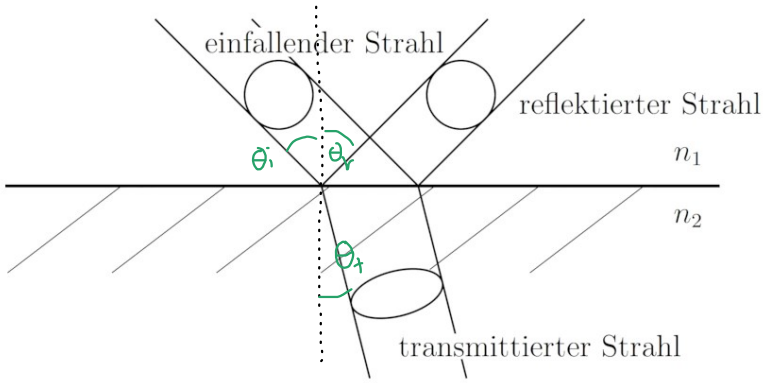


$\theta_i = \theta_1 \qquad \theta_t = \theta_2$

$$\frac{\sin(\theta_1)}{\sin(\theta_2)} = \frac{n_2}{n_1}$$

a) θ_e, θ_r, θ_t ?

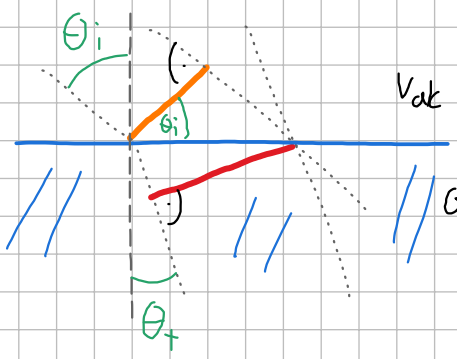
$$\sin(\theta_i) = \sin(\theta_t) \cdot 1{,}6$$

$$\theta_b = \theta_i = \arctan\left(\frac{n_2}{n_1}\right) = 57{,}994° = \theta_r$$

$$\theta_t = \arcsin\left(\frac{\sin\theta_i}{1{,}6}\right) = 32°$$

b) A von trans.

Fläche ellipse : $A = \frac{\pi ab}{4}$ =



2 Schritte : $b_i = 2\sqrt{\frac{A}{\pi}} \rightarrow b_g = \frac{b_i}{\cos(\theta_i)}$

$b_t = b_g \cdot \cos\theta_t)$

$$A = \frac{1}{4}\pi \cdot 2\cdot\sqrt{\frac{A}{\pi}}\; b_t = \frac{1}{4}\pi 2\sqrt{\frac{A}{\pi}} \cdot 2\sqrt{\frac{A}{\pi}} \cdot \frac{\cos(\theta_t)}{\cos(\theta_i)}$$

$$= A \cdot \frac{\cos(\theta_t)}{\cos(\theta_i)} = 4{,}8\ mm^2$$

c) $P_{TE,t}$, $P_{TM,t}$?

$P_{TM,e} = P_{TE,e}$ weil ⊙ - Polarisierte Welle

$\vec{P} = \vec{P}_{TE} + \vec{P}_{TM} \rightarrow P_{TM,e} = P_{TE,e} = \frac{P_e}{2} = 5\ mW \rightarrow E_e = \sqrt{\frac{2P\eta_0}{A_e}} =$ 1,124 V/m

T, T von Formelsammlung: $n = \frac{n_2}{n_1} = 1{,}6$

$$T_{TM} = \frac{n^2\cos(\theta_1) - \sqrt{n^2 - \sin^2(\theta_1)}}{n^2\cos(\theta_1) + \sqrt{n^2 - \sin^2(\theta_1)}} = \frac{1{,}6^2\cdot\cos(58°) - \sqrt{1{,}6^2 - \sin^2(58°)}}{1{,}6^2\cdot\cos(58°) + \sqrt{1{,}6^2 - \sin^2(58°)}} \approx 0 = T_{TM}$$

T_{TM} wenn Brewster = 0

$T_{TE} = -0{,}438$

$$T_{TM} = \frac{2n\cos\theta_1}{n^2\cos\theta_1 + \sqrt{n^2 - \sin^2(\theta_1)}} = 0{,}624 = T_{TM}$$

$T_{TE} = 0{,}561$

$$P_{TE,e} = P_{TM,e} = \frac{E_e^2 A_e}{2\eta_e} \qquad E_e^2 = \frac{P_e 2\eta_e}{A_e} \qquad \frac{n_1}{n_2} = \frac{\eta_2}{\eta_1}$$

$$P_{TE,t} = \frac{E_{TE,t}^2 A_t}{2\eta_t} = \frac{(T_{TE} E_e)^2 A_t}{2\eta_T} = \frac{T_{TE}^2 P_e 2\eta_e A_t}{2\eta_T A_e} = 0{,}561^2 \cdot 5\,mW \frac{\eta_e}{\eta_T} \frac{A_T}{A_e} =$$

$$= 0{,}561^2 \cdot 5\,mW \frac{\eta_t}{\eta_e} \frac{A_t}{A_e} =$$

$$= 4{,}03\,mW$$

$$P_{TM,t} = \frac{E_{TM,t}^2 A_t}{2\eta_t} = \frac{(T_{TM} E_e)^2 A_t}{2\eta_T} = 0{,}624^2 \cdot 5\,mW \frac{\eta_t}{\eta_e} \frac{A_t}{A_e} = 5\,mW$$