

TAP 504-2: Lasers and safety

The following is an extract from the CLEAPSS Science Publications Handbook Section 12.12:

12.12 Lasers

A low-power, continuous-wave, helium-neon laser is useful for teaching wave optics because it produces a beam of light that is:

- highly monochromatic (very narrow spread of wavelengths) and coherent (the same phase) both across the beam and with time;
- of high intensity;
- of small divergence (typically 1 mm in diameter when it leaves the laser, 5 mm in diameter 4 m away).

Because of its intensity, care must be taken to prevent a beam from a laser falling on the eye directly or by reflection, as it could damage the retina. In fact, it is now known that eyes could be damaged by the beam from the low power Class II lasers used in schools only if a deliberate attempt were made to stare at the laser along the beam or to concentrate the beam from a IIIa laser with an instrument; the normal avoidance mechanism of the body would prevent damage in other cases. Nevertheless, it is good practice to take precautions to avoid a beam falling on the eye.

Lasers should be positioned so that beams cannot fall on the eyes of those present, i.e., are directed away from spectators. Ancillary optical equipment must be arranged so that reflected beams cannot reach eyes.

Ten years ago, the lasers affordable by schools would work for only a few years and then only if run periodically. Those currently available have longer lives and do not require this.

DES Administrative memorandum 7/70

This advises on the use of lasers in schools and FE colleges. It confines use at school level to teacher demonstration. Safety rules include the avoidance of direct viewing; screening pupils who should be at least 1 m away; keeping background illumination as high as possible (so that eye pupils are as small as possible); displaying warning notices; keeping lasers secure from unauthorised use or theft; use of goggles by the demonstrator. Because of the more recent realisation that the lasers used in schools and colleges will not harm an eye by a beam accidentally falling on it, these rules are not strictly necessary but following them is good training. However, goggles are expensive, impractical and do not reduce hazard as they make it harder for the demonstrator to see the beam, stray reflections etc.