

Name _____
AP Physics
Period _____

Date _____
Lab Activity #21 (35 pts)
Mrs. Nadworny

Partners:

Due Date _____

Measuring the Wavelength of Laser Light

Purpose

To measure the wavelength of laser light in three ways and compare it to the “literature value” listed on the laser.

NO Lab Write-Up Required
must be neatly written in pencil

Materials

- laser
- diffraction plate
- diffraction grating
- clean white board
- whiteboard marker

Diagram (3)

Sketch a diagram of your setup. Label the equipment and any measureable variables.

- * Note – L should be approximately 1 meter or greater

Procedure

Method #1 (Single Slit Diffraction)

- Shine the laser through the **top single slit** ($w = 8.79 \times 10^{-5} \text{ m}$) from the glass diffraction plate onto a white board. Take any measurements needed in order to predict the wavelength of the light.

Interference Pattern (2)

Draw the interference pattern created. Label where x is measured on the pattern.



Data Collection (3)

Record all data, clearly labeled, with appropriate units and uncertainties.

Data Processing (5)

Calculate wavelength of the laser. Show all work clearly, with formulas and substitutions.

Method #2 (Double Slit Diffraction)

- Shine the laser through the **middle double slit** ($d = 2.64 \times 10^{-4}$ m) from the glass diffraction plate onto a white board. Take any measurements needed in order to predict the wavelength of the light.

Interference Pattern (2)

Draw the interference pattern created. Label where x is measured on the pattern.

Data Collection (3)

Record all data, clearly labeled, with appropriate units and uncertainties.

Data Processing (5)

Calculate wavelength of the laser. Show all work clearly, with formulas and substitutions.

Method #3 (Diffraction Grating)

- Shine the laser through the **diffraction grating** (13,400 lines/inch) onto a white board. Take any measurements needed in order to predict the wavelength of the light. (Is the angle greater than 15° ?)
- * Note – L or the board placement may need to be adjusted to fit the pattern on the board

Interference Pattern (2)

Draw the interference pattern created. Label where x is measured on the pattern.

Data Collection (3)

Record all data, clearly labeled, with appropriate units and uncertainties.

Data Processing (5)

Calculate wavelength of the laser. Show all work clearly, with formulas and substitutions.

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