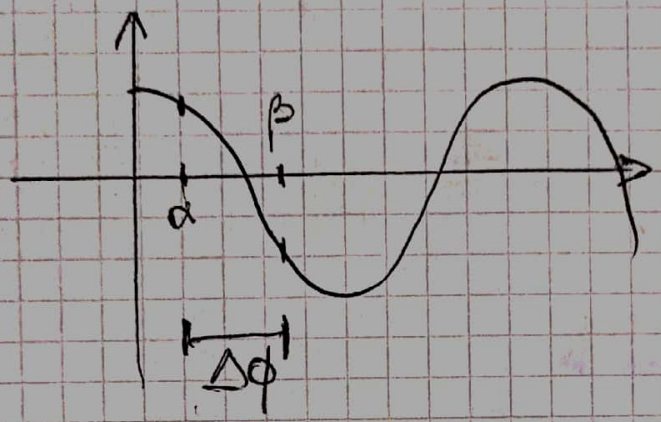
Luz Polarizada:

$$\begin{cases} E_x = E_{ox}\cos(kz-\omega t+\alpha) \\ E_y = E_{oy}\cos(kz-\omega t+\beta) \end{cases} \qquad \Delta\phi = \alpha-\beta$$



- **LP:** E_{ox} y E_{oy} no tienen que ser iguales

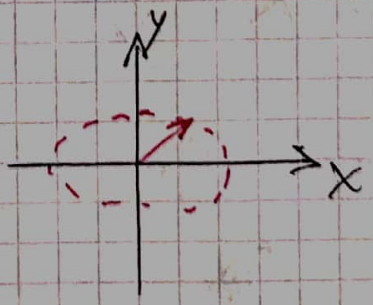
  $\Delta\phi = 0 ; \pi$

- **CP:** $E_{ox} = E_{oy} = E$

  $\Delta\phi = \pm\frac{\pi}{2}$

- **EP:** $E_{ox} \neq E_{oy}$

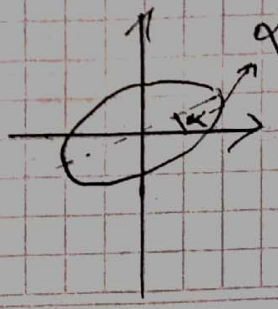
  $\Delta\phi = \pm\frac{\pi}{2}$



En general:

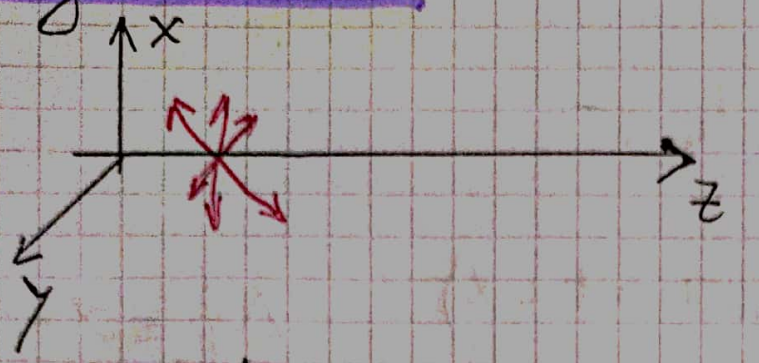
$$E_x = E_{ox}\cos(kz-\omega t)$$
$$E_y = E_{oy}\cos(kz-\omega t+\phi)$$

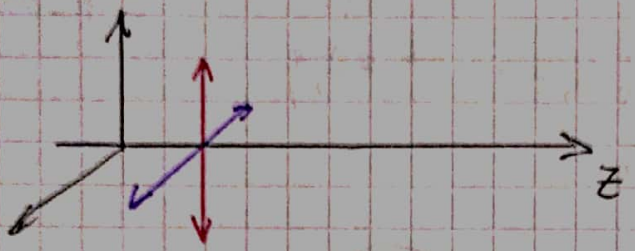
$$tg(2\alpha) = \frac{2E_{ox}E_{oy}\cos(\phi)}{E_{ox}^2 - E_{oy}^2}$$



NOTA

Luz Natural:



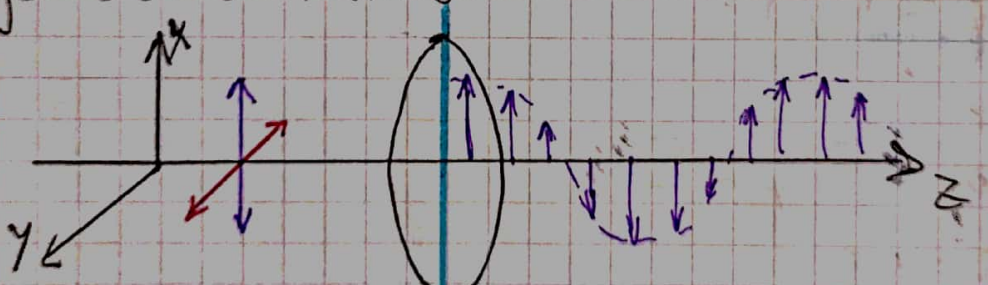


Amplitudes iguales pero $\Delta\phi$ varía

Polarizadores:

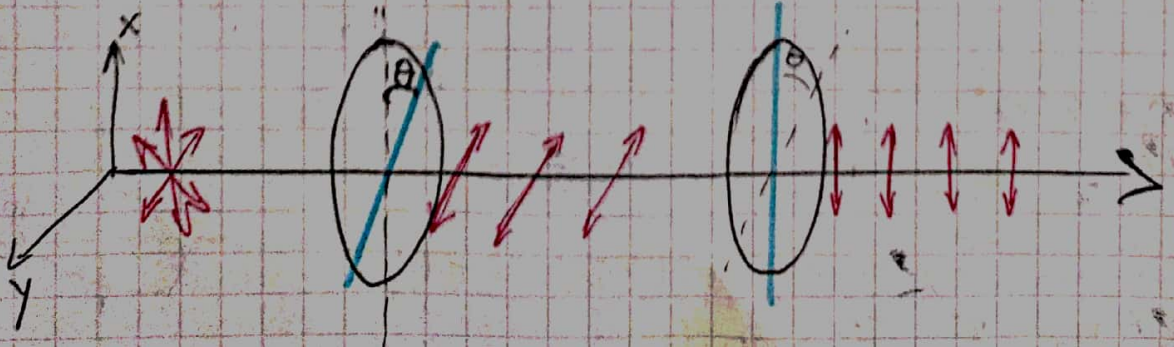
Polaroide: polarizador lineal.

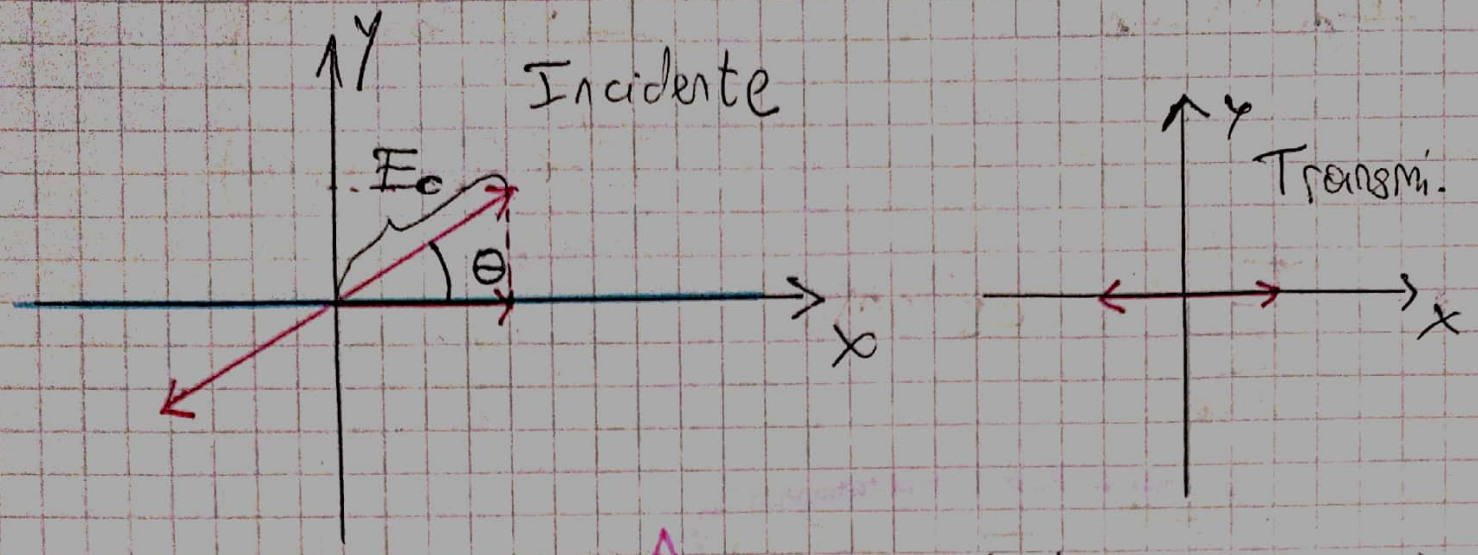
Eje de transmisión



$$I(E) = K E_{Max}^2 \Rightarrow I' = \frac{I_0}{2}$$

Incido con LP:





$$\underline{E}_0 \begin{cases} \underline{E}_x = E_{0x}\, e^{i(kz-\omega t)}\,\hat{x} \\ + \\ \underline{E}_y = E_{0y}\, e^{i(kz-\omega t)}\,\hat{y} \end{cases} \longrightarrow \underline{E}': \begin{cases} \underline{E}'_x = E_{0x}\, e^{i(kz-\omega t)} \\ \underline{E}'_y = 0 \end{cases}$$

