MEDIS ~~ISO~~ / ANISÒTROPS

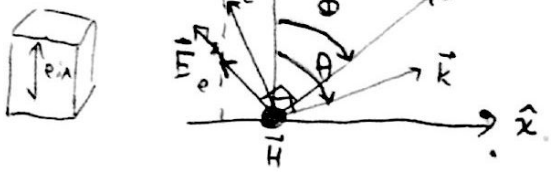
$\vec{P} = \varepsilon_0 \overleftrightarrow{\chi}\, \vec{E}$, $\vec{D} = \varepsilon_0 (\mathbb{1} + \overleftrightarrow{\chi})\vec{E}$.

- iso - $\overleftrightarrow{\chi}$ escalar
- ani - $\overleftrightarrow{\chi}$ matriu

$\vec{E} = \hat{\varepsilon}\begin{pmatrix} 1/n_1^2 & & \\ & 1/n_2^2 & \\ & & 1/n_3^2 \end{pmatrix} \vec{D}$

- uniàxic: n_e, n_o, n_o
- biàxic: n_x, n_y, n_z

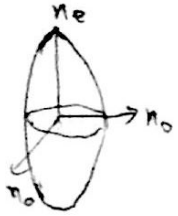
Cristall uniàxic

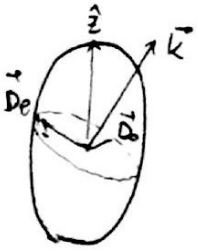


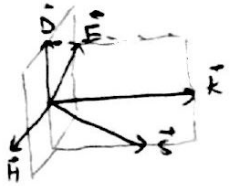
raig extraordinari: $t\theta = \left(\frac{n_e}{n_o}\right)^2 t\Phi$

Defasament ente raigs (extra)ordinaris: $\Delta = (n_e - n_o)\, d \Rightarrow \delta = \frac{2\pi}{\lambda_0}(n_e - n_o)\, d$

Retardadores:
- $\frac{\lambda}{2} \to \delta = \pi$ pol. creu
- $\frac{\lambda}{4} \to \delta = \frac{\pi}{2}$ retard.



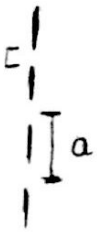




pla DEKS

FRAUNHOFER

$E = \int_S \frac{E_0(x,y)}{r} e^{i(\omega t - ks)} f(\theta)\, ds$

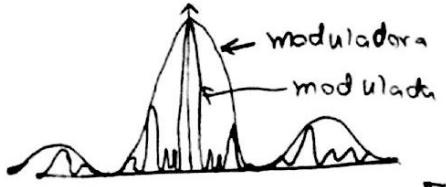


Una escletxa:

$E = \frac{\varepsilon_0}{R}\int_{-b/2}^{b/2} \sin[\omega t - k(R - y\sin\theta)]\, dy$

$E = \frac{\varepsilon_0 b}{R}\frac{\sin[(kD/2)\sin\theta]}{(kD/2)\sin\theta}\sin(\omega t - kR)$, $\beta = \frac{kb}{2}\sin\theta$

$I(\theta) = \langle E^2 \rangle = \frac{1}{2}\left(\frac{\varepsilon_0 D}{R}\right)^2 \left(\frac{\sin\beta}{\beta}\right)^2 = I_0 \operatorname{sinc}^2\beta$



N-1 mínims
N-2 màxims secundaris

Posició i amplada màxims
- Pos. $\sin\theta_m = \frac{m\lambda}{a}$
- Amp. $\theta_{m+1} - \theta_m = \frac{\lambda}{a\cos\theta_m}$

Doble escletxa: $\alpha = \frac{Ka}{2}\sin\theta$, $I(\theta) = I_0 \cos^2\alpha \operatorname{sinc}^2\beta$

N escletxes: $I(\theta) = I_0 \frac{\sin^2(\alpha N)}{\sin^2\alpha}\operatorname{sinc}^2\beta$

INTERFERÒMETRES

$I(\theta) = I_1 + I_2 + 2\sqrt{I_1 I_2}\cos(\delta(\theta))$

$d = |d_1 - d_2|$ (Mich) , $\Delta = 2d\cos\theta$, $\delta = \frac{2\pi}{\lambda}\Delta$

màxim: $\Delta = m\lambda$, mínim: $\Delta = \frac{2m-1}{2}\lambda$

ordres: $m_0, m_0 - 1, \dots$

anells: $r = f' \tan\theta$ | ± anells: $\Delta d = \frac{\lambda}{2}\Delta m$

Fabry-Perot

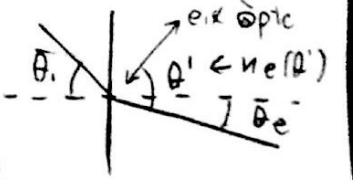
$F = \frac{4R}{(1-R)^2}$

$R = |r|^2$

$\mathcal{R} = \left|\frac{\lambda}{\Delta\lambda}\right| = \frac{\pi}{2}\sqrt{F}m$ (m: ordre)

CRISTALL UNIÀXIC (BIS)

- Raig ord: $n s\theta_i = n_o s\theta_o$
- R extraord: $n s\theta_i = n_e(\theta')\theta_e$



$\updownarrow$ eix òptic $\Rightarrow \tan\theta_e = \frac{n_o s\theta_i}{n_e\sqrt{n_o^2 - s^2\theta_i}}$

$\leftrightarrow$ eix òptic $\Rightarrow \tan\theta_e = \frac{n_e s\theta_i}{n_o\sqrt{n_e^2 - s^2\theta_i}}$

$n_e(\theta') = \frac{n_e n_o}{\sqrt{n_o^2 s^2\theta' + n_e^2 c^2}}$