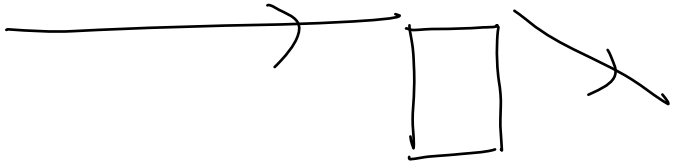
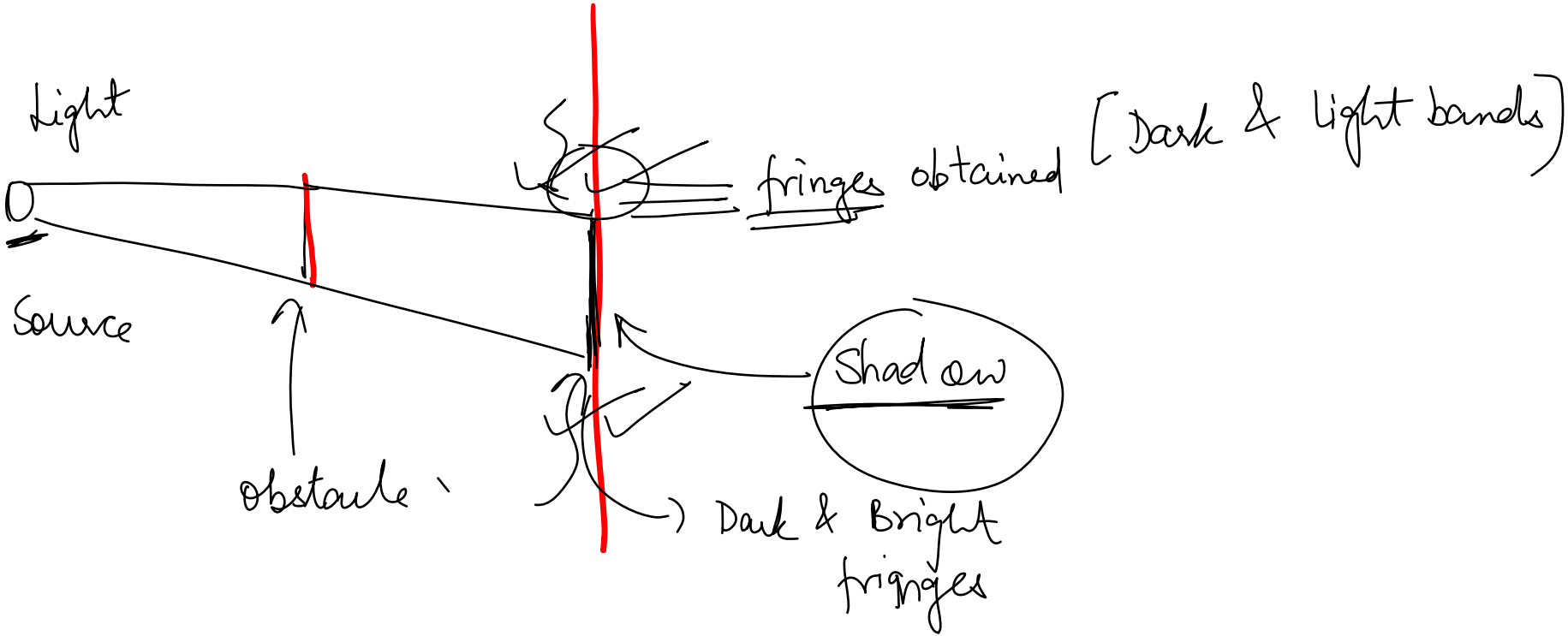
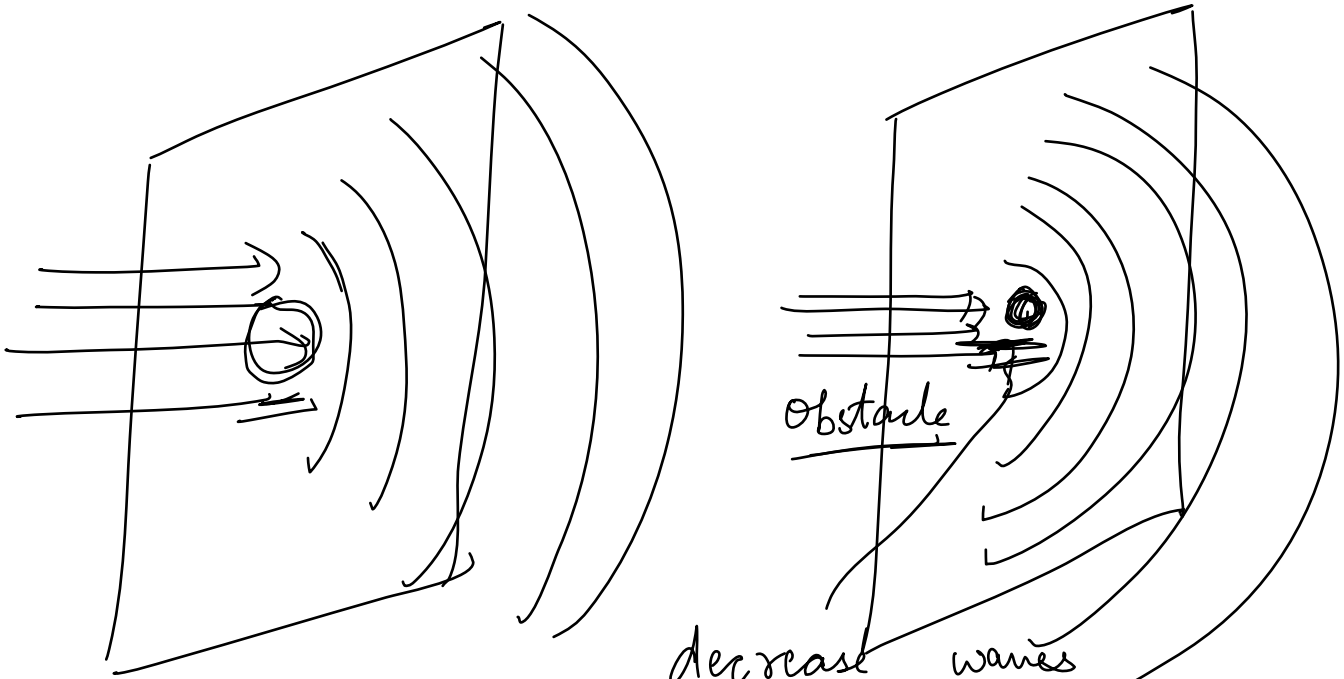
Diffraction :



