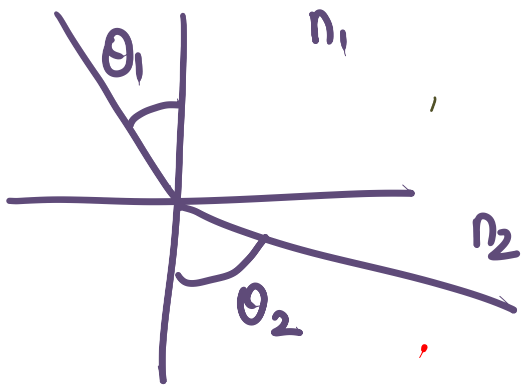
$$\mu = \frac{c}{V_{medium}}$$



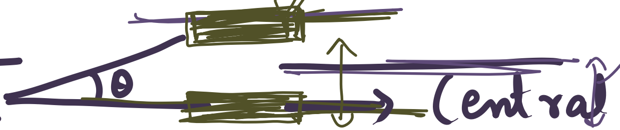
$$n_1 \sin\theta_1 = n_2 \sin\theta_2$$

$$y = \frac{\lambda D}{d}$$

Light fringe: 1st maxima

$\rightarrow \frac{\lambda D}{2d}$

Angular fringe $= \frac{\lambda}{d}$



$\phi \rightarrow$ Phase difference

$\Delta\phi = k\Delta x$

$$I = 4I_0^2 \cos^2 \frac{\phi}{2}$$

π

$I = 0$

$$\theta = \frac{n\lambda}{d} \longrightarrow \text{maxima}.$$

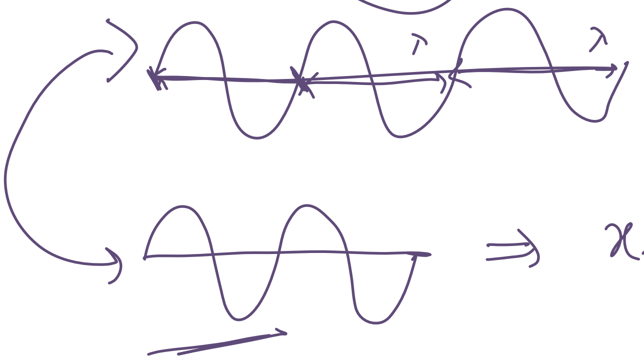
nth order of maxima $\Rightarrow \frac{n\lambda D}{d}$ ✓

nth order of minima $\Rightarrow \left(n - \frac{1}{2}\right)\frac{\lambda D}{d} \leftarrow n = 1$ ✓

Coherent Sources & Incoherent Sources.

At any t, $\Delta\phi$ = constant $= K\Delta x$.

Laser light

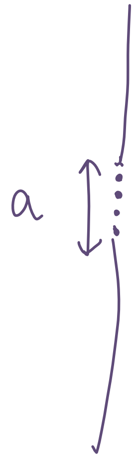


$\Rightarrow 3\lambda \leftarrow x_1$

$\Rightarrow x_2 \Rightarrow 2\lambda$.

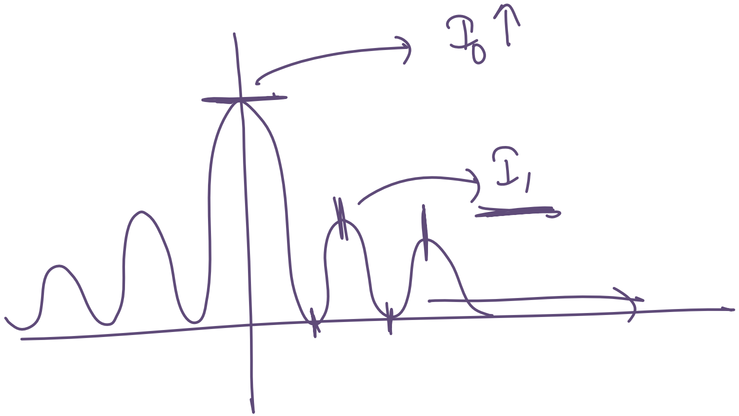
$$K\Delta x = K(3\lambda - 2\lambda)$$
$$= K(\lambda).$$

Diffraction :



