

EXPERIMENT - 02

classmate

Date _____

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AIM

To measure the diameter of a given wire using interference patterns formed using an extended source, at the air wedge b/w two glass plates.

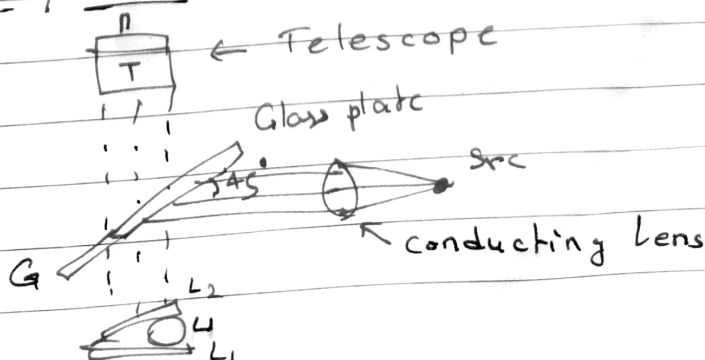
Materials Required :

Sr. No	Object	Spec.	Qnt
1	Travelling microscope	-	1
2	Optically plan rectangular plates	-	1
3	A thin wire	-	1
4	Na vapour lamp	-	1
5	Reading lens	-	1
6	Conven lens with stand	-	1
7	Rubber band	-	1
8	Wooden box (45°)	-	1

PRINCIPLE :

$$d = L\lambda / 2\beta m$$

CIRCUIT / SETUP :



OBSERVATION & CALCULATION

$$LC = 1 \text{ MSD} - 1 \text{ VSD}$$

$$20 \text{ MSD} = 1 \text{ cm}$$

$$\text{Value } 1 \text{ MSD} = \frac{1}{20} \text{ cm} = 0.05 \text{ cm}$$

$$\text{No. of Vernier Scale Div} = 50$$

$$50 \text{ VSD} = 49 \text{ MSD}$$

$$1 \text{ VSD} = \frac{49}{50} \text{ MSD} = 0.049$$

$$LC = 0.05 - 0.049 = 0.001 \text{ cm}$$

$$LC \text{ of T. microscope: } 0.001 \text{ cm} = 0.01 \text{ mm}$$

Order	MSR (cm)	VSC (div)	TR = MSR + (VSC × LC) cm	Width of band β
n	49	24	0.7349 24	0.61
n+3	49	9	49.9	0.66
n+6	49	73	49.73	0.17
n+9	50	24	50.24	0.51
n+12	51	69	51.69	1.45
n+15	51	96	51.96	0.27
n+18	51	34	51.34	0.62
n+21	51	64	51.64	0.30

CALCULATION: Mean $\beta = 0.5737$

~~$L = 4.6$~~ Mean $\beta = 0.57 \times 10^{-3} \text{ m}$

Position	MSR (mm)	VSR = VSD X LC	TR = MSR + VSR
Edge of contact (Rubber band)	4.6	0	$R_1 = 4.6$
specimen wire	10.1	0	$R_2 = 10.1$

CALCULATION:

Distance b/w the edge of contact & the wire $L = 5.5 \times 10^{-3}$ m

λ of Na light = 580×10^{-9} m

$\beta =$ _____ m

Diameter or thickness of

thin wire (d) = _____ m

$$d = L\lambda / 2\beta = 2.7 \times 10^{-6} \text{ m}$$

* RESULT:

The thickness of wire, $d = 2.7 \times 10^{-6}$ m

PRECAUTIONS:

1. Lens should be clean.
2. Traveling microscope should move in one direction.
3. Light should be monochromatic