

CE12E12+

FOR THE

$$\mathbf{k}_i = \begin{pmatrix} k_{ix} \\ k_{iy} \\ k_{iz} \end{pmatrix}$$

$$\mathbf{k}_r = \begin{pmatrix} k_{rx} \\ k_{ry} \\ k_{rz} \end{pmatrix}$$

$$\mathbf{k}_t = \begin{pmatrix} k_{tx} \\ k_{ty} \\ k_{tz} \end{pmatrix}$$

$$E_z(r) = E_0 e^{ik_z r}, \quad E_r(r) = r E_0 e^{ik_z r}, \quad E_t(r) = t E_0 e^{ik_z r}$$











$$e^{ik \cdot r} + r e^{ik_r \cdot r} = -te^{ik_t \cdot r} \Big|_{z=0}$$



$$e^{ik_x x} + r e^{ik_r x} + k_r v y = t e^{ik_t x} + k_t v y, \quad \forall x, y$$



$$re^{ikrv} = e^{ikrv} (1 + re^{ikrv})$$





$$\cos(\theta) = 1 + r \cos(\theta) = t \cos(\theta)$$







$$e^{ik_z x} + r e^{ik_z x} = t e^{ik_z x}, \quad v x$$



$$1 + \operatorname{re} i(k_r x - k_z x) = \operatorname{re} i(k_r x - k_z x), \quad \forall x$$



$$v_1 \sin \theta_1 = v_2 \sin \theta_2$$





$$k_i \cdot k_i = k_0^2 \epsilon_i \Rightarrow k_i = k_0 \sqrt{\epsilon_i} = k_0 n_i$$

$$\left\{ \begin{array}{l} k_{ix} = n_1 k_0 \sin \theta_i \\ k_{rx} = n_1 k_0 \sin \theta_r \\ k_{tx} = n_2 k_0 \sin \theta_t \end{array} \right.$$

$$\left\{ \begin{array}{l} \theta_i = \theta_r \\ n_1 \sin \theta_i = n_2 \sin \theta_t \end{array} \right.$$

$$2\pi \int_{-\infty}^{\infty} \frac{1}{\sqrt{1-x^2}} dx = 2\pi \int_{-\infty}^{\infty} \frac{1}{\sqrt{1-x^2}} dx$$





1. = 10

$$\Rightarrow \begin{cases} k_x^2 + k_{iz}^2 = \epsilon_1 k_0^2 \\ k_x^2 + k_{rz}^2 = \epsilon_1 k_0^2 \\ k_x^2 + k_{tz}^2 = \epsilon_2 k_0^2 \end{cases} \Rightarrow k_{iz} = \pm \sqrt{\epsilon_