

MIT Laser Pointer Safety Guidelines

The Potential Optical Hazards

When used responsibly for the intended purpose such as an aid in visual presentations, laser pointers are valuable tools that present little potential hazard. However, laser pointers have received a lot of attention in the media and have raised public concern. The safety concerns regarding the use of lasers are the potential optical hazards. These optical hazards may be exposures from momentary direct viewing with the potential side effects being glare, flash-blindness, after images and possible startle effects. Typically these side effects last on the order of several minutes up to a few hours.

MIT Policy

Only Class 2 and Class 3R (formerly 3a) laser pointers are permissible for use as an aid in presentations. These laser pointers should be used in accordance with guidelines outlined in this document. In terms of power level the laser light emitted from a laser pointer should not exceed 5 milliwatts (mW) which is the upper limit for a Class 3R laser. Any Class 3B laser pointer must be reviewed by and registered with the RPP Office.

Background

Class 2 laser pointers output power is less than 1 mW and the human aversion response time of 0.25 seconds to bright light is adequate protection. Class 3R (formerly 3a) laser pointers output power is between 1 and 5 mW and can be hazardous under some direct and specular viewing conditions.

Optical Hazards

Most common laser pointers are the red diode beam that is produced at wavelengths of about 633-690 nm. Other colors are becoming available and the green laser is of particular concern since the human eye is 50 X more sensitive to green light at 532 nm versus red light at 633 nm for the same power. These newer green lasers use a diode pumped doubled frequency Nd:YVO₄ (albeit some still use Nd:YAG) with a blocked infrared component to produce the green (532 nm) light.

Remember when used properly, laser pointers are very safe to use.



Laser pointers sold in the United States are required to carry a warning label. The label on a Class 1 or 2 laser with a power output less than 1 milliwatt (mW) reads "Caution." The label on a more powerful Class 3R (formerly 3a) laser, such as the 5 mW green (532-nanometer) pointer shown here, reads "Danger."

Safety Guidelines

- *— Recommend the purchase of red laser pointers that operate between 633-690 nm. Maximum power is 5 milliwatts.
- *— Avoid the use of > 1mW green laser pointers due to the eye's increased sensitivity at 532 nm.
- *— Purchase only Class 2 or 3R laser pointers that have a caution or danger sign that identifies the Class and output power in accordance with the MIT policy.
- *— Do not intentionally stare into the laser beam or aim at another person.
- *— Do not point the laser pointer at reflective surfaces such as flat screen TV's and glass table tops.
- *— Choose laser pointers with momentary switch that only stays "ON" when you apply pressure with your finger.
- *— Check the warning label on your pointer to determine the class and output power.
- *— Do not use with aided viewing such as binoculars.

Contact

**Environment, Health, and Safety Office
Radiation Protection Program**



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