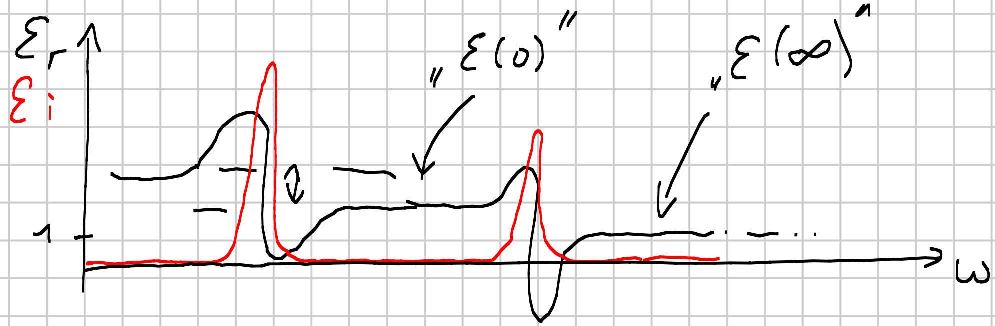
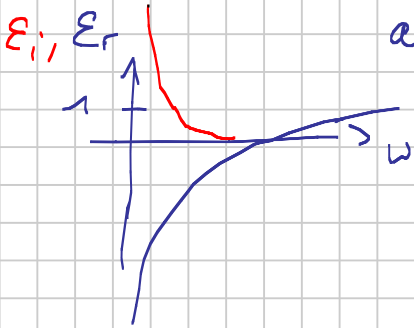
Dispersion im Lorentz-Modell

$$\varepsilon(\omega) = 1 + \sum_{i=0}^{N} \frac{A_i}{\omega_0^2 - \omega^2 - 2 i \gamma_i \omega}$$

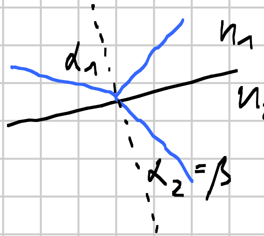


⇒ Metall: keine Rückstellkraft auf e^-. Freie Ladung $\omega_0 \to 0$

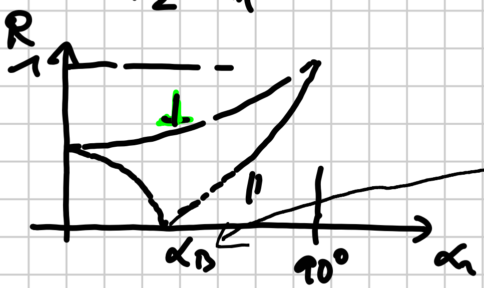


Drude-Modell

Fresnel-Formeln

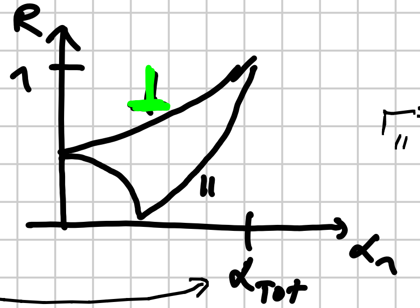


$n_2 > n_1$



$$\tan \alpha_B = \frac{n_2}{n_1}$$

$$\sin \alpha_T = \frac{n_2}{n_1}$$



$$r_\perp = \left(\frac{E_r}{E_e}\right)_\perp = \frac{n_1 \cos\alpha_1 - n_2 \cos\alpha_2}{n_1 \cos\alpha_1 + n_2 \cos\alpha_2}$$

$$r_\parallel = \left(\frac{E_r}{E_e}\right)_\parallel = \frac{n_1 \cos\alpha_2 - n_2 \cos\alpha_1}{n_1 \cos\alpha_2 + n_2 \cos\alpha_1}$$

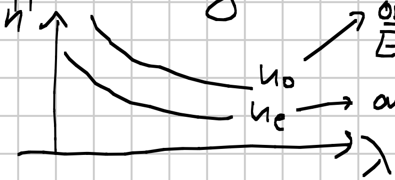
$n_1 > n_2 \Rightarrow \frac{n_1 - n_2}{n_1 + n_2} < 0 \Rightarrow \pi$ Phasensprung

Reflektivität auf Intensität bezogen: $R = |r|^2 = \left|\frac{n_1 - n_2}{n_1 + n_2}\right|^2$

Elliptische Polarisation: $\vec{E} = \begin{pmatrix} E_x \\ 0 \\ 0 \end{pmatrix} \sin(\omega t - kz) + \begin{pmatrix} 0 \\ E_y \\ 0 \end{pmatrix} \sin(\omega t - kz + \varphi)$

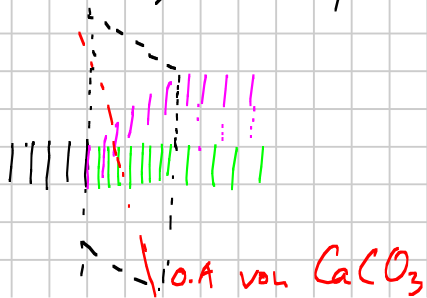
wenn $E_x = E_y$ und $\varphi = \frac{\pi}{2}$ ⇒ zirkular. Wenn E_x oder $E_y = 0$ oder $\varphi = 0$ ⇒ linear

Doppelbrechung:



n_o → ordentliche Polarisation $\vec{E} \perp$ optische Achse

n_e → außerordentliche Pol. $E \parallel$ opt. Achse



Wellenvektoren folgen Snellius. Energiestrom folgt Poynting:

$$S \sim E_\parallel^2 \vec{V}_\parallel + E_\perp^2 \vec{V}_\perp$$