Lesson Learned Briefing

No.: LL10-0013

Title: Viewing of Plasma Flash from Femtosecond Laser

Event: Other Facility Event

Event Date:

Category: ES&H - Laser Safety

Summary:
Lessons Learned:
Prolonged viewing of a plasma flash, induced by a focused femtosecond laser in the air without the use of required laser eye protection, may produce persistent damage to the retina.

Discussion:
The injury reported in the attached article (Accidental Macular Injury from Prolonged Viewing of a Plasma Flash Produced by a Femtosecond Laser) was caused by prolong exposure to a flash from the plasma formed at the focus of a femtosecond laser, which is not an uncommon occurrence in an ultrafast laser lab.

A post graduate student stared at a bright plasma flash formed at the focus of a femtosecond laser from a distance of less than 30 cm, for greater than 8 seconds, in normal room light conditions. The laser specifications were Ti:sapphire laser (800nm), 1kHz, 0.5mJ/ pulse, 50 femtosecond pulse. The beam was focused by a lens with a 50 cm focal length before delivered to a target tissue.

The post graduate student did not report any pain, but developed subjective decrease in vision. The student stated that he was not wearing laser protective eyewear, because doing so made it difficult to perform the required tasks. Three hours post injury, a funduscopy exam demonstrated a well circumscribed, yellow white spot lesion near the central fovea, which was caused by prolonged viewing of a plasma flash induced by a focused femtosecond laser in the air

without the use of required laser eye protection. The damage occurred through a combination of thermal and photochemical processes.

Recommended Action:
Careful consideration should go into appropriate laser eyewear selection or alternate means to achieve required work, such as remote viewing.

Uploaded documents/attachments:

Yang2010_ fs plasma viewing - macular damage OPHTHAL 117.pdf

Give feedback for this briefing

For other lessons learned and best practices, go to Lessons Learned and Best Practices Library