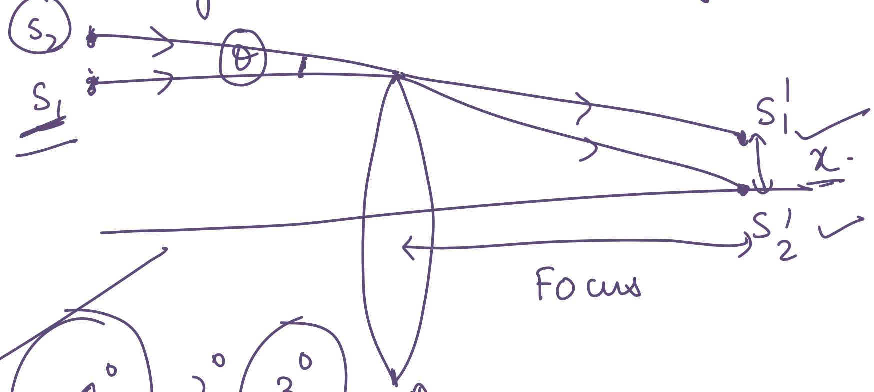
$$\theta = \frac{\lambda}{a} \longrightarrow \text{condition for minima.}$$

$$\theta = \left(n + \frac{1}{2}\right)\frac{\lambda}{a} \longrightarrow \text{Condition for maxima}$$



Resolving Power :

It is the reciprocal of smallest angular separation between two distant objects whose images are seen separately.

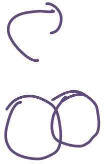


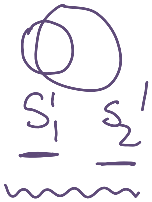
1°, 2°, 3°

$\theta \downarrow \rightarrow$ R.P (Better) -

Telescope - {Convex lens}.

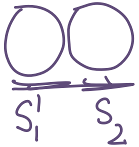
Just resolved





Overlap -

Unresolved -

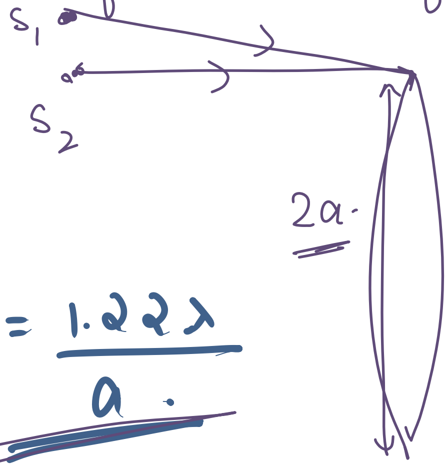


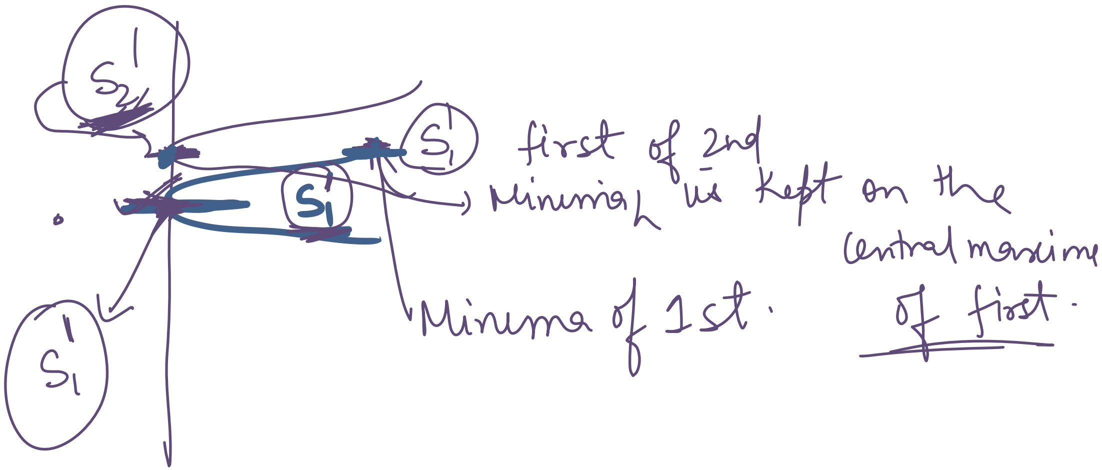
→ Resolved.

Separate images

Rayleigh's Criteria:

According to Rayleigh's Criteria, for resolution, two point sources are said to be just resolved when the central maxima of one image falls on the first minima of the other diffraction pattern.

