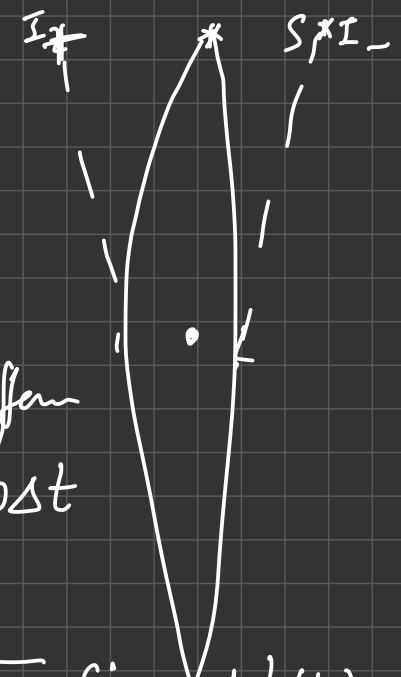
$$\mu_\pm = \frac{y^2+2}{2y\sqrt{y^2+4}} \pm \frac{1}{2}$$



$$F_+ = \mu_+ F$$
$$F_- = \mu_- F$$

} phase diffem $\Delta\phi = \omega \Delta t$

$$|\vec{\theta} - \vec{\beta}|^2$$

$$F(y) = F_+(y) + F_-(y) + 2\sqrt{F_+ F_-} \sin \omega \Delta t(y)$$

① Spatial :-

① $\rightarrow$ $\Delta t = \frac{1}{c} \frac{D_L D_S}{D_{LS}} (1+z_L) \left(\frac{|\vec{\theta} - \vec{\beta}|^2}{2} - \psi(\vec{\theta}) \right)$

$\rightarrow$ $\psi(\vec{\theta}) = \theta_E^2 \log \theta$ (for point-like lens)

$\psi \quad \nabla^2 \psi \quad \xleftarrow{\text{scale}} \Sigma = \int_{\text{los}} \rho \, dz$

$\psi \rightarrow$

$D_S = 1 \text{ Mpc}$

$D_L = \frac{1}{2} \text{ Mpc}$,

$M \sim 10^{-10} M_\odot$

$\omega = \frac{2\pi c}{\lambda} =$

$\lambda = 500 \text{ nm}$, $\lambda_{\text{Gamma Ray}}$

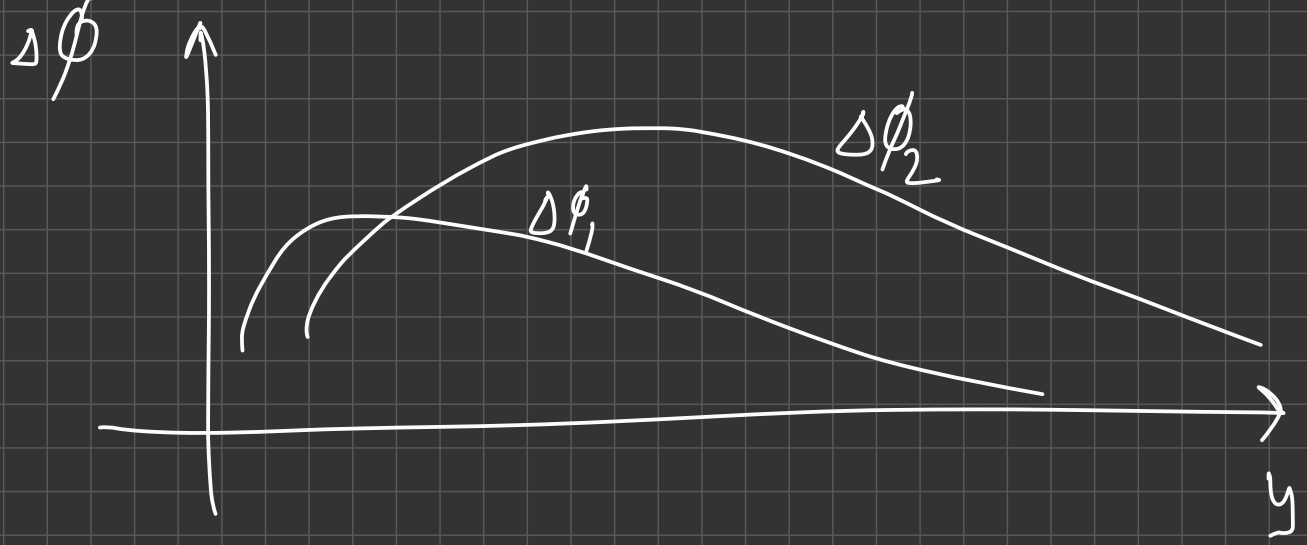
$\frac{2GM}{c^2} = R_S \sim \lambda$

$$\Delta\phi\left(D_s, D_2, M, \lambda, y\right) = \omega\,\delta t$$

$M \sim 10^{-15} M_0$

$\lambda_1 = 500\,nm = 5\times10^{-7}\,m$

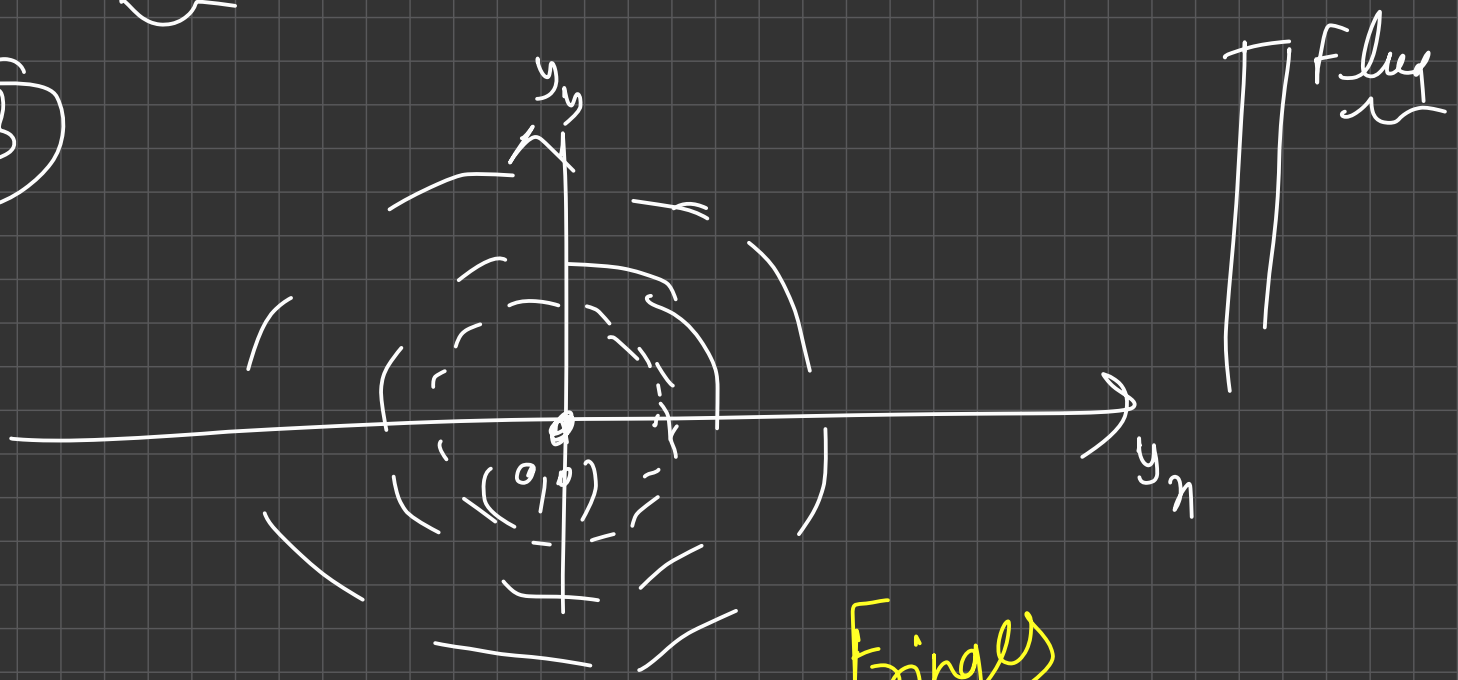
$r_2 = 10^{-23}\,m$



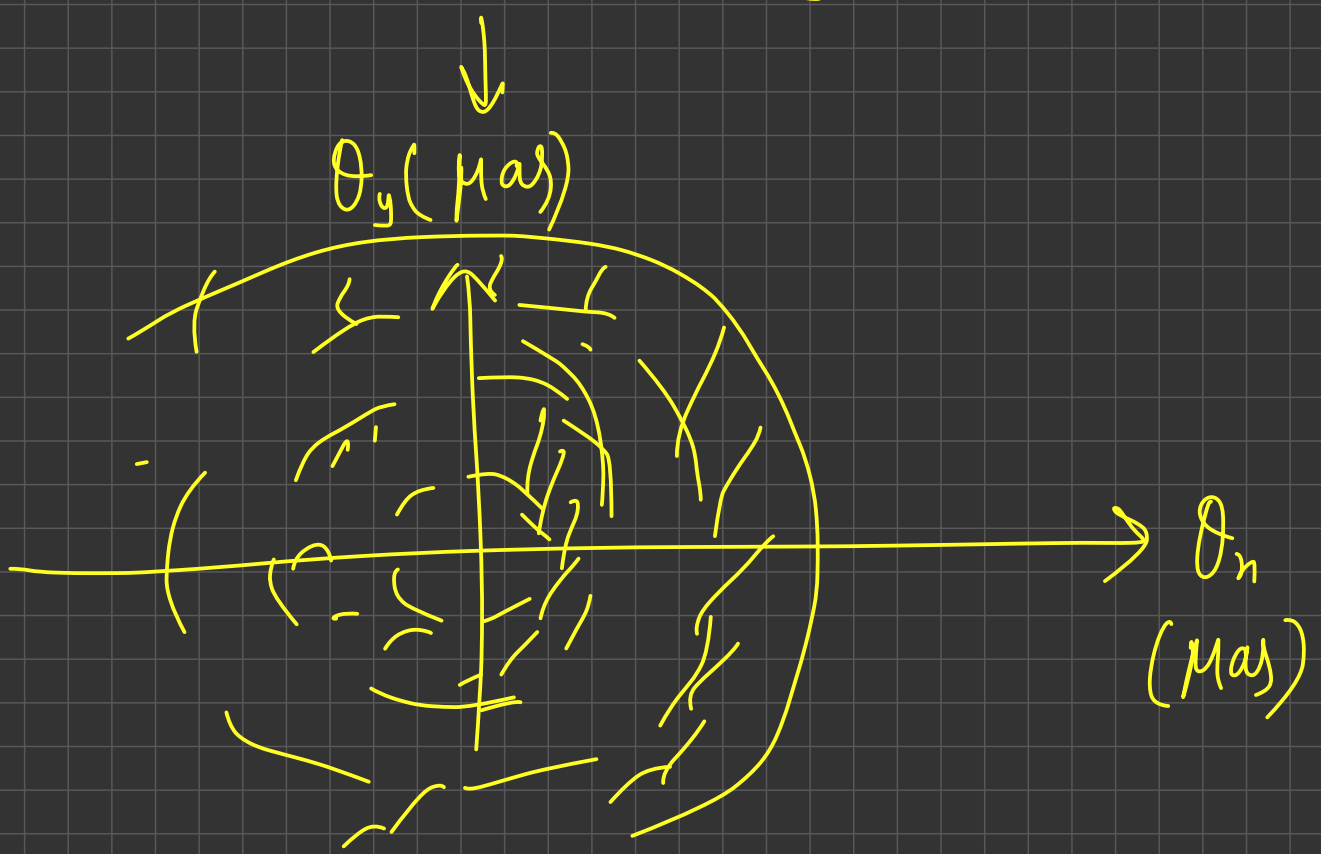
② $\Delta\phi(y)$

$$F(y) = F_+(y) + F_-(y) + 2\sqrt{F_+F_-}\cos\omega\Delta t(y)$$

③



Fringes



④ $\delta F_1 = F_1^{max} - F_1^{min}$ ✓

$\delta F_2 =$ ✓

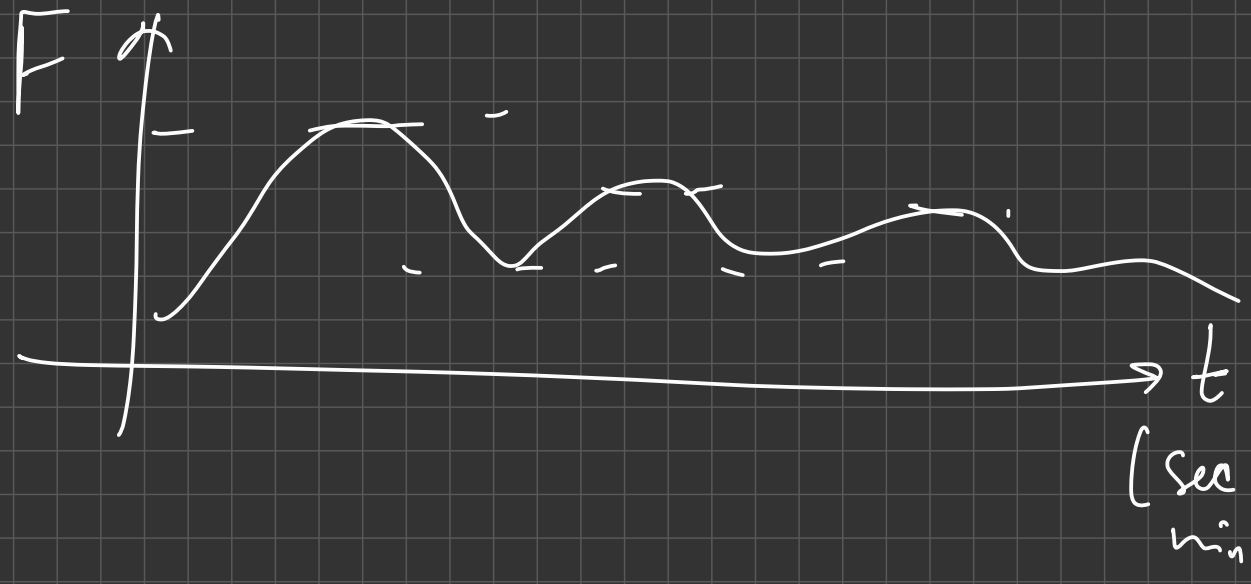
(II) Temporal :-

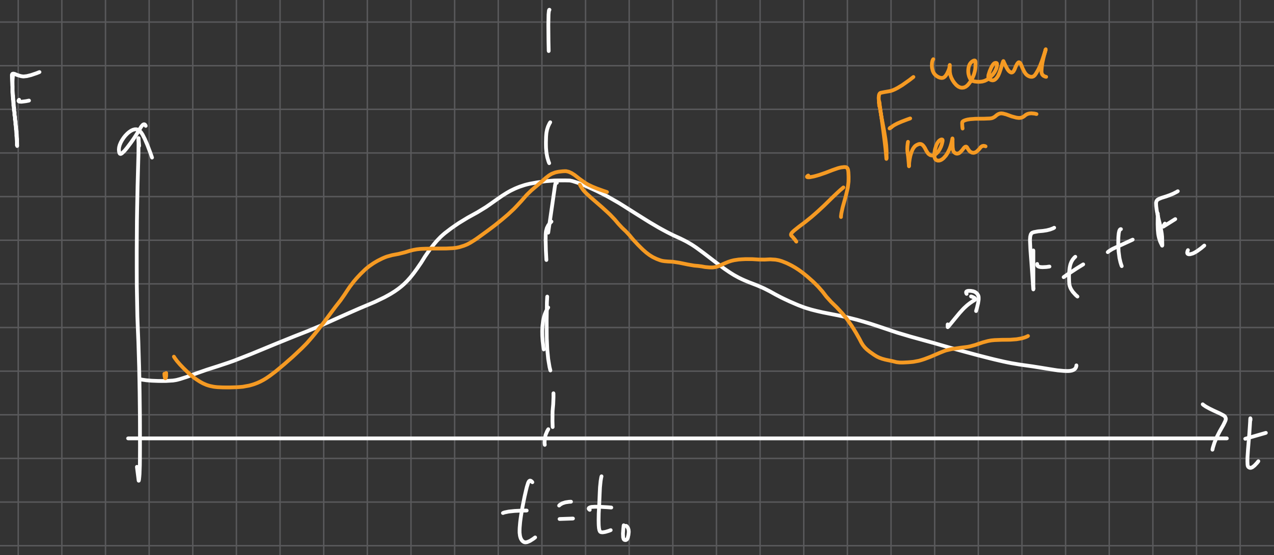
$$\vec{y}(t) = \left[\frac{t - t_0}{t_E} \right] \xi(t)$$

$$\left[\frac{v}{D_L} \right] \quad t_E = \frac{\theta_E}{\mu}$$

$v = 200$ km/sec

$$F(y(t)) = F_+(y) + F_-(y) + 2\sqrt{F_+ F_-} \sin \omega \Delta t(y(t))$$




F
t
t = t₀
$F_+ + F_-$
F_{mean}