Experiment 4 Diffraction and Interference of Light

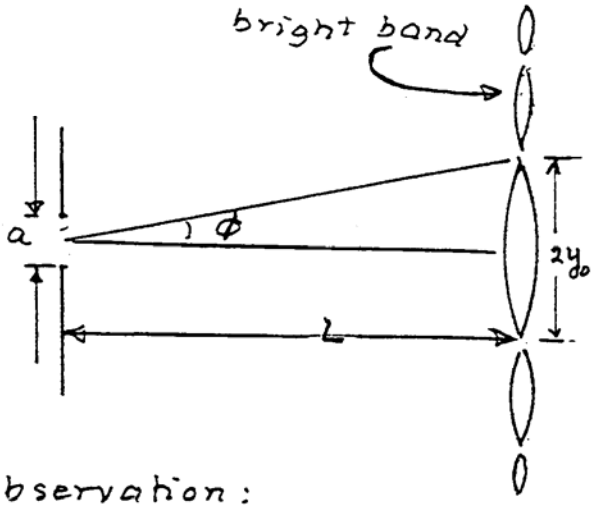
Name

Date perform

Partner's Name

A. Single-Slit Diffraction

Condition for the first dark spot: $a \sin\phi = \lambda$



Observation:
observe the relationship between a and $2y_0$

Position of slit P_1 = ...

Position of screen P_2 = ...

Distance between slit and screen $L = P_2 - P_1$ = ...

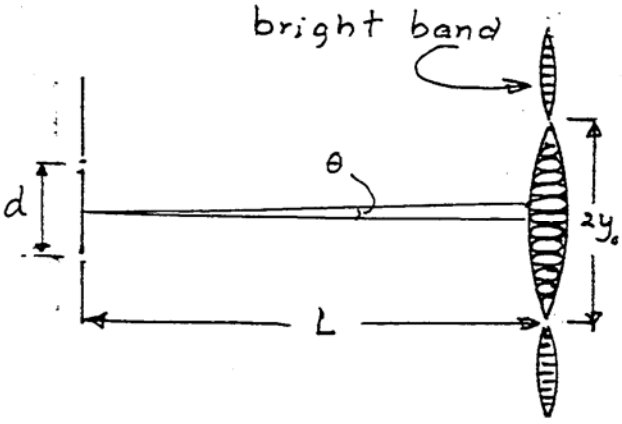
Pattern and slit-width a.	Central max. width $2y_0$	$\sin\phi = \frac{y_0}{L}$	$\lambda = a\sin\phi$
			λ_1
			λ_2
			λ_3
	$\lambda_{av} = \frac{1}{3}(\lambda_1 + \lambda_2 + \lambda_3)$ = ...		

% of error = $\frac{\lambda_{av} - 632.8\times10^{-9}\,m}{632.8\times10^{-9}\,m} \times 100$

= ----------%

B. Double-Slit Interference

Condition for the 1st order bright fringe $d \sin\theta = \lambda$



N = number of bright fringes in the central maximum.

Position of slit P_1 = ...

Position of screen P_2 = ...

Distance between slit and screen $L = P_2 - P_1$ = ...

Slit width a = ...

Slit-separation d.	$\Delta y = \frac{2y_0}{N}$	$\sin\theta = \frac{\Delta y}{L}$	$\lambda = d\sin\theta$
			λ_1
			λ_2
	$\lambda_{av} = \frac{1}{2}(\lambda_1 + \lambda_2)$ = ...		

% of error = $\frac{\lambda_{av} - 632.8\times10^{-9}\,m}{632.8\times10^{-9}\,m} \times 10$

= ----------%

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