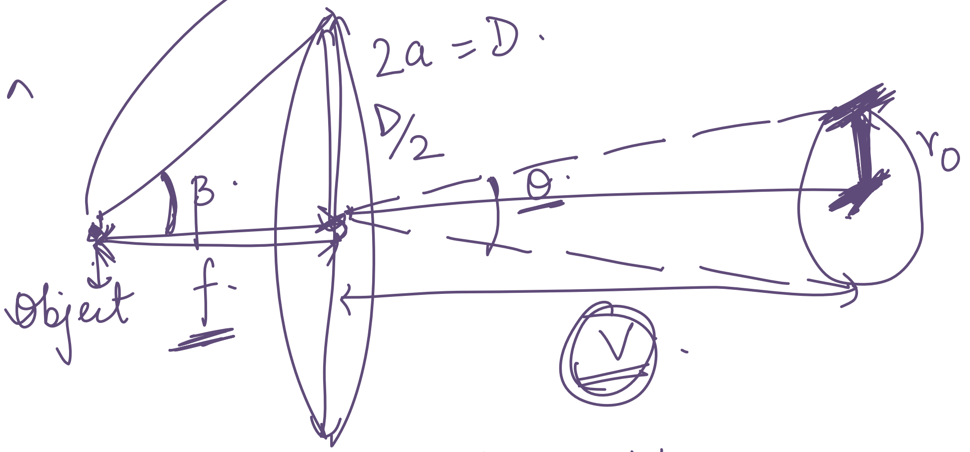




$$\theta = \frac{1.22\lambda}{a}$$

Resolving $= \dfrac{1}{d_{min}}$

Two objects distance $= d_{min}$



$r_0 = \dfrac{1.22 \lambda f}{2a}$

$\theta = \dfrac{1.22 \lambda}{2a}$

Angular resolving power of telescope

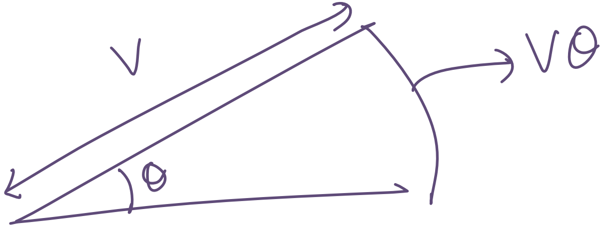
$\tan \beta = \dfrac{D}{2f}$

$V\theta = V$

Objective lens

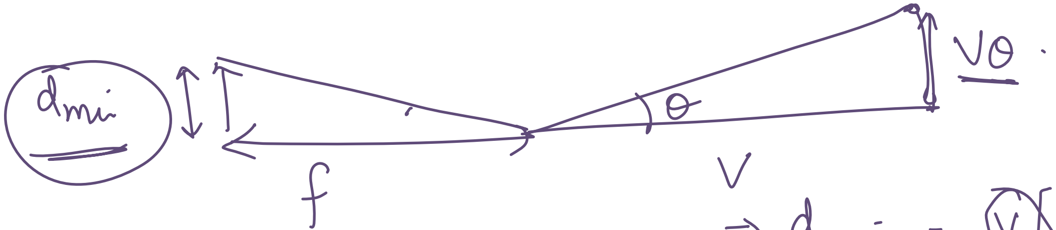
magnification, $m = \dfrac{V}{f}$

$\tan\beta = \dfrac{D}{2f}$, $m = \dfrac{V}{f}$



$\Rightarrow V\theta = V\left(\dfrac{1.22\lambda}{D}\right)$

$m = \dfrac{V\theta}{d_{min}}$



$\Rightarrow d_{min} = \dfrac{V\theta}{m} \Rightarrow \dfrac{V\left[\dfrac{1.22\lambda}{D}\right]}{d_{min}} \Rightarrow m$

$\Rightarrow d_{min} = \dfrac{V}{D m}\left[1.22\lambda\right]$

$d_{min} = \dfrac{1.22\lambda f}{D}$

$\Rightarrow D = 2f\tan\beta$. $= \dfrac{1.22\lambda f}{2f\tan\beta}$

ABLES KOTA

$$d_{min} = \frac{1.22\lambda}{2\tan\beta}$$

$$\text{Resolving power} = \frac{1}{d_{min}} = \frac{2\tan\beta}{1.22\lambda}$$

Medium has r. I $\rightarrow n$, $d_{min} = \frac{1.22\lambda}{2n\sin\beta}$