Physics 112: Diffraction Lab

Purpose: To observe how the diffraction pattern depends on wavelength and distance between the diffraction grating slits. The wavelength of the laser and green light will be determined.

Materials: Laser pointer, ray box, metre stick, known diffraction gratings

Qualitative Analysis: Describe what you observe and what affect the following changes have on your diffraction pattern.

I. Move towards and away from the diffraction grating while shining your laser on it.
II. Move the diffraction grating further from the wall and shine the laser through. Repeat with the diffraction grating closer than it was.
III. Set up the diffraction grating and note the pattern, now replace that grating with the other one available (keeping the distance to the wall the same).
IV. Use the ray box to shine white light through the grating.

Quantitative Analysis: Determining the wavelength of the laser and of green light.

I. Setup the diffraction grating (be sure you can see the pattern) and record its distance to the wall and how many lines per inch on the grating.
II. Shine the laser through and measure the distance from the centre dot to the first and second dots on the right (or left).
III. Replace the diffraction grating with a different one and repeat steps I and II.
IV. Replace the laser with the ray box. Repeat steps I and II (measuring the distance from the centre line to the middle of the first and second green line).
V. Record your numbers on the Excel file called Diffraction Lab Results (be sure to save it as a different name).

Discussion/Conclusion

- Remember to restate the purpose of the lab.
- Be sure to include a summary of your findings and sources of error.
- Did you successfully determine the wavelength of the laser to within factory value?
- Write a few sentences concluding the lab report.
- I will print your data table for you.