Waves A & B Worksheet

Your Name: __Trevor N.__   Signature: __TvN.__

Lab partner(s): __Lauren Lee__

Course & Section: __PHYS122:19B__   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:

Slope = __0.01317__ ± __0.00083__ __nm__ (units)

λ = $\dfrac{0.000636}{636}$ ± $\dfrac{0.00000124}{1.2}$ __mm / nm__ (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_+ = __4.40__ ± __0.05__ __cm__ (units) λ = __623.9__ __nm__ (units)

y_- = __4.40__ ± __0.05__ __cm__ (units) λ = __623.9__ __nm__ (units)

$m = 2$: y_+ = __10.90__ ± __0.05__ __cm__ (units) λ = __631.0__ __nm__ (units)

y_- = __10.90__ ± __0.05__ __cm__ (units) λ = __6310__ __nm__ (units)

λ_{mean} = __627.5__ __nm__ (units)

D: 13.4 ±0.1 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.
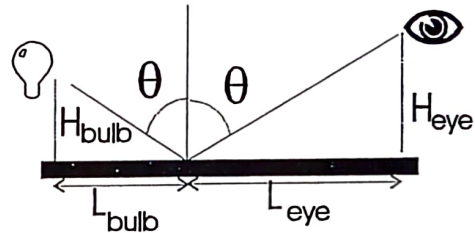
List here your fitted parameters:

$A = \underline{74} \pm \underline{4}$ Lux (units)

$I_0 = \underline{240} \pm \underline{40}$ Lux (units)

$\phi = \underline{0.04} \pm \underline{0.03}$ Rad (units)

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

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

$H_{bulb} = \underline{103 \pm 0.5}$ cm (units) $L_{bulb} = \underline{175.5 \pm 0.5}$ Cm (units) $\tan\theta_{bulb} = \underline{0.589 \pm 0.003}$

Index of refraction: $\underline{1.52}$

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, $\Delta d = \underline{15.5} \pm \underline{0.2}$ μm (units)

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

GRADE: _____
(out of 30 points)

GRADED BY _____
(TA's initials)