

PHYS115 PHYS121 PHYS123
PHYS116 PHYS122 PHYS124
Lab Cover Letter

Author (You) Trevor N. Signature: Trevor N.

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Lab Partner(s) Lauren Lee

Date Performed 2024-12-05 Date Submitted 11

Lab (such as #1: UNC) _____

TA: Eli

GRADE (to be filled in by your TA) See your TA for detailed feedback.
An 'x' next to a subcategory means you need to improve this aspect of your work.

Paper Subtotals (points)

- | | |
|--|--|
| <p>() General (6)</p> <p>_____ Sig. figs.</p> <p>_____ Units</p> <p>_____ Clarity of Presentation</p> <p>_____ Format</p> <p>() Abstract (4)</p> <p>_____ Quantity or principle</p> <p>_____ How measurement was made</p> <p>_____ Numerical Results</p> <p>_____ Conclusion</p> <p>() Intro & Theory (9)</p> <p>_____ Basic principle</p> <p>_____ Main equations to be used</p> <p>_____ Apparatus</p> <p>_____ What will be plotted</p> <p>_____ Fitting parameters related</p> <p>() Exp. Procedures (15)</p> <p>_____ Description</p> <p>_____ Stating and justifying uncertainties</p> <p>_____ Data Record</p> <p>_____ Quality of Lab Work</p> <p>() Analysis & Error Analysis (20)</p> <p>_____ Discussion</p> <p>_____ Equations & Calculations</p> <p>_____ Presentation inc. Graphs, Tables</p> <p>_____ Results Reported & Reasonable</p> <p>_____ Underlined items addressed</p> | <p>() Discussion & Conclusions (6)</p> <p>_____ Numerical comparison of results</p> <p>_____ Logical conclusions</p> <p>_____ Discussion of pos. errors</p> <p>_____ Suggestions to reduce errors</p> <p>() Paper Total (60 points)</p> <p style="text-align: center;">(30 points for CME or EPF)</p> <p>() Notebook (10 points)</p> <p>_____ Format (<i>proper style, following directions</i>)</p> <p>_____ Apparatus (<i>brief description of equipment, including sketches</i>)</p> <p>_____ Data (<i>including computer file names and manually recorded data</i>)</p> <p>_____ Experimental Technique (<i>describing your procedures; stating & justifying uncersts.</i>)</p> <p>_____ Analysis (<i>results and errors</i>)</p> <p>() Worksheet(s)/Fill-in-the-Blank-Report (30 points) if applicable</p> <p>() Adjustments – late submissions, improper procedures, etc. – or bonus points for exceptional work.</p> <p>() Total Grade</p> <p>Graded by _____ (TA's initial)</p> |
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Waves A & B Worksheet

Your Name: Trew N. Signature: TWN

Lab partner(s): Lauren Lee

Course & Section: PHYS122:119B Station # 31 Date: 2024-12-05

Waves – A

Single Slit Diffraction (Section D.1)

What is the total separation between the first minima on either side of the central maxima for slit B?

1.25 ± 0.05 (units) cm

Your estimate of λ :

$$\text{Slope} = \frac{0.01317}{636} \pm \frac{0.00003}{1.2} \text{ mm (units)}$$

$$\lambda = \frac{0.000636}{636} \pm \frac{0.00000124}{1.2} \text{ mm (units)}$$

Double Slit Diffraction (Section D.2)

Single slit diffraction features from slits "A": the total separation in mm between the first minima corresponding to single slit diffraction is: 25 ± 1 mm (units)

Double-slit interference pattern:

Number n of bright spots in the central diffraction maximum: 13

Width s of central diffraction maximum: 24 ± 1 mm (units)

Mean separation Δy of interference maxima: 2.00 ± 0.08 mm (units)

λ from your data and Eq. 5 604 ± 24 nm (units)

Diffraction Grating (Section D.3)

Measure the positions of the left y_- and right y_+ maxima in first and second order. Calculate λ using Eq. 3 for each measurement and then combine all four to obtain a mean λ .

$$m = 1: y_+ = \frac{4.40 \pm 0.05}{\text{cm}} \text{ (units)} \quad \lambda = \frac{623.9}{\text{nm}} \text{ (units)}$$

$$y_- = \frac{4.40 \pm 0.05}{\text{cm}} \text{ (units)} \quad \lambda = \frac{623.9}{\text{nm}} \text{ (units)}$$

$$m = 2: y_+ = \frac{10.90 \pm 0.05}{\text{cm}} \text{ (units)} \quad \lambda = \frac{631.0}{\text{nm}} \text{ (units)}$$

$$y_- = \frac{10.90 \pm 0.05}{\text{cm}} \text{ (units)} \quad \lambda = \frac{631.0}{\text{nm}} \text{ (units)}$$

$$\lambda_{\text{mean}} = \frac{627.5}{\text{nm}} \text{ (units)}$$

$$D = 13.4 \pm 0.1 \text{ cm}$$

Waves – B

Polarization by Transmission (Section C.3 & C.4)

Attach your *Origin* plot and least-squares fit of the intensity I vs. angle θ .

List here your fitted parameters:

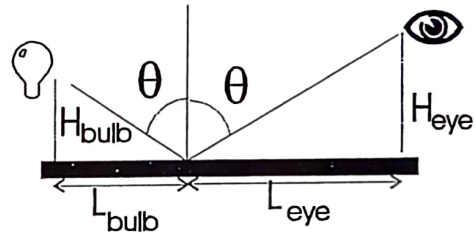
$$A = \underline{74} \pm \underline{4} \text{ Lux (units)}$$
$$I_0 = \underline{340} \pm \underline{40} \text{ Lux (units)}$$
$$\phi = \underline{0.04} \pm \underline{0.03} \text{ Rad (units)}$$

Polarization by Reflection (Section D.2 & D.3)

$H_{\text{eye}} = \underline{164.0} \pm \underline{0.5} \text{ cm (units)}$ $L_{\text{eye}} = \underline{233.5} \pm \underline{0.5} \text{ cm (units)}$ $\tan \theta_{\text{eye}} = \underline{0.660} \pm \underline{0.002}$

$H_{\text{bulb}} = \underline{103} \pm \underline{0.5} \text{ cm (units)}$ $L_{\text{bulb}} = \underline{175.5} \pm \underline{0.5} \text{ cm (units)}$ $\tan \theta_{\text{bulb}} = \underline{0.580} \pm \underline{0.003}$

Index of refraction: ~~2.04~~ 1.52



Michelson Interferometer (Section E.2 & E.3)

Each lab partner must count her or his own $N = 50$ or so fringes.

Number of fringes, $N = \underline{50} \pm \underline{1}$

Micrometer Reading, $\Delta d = \underline{15.5} \pm \underline{0.2} \text{ } \mu\text{m (units)}$

$\lambda = \underline{620} \pm \underline{15} \text{ nm (units)}$

GRADE: _____
(out of 30 points)

GRADED BY _____
(TA's initials)

