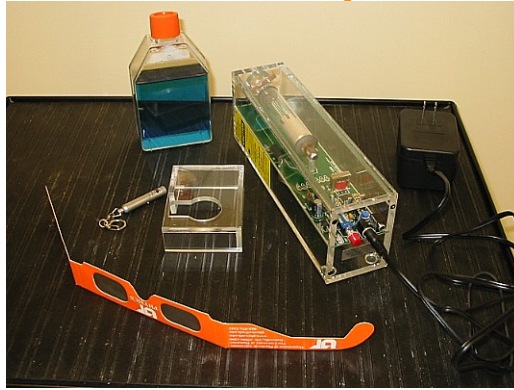
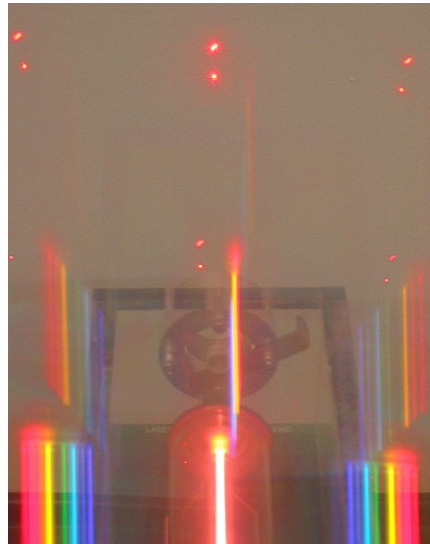


Lasers and Spectra



Laser Demo Items



Diode and HeNe Lasers Viewed through Diffraction Glasses.

Purpose: Demonstrates the workings of a HeNe laser, diffraction gratings, and the sensitive absorption edge of blue food coloring.

This is a nice demonstration in itself, or can be used as an addition to the Spectral Lines demo. The star of the show is a see-through HeNe laser. By standing it upright (beam down) in its plastic holder, the class can see (through their diffraction glasses) the lovely spectra extant in the laser cavity. By removing the laser from the stand, you can then show (shine it upwards on the wall nearby) that the cavity picks out only a certain red line.

Next, show them the diode laser pointer. To the eye, its color is the same as that of the HeNe laser. You can show it is not though by shining both lasers onto the wall, with the diode spot slightly above that of the HeNe spot. Through their diffraction glasses, the students can see that the 1st order spots are slightly shifted: the diode spot is farther out (see photo). Since

$$l = 2d \sin \theta,$$

the diode laser must have a longer wavelength. It does — 650 nm vs. the HeNe 633 nm.

With this fact established, examine the transmission of the two lasers through the blue food coloring. The diode laser goes through while the HeNe beam does not! The absorption edge of the food coloring is pretty sharp.

Note:

Extra Equipment: Diffraction Glasses

Location: See Marianne or Christine