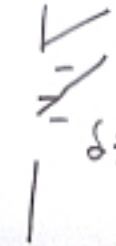
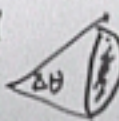
(22)

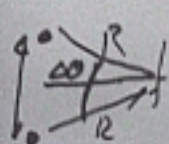


$w \sin\theta_m = \pm m\lambda$



$\therefore \Delta\theta = 2\frac{\lambda}{w}$ □

$\Delta\theta = 1.22\frac{\lambda}{w}$



$\therefore S = R\Delta\theta$

$\Delta\theta = \frac{S}{R}$

$d \uparrow \equiv$ $\quad S = d\sin\theta = m\lambda$

Bright $\quad m = 0, \pm 1, \ldots$

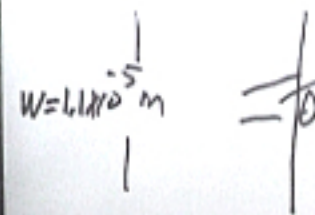
$$\sin\theta = \frac{m\lambda}{d}$$

max: $\sin\theta = 1$

$$1 = \frac{m'\lambda}{d}$$

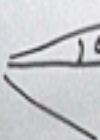
$$m' = \frac{d}{\lambda} \quad \text{Integer} \le m'$$

$I = I_0 \cos^2\theta$



~~2π~~

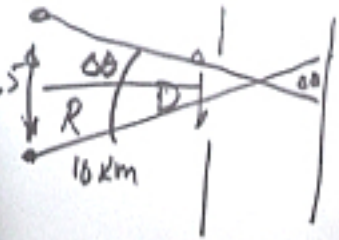
$W \sin(\theta) = \pm m\lambda$



$m=1: \quad \lambda = W \sin\theta$

$\lambda = (1.1\times10^{-5}) \sin(2.25)$

$= 528\,nm$



$$S = R\,\Delta\theta \Rightarrow \Delta\theta = \frac{S}{R} = \frac{.5}{10\times10^3}$$

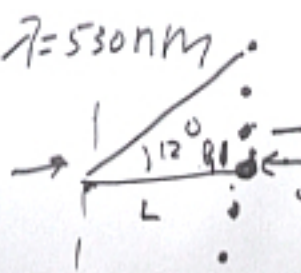
$$= 5\times10^{-5}\,R.I$$

$$\Delta\theta_{min} = 1.22\frac{\lambda}{D}$$

$$D = \frac{1.22 \times 500\times10^{-9}}{5\times10^{-5}} = .01220$$

$$\approx 1.2\,cm$$

$\lambda = 530nm$



$\approx \sin\theta$

$\frac{y}{L} = \tan\theta$

$\sin\theta_m = \frac{m\lambda}{d}$

$m = +3$

$N = \frac{1}{d}$

$= 1.3 \times 10^5 / m$

$d = \frac{m\lambda}{\sin\theta_m}$

$= \frac{3 \times 530 \times 10^{-9}}{\sin(12^\circ)}$

$= 7.65 \times 10^{-6} m$

$\lambda = 600nm \rightarrow$

$N = 5\times10^5 \ /_m$

$$\sin\theta_m = \frac{m\lambda}{d}$$

maximum: $\sin\theta = 1 = \frac{m'\lambda}{d}$

$$m' = \frac{d}{\lambda} = \frac{1}{N\lambda} = \frac{1}{5\times10^5 \times 600\times10^{-9}}$$

$$= 3.3$$

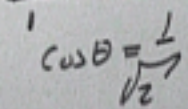
max $m = 3$

$$I = I_0 \cos^2\theta$$

$$\frac{I}{I_0} = \frac{1}{2} = \cos^2\theta$$

$$\theta = 45^\circ$$

$$\cos\theta = \frac{1}{\sqrt{2}}$$



$$\cos\theta = \frac{1}{\sqrt{2}}$$