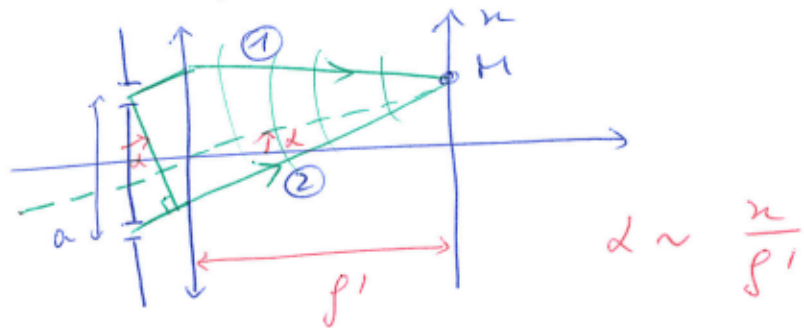


OP3 - 02

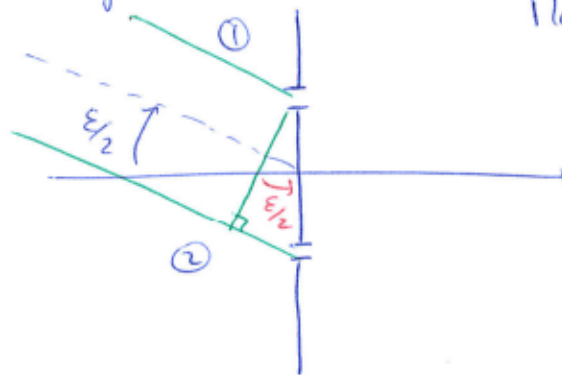
1) Déphasage après les fentes :

Pathes ⊕ retour inverse.



$$\text{et } \delta_{ap} = (S_1 r) - (S_2 r) \\ = - \delta a = - \frac{a r}{f'}$$

Déphasage avant les fentes.



Pathes

$$\delta_{av} = (E_1 S_1) - (E_1 S_2) \\ = - a \frac{\epsilon}{2}$$

$$\delta_{E_1} = \delta_{ap} + \delta_{av} = - a \left(\frac{r}{f'} + \frac{\epsilon}{2} \right)$$

$$I_1 = 2 I_0 \left(1 + \cos \left(\frac{2\pi \delta_{E_1}}{\lambda} \right) \right)$$

et idem $\delta_{E_2} = \delta_{ap,2} + \delta_{av,2}$

$$= - a \left(\frac{r}{f'} - \frac{\epsilon}{2} \right)$$

($\epsilon \rightarrow -\epsilon$
mais δ_{ap} identique)

$$I_2 = 2 I_0 \left(1 + \cos \left(\frac{2\pi \delta_{E_2}}{\lambda} \right) \right)$$

2) Franges sombre de l'une sur les franges claires de l'autre.

$$3) \cos p + \cos q = 2 \cos\left(\frac{p+q}{2}\right) \cos\left(\frac{p-q}{2}\right)$$

$$I(x) = 4I_0 \left(1 + \cos\left(\frac{\pi}{\lambda}(\delta_1 - \delta_2)\right) \cos\left(\frac{\pi}{\lambda}(\delta_1 + \delta_2)\right) \right)$$

$$\begin{cases} \delta_1 - \delta_2 = -a\varepsilon \\ \delta_1 + \delta_2 = -\frac{2an}{f'} \end{cases}$$

$$I(x) = 4I_0 \left\{ 1 + \cos\left(\frac{2\pi an}{\lambda f'}\right) \underbrace{\cos\left(\frac{\pi a\varepsilon}{\lambda}\right)}_{\text{Contraste}} \right\}$$
$$\mathcal{C} = \left| \cos\left(\frac{\pi a\varepsilon}{\lambda}\right) \right|$$

Contraste nul si

$$\frac{\pi a\varepsilon}{\lambda} = \frac{\pi}{2} + p\pi \quad p \in \mathbb{Z}$$

$$2 \frac{a\varepsilon}{\lambda} = (2p+1)$$

$$a_p = \frac{\lambda}{2\varepsilon} (2p+1) \quad p \in \mathbb{Z}$$

$$a_0 = 116,5 \text{ cm} \quad \Rightarrow \quad \boxed{\varepsilon = \frac{\lambda}{2a_0}}$$

$$\underline{\underline{AN}} \quad \varepsilon = 2,7 \cdot 10^{-7} \text{ rad}$$

$$= 1,5 \cdot 10^{-5} \text{ }^\circ$$

$$= 0,05 \text{ '' (seconde d'arc)}$$

$$\begin{cases} 1^\circ = 60' \\ 1' = 60'' \end{cases}$$