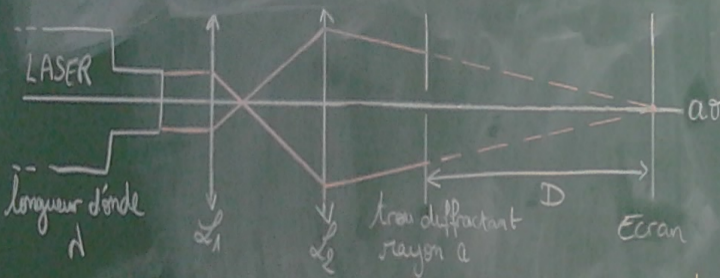
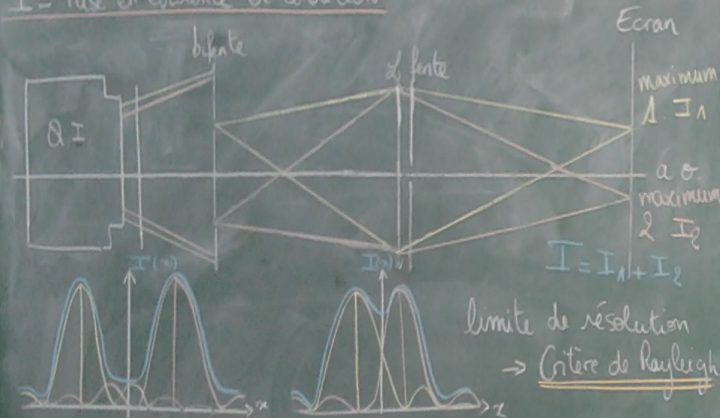


TIP 8. Diffraction des ondes lumineuses

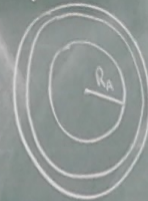
I - Mise en évidence et conditions



Nombre de Fresnel: $\frac{a^2}{\lambda D}$ $\left\{ \begin{array}{l} \ll 1: \text{Fraunhofer} \\ \gg 1: \text{Fresnel} \end{array} \right.$

II - Propriétés de la figure de diffraction

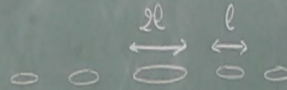
• Trou circulaire de rayon R_0



tâche d'Airy

$$R_A = \frac{1,22 \lambda}{R_0}$$

• Fente de largeur a



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

Quelques propriétés de la transformée de Fourier

homothétie: $\mathcal{F}(f(ax)) = \frac{1}{|a|} \tilde{f}(q/a)$

translation: $\mathcal{F}(f(x-a)) = \exp(-2i\pi qa) \tilde{f}(q)$

Application: détermination du rayon de pores de lysopode

$\lambda = 632,8 \text{ nm}$

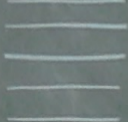
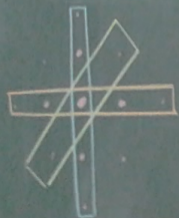
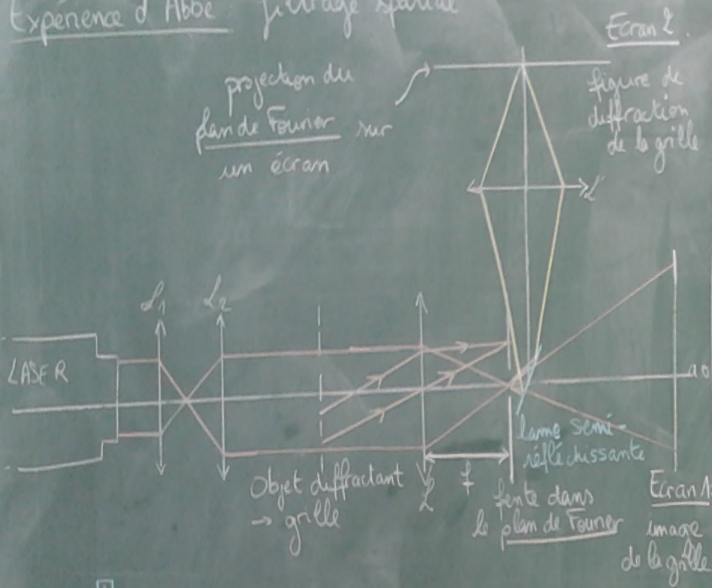
$R_A = \dots$

$\Rightarrow \frac{\Delta R_A}{R_A} = \dots$

$R_D = \dots \%$

III - Application en traitement d'image

Expérience d'Abbe : filtrage spatial



Sans la fente



Stéréoscopie : filtre passe-haut