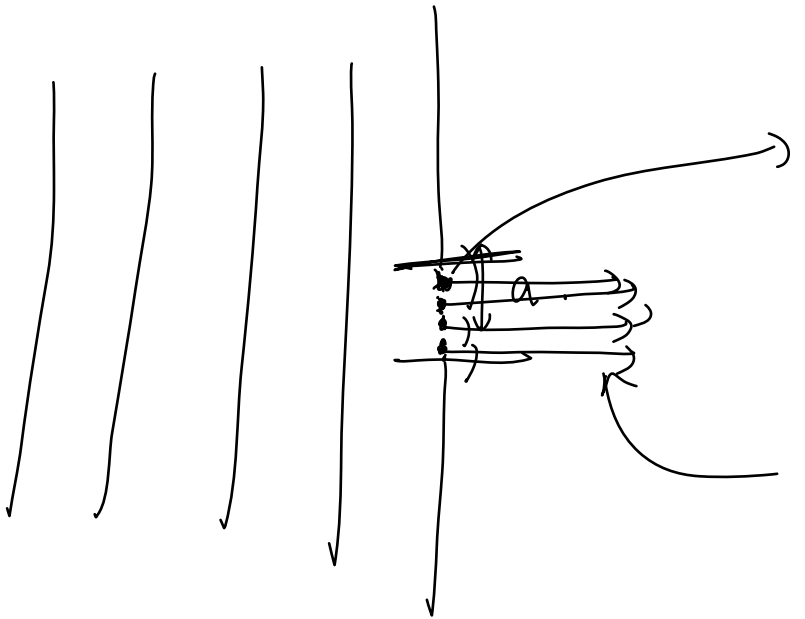
It is the process of bending of light around an obstacle or spreading of the particle moves through a very small space.


Light
Source
Obstacle
fringes obtained
[Dark & light bands]
Shadow
Dark & Bright fringes