(Amplitud del $\underline{E}$ incidente) E_0 $\longrightarrow$ $E' = E_0 \cos(\theta)$

E_{0x}

$$\sqrt{E_{0x}^2 + E_{0y}^2}$$

$$E_{0x} = E_0 \cos(\theta)$$

$$E_{0y} = E_0 \operatorname{sen}(\theta)$$

$$E_0 = \sqrt{E_{0x}^2 + E_{0y}^2} = \sqrt{E_0^2 \cos^2(\theta) + E_0^2 \operatorname{sen}^2(\theta)}$$

$$= \sqrt{E_0^2} = E_0.$$

$\operatorname{sen}^2(\theta) + \cos^2(\theta) = 1$

$I_0 \propto E_0^2$

$I' \propto (E_0 \cos(\theta))^2$

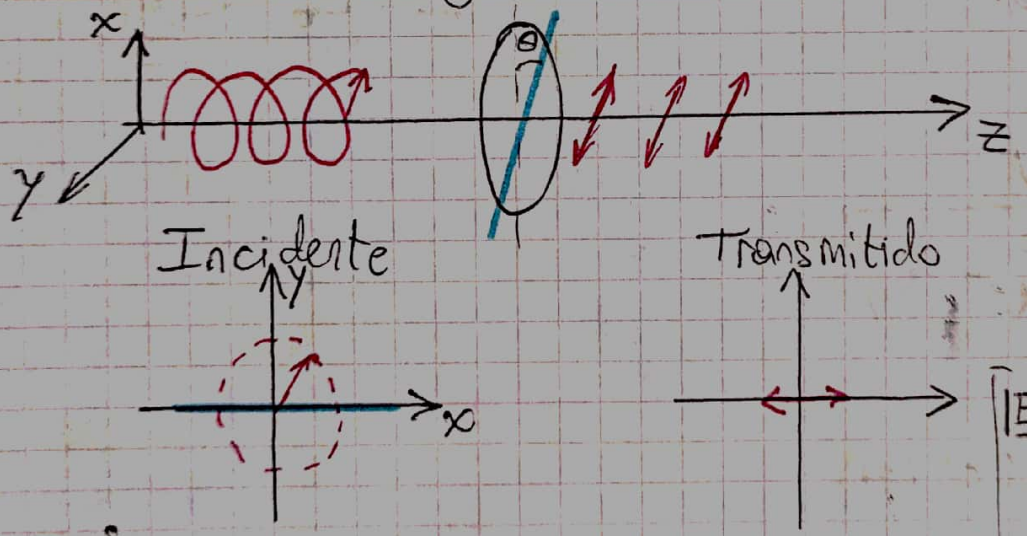
$I' \propto E_0^2 \cos^2(\theta)$

$$\frac{I'}{I_0} = \cos^2(\theta)$$

$$I' = I_0 \cos^2(\theta)$$ Ley de Malus.

(Solo si incide LP.)

Incido con luz CP:



$$\vec{E} = E\cos(kz-\omega t)\hat{x} + E\,\text{sen}(kz-\omega t)\hat{y} \Rightarrow$$

$$|\vec{E}|^2 = E^2C^2(kz-\omega t) + E^2S^2(kz-\omega t)$$

$$= E^2\left[C^2(kz-\omega t) + S^2(kz-\omega t)\right]$$

$$C^2 + S^2 = 1$$

$$|\vec{E}|^2 = E^2$$

$$|\vec{E}|^2 = 2E^2$$

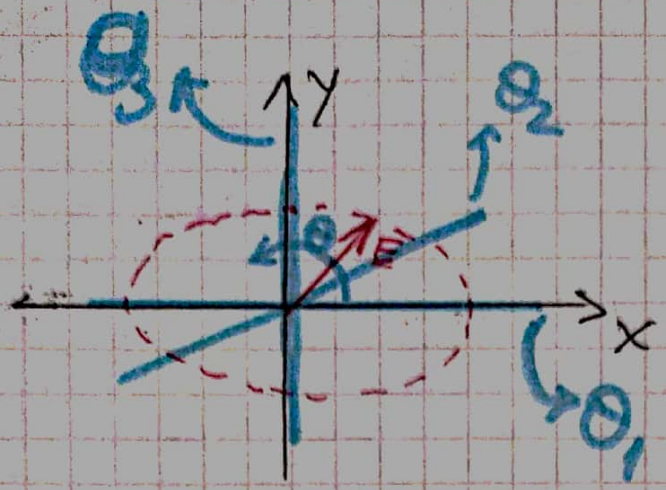
$$|\vec{E}'|^2 = E^2\cos^2(kz-\omega t$$

$$I_0 = K2E^2$$

$$I' = KE^2.$$

$$I' = \frac{I_0}{2}$$

EP:



z fijo