student was a guest affiliate working on a research program through NASA. She is a chemistry major entering her senior year with experience in electron microscopy but none in laser operations.

According to the report, the mentor and student had set up a laser experiment designed to suspend and then analyze particles inside a vacuum target chamber using an unusual laser configuration that was neither described nor analyzed in work control documents.

The experiment used two lasers, one to suspend particles and a second laser (the Nd:YAG laser) to vaporize the suspended particles. The first laser was aligned vertically to allow the beam to enter through the top of the target chamber. The second laser was aligned horizontally to allow the beam to enter through a side window.

The report said that the mentor energized both laser power supplies and was operating the second laser with the Q switch trigger cable disconnected (a mode the mentor believed did not allow the laser to produce a laser beam). With the Q switch disabled and the laser's flashlamps operating, the mentor believed that only white light exited the laser and traveled down the laser beam path. The mentor wanted

http://www.lanl.gov/news/index.php?fuseaction=home.story&story_id=5657&view=print

to demonstrate that the first laser could suspend particles from the sample and intended to use the light from the second laser to illuminate the suspended particles and make them visible inside the target chamber.

The mentor fired and secured the first laser and then observed the suspended particles inside the target chamber. He told the student he could see suspended particles and invited the student to take a look. As the student bent down to look into the chamber, she saw a flash and immediately noted a reddish brown substance floating in her left eye.

The report said that the student's eye injury was caused by energetic laser pulses striking the retina of her left eye. Neither the scientist nor the student was wearing laser eye protection.

The student was taken to Occupational Medicine (HSR-2) and referred to several eye specialists. Laser eye damage was confirmed. The student continues to experience loss of central vision in her left eye. According to the report, it may take a month or two to determine whether surgery should be performed and a year before a final outcome is determined.

Following the reporting of the laser accident, operations at the Lab were suspended by Laboratory Director G. Peter Nanos. The Lab recently issued an all employee memo on the status of the investigations and personnel actions taken. To read the memo [click here](#).

The investigation has been completed and approved by Nanos. A corrective action plan is being developed and was scheduled to be submitted to Nanos this month for his approval.

For detailed information about the laser safety investigation see [http://ps.lanl.gov/ps7/accident%20reports/Laser_Report_\(9=8\).pdf](http://ps.lanl.gov/ps7/accident%20reports/Laser_Report_(9=8).pdf) or <http://dominoapp.lanl.gov/lln/lldocs.nsf/main> online.

--Kathryn Ostic

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