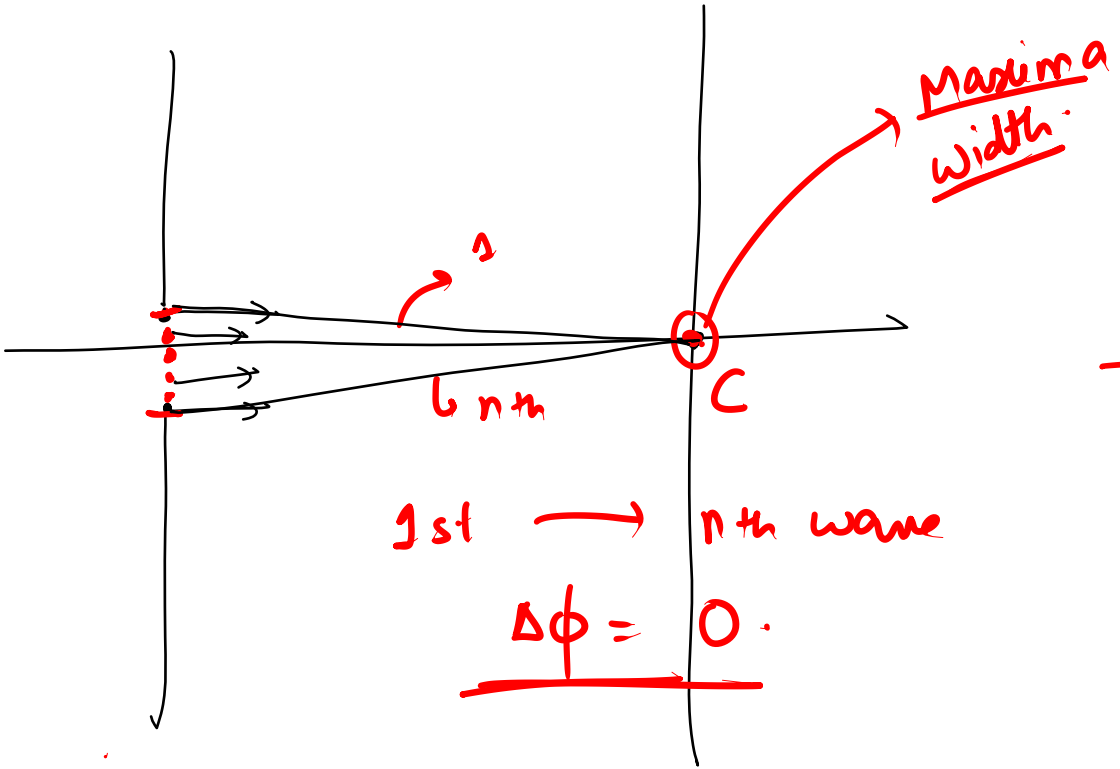
decrease waves

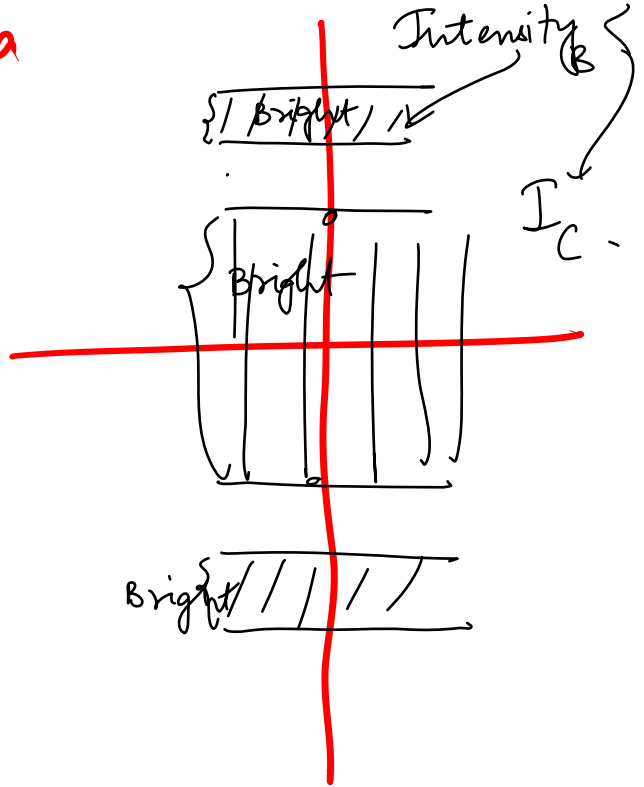
Bending of light

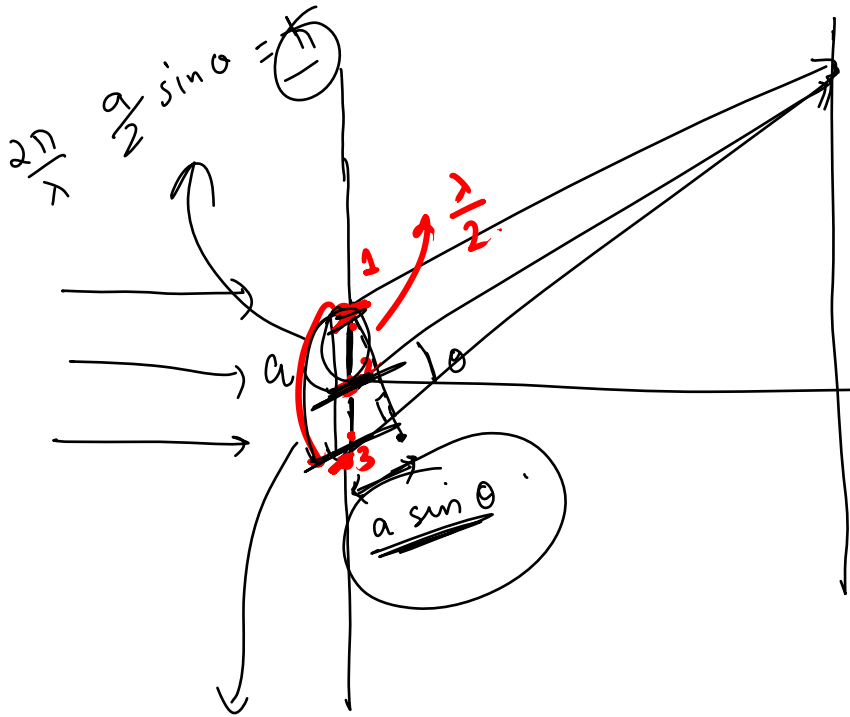


Act as secondary wavelets

Travel with speed of light


Maxima
width.
1
b nth
C
1st → nth wave
Δϕ = 0.


Intensity (I)
Bright
Bright
Bright
I_C.



Phase difference $\Rightarrow$ $K\Delta x = 2n\pi$

$\frac{2\pi}{\lambda} \times a\sin\theta = 2n\pi$

$\frac{a\sin\theta}{\lambda} = n$

$\theta \sim$ very small $\frac{a\theta}{\lambda} = 1$

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

condition for minima

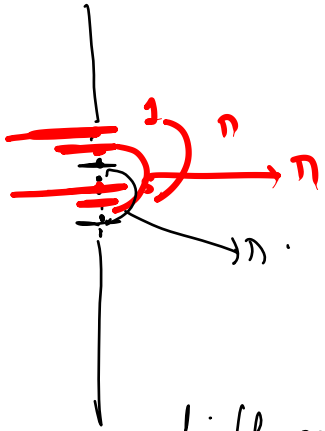
Phase difference $\Delta\phi = \frac{2\pi}{\lambda} \times \frac{\lambda}{2} = \pi$.

1st & 2nd.

2nd & 3rd

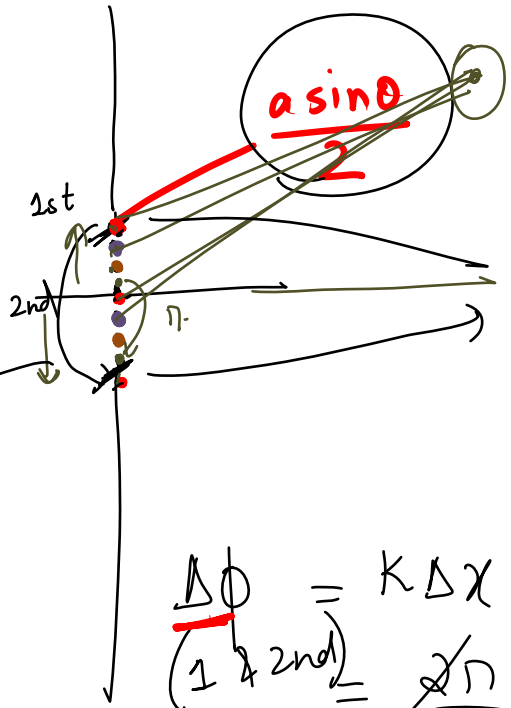
$\Delta\phi = \pi$.

$$\theta = \pm \frac{n\lambda}{a}$$



Intensity = 0.

→ condition for Minima in diffraction.



$2n\pi$.

Maxima

Minima.

$\Delta x = a \sin\theta$. $= n\lambda$

$K\Delta x = \frac{2\pi}{\lambda} \times a\sin\theta = 2n\pi$. (1)

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

$2\pi = \Delta\phi$

$\frac{\Delta x = a\sin\theta}{\Delta\phi = 2\pi}$

$\Delta\phi = K\Delta x$

(1 & 2nd) $= \frac{2\pi}{\lambda} \times a\sin\theta = \frac{n\lambda}{\lambda} \times \frac{x}{a} = n$.

Minima ($I = 0$) $\cos n$. $= -1$.

$I_{net} = 0$.

Central Bright Fringe: