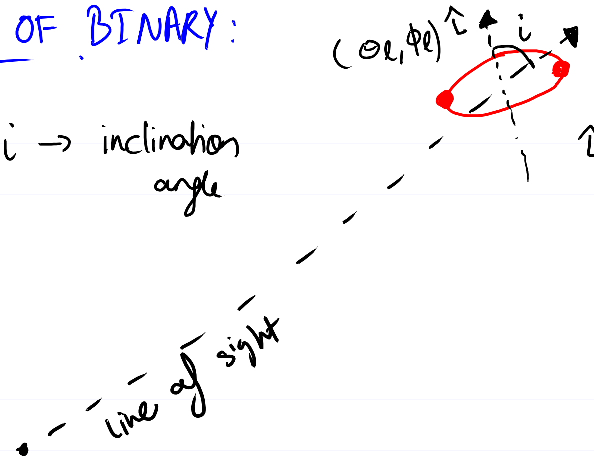
ORIENTATION OF BINARY:



$\angle i \rightarrow$ inclination angle

$$\hat{L}\cdot\hat{n} = \cos i$$
$$= \cos\theta_L \cos\theta_n + \sin\theta_L \sin\theta_n \cos(\phi_L - \phi_n)$$

① The plus and cross polarization can be written as (for orbiting Binary)

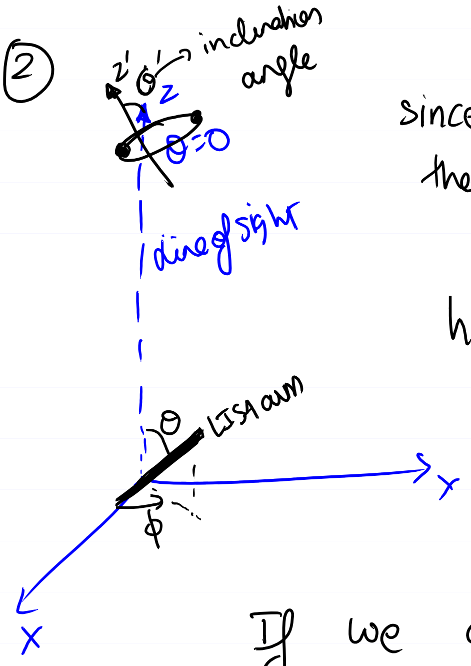
$$h_+ = \frac{-4GM}{c^2 r}\left(\frac{v}{c}\right)^2 \left\{\frac{1+(\hat{L}\cdot\hat{n})^2}{2}\right\} \cos 2\phi$$

$$= \frac{-4GM}{c^2 r}\left(\frac{v}{c}\right)^2 \left(\frac{1+\cos^2 i}{2}\right) \cos 2\phi \quad //$$

$$h_\times = -\frac{4GM}{c^2 r}\left(\frac{v}{c}\right)^2 (\hat{L}\cdot\hat{n}) \sin 2\phi$$

$$= -\frac{4GM}{c^2 r}\left(\frac{v}{c}\right)^2 \cos i \sin 2\phi \quad //$$

②



since $\theta = 0$ is the line of sight, the inclination angle is θ'

$$h_+ = -\frac{4GM}{c^2 r}\left(\frac{v}{c}\right)^2 \left(\frac{1+\cos^2\theta'}{2}\right) \cos 2\phi$$

$$h_\times = \frac{-4GM}{c^2 r}\left(\frac{v}{c}\right)^2 \cos\theta' \sin 2\phi$$

If we define $F_n^{(+)}$ & $F_n^{(\times)}$ as the antenna beam parameters we can write more accurately

$$h(t) = B(t) \cos \chi(t) \quad \text{where} \quad B(t) = \sqrt{\left(F^{(+)}(t) A_+(t)\right)^2 + \left(F^{(\times)}(t) A_\times(t)\right)^2}$$

$$\chi(t) = \phi_{gw}(t) + \phi_N(t)$$

$$\text{where} \quad \phi_N(t) = \tan^{-1}\left[\frac{-F^{(\times)}(t) A_\times(t)}{F^{(+)}(t) A_+(t)}\right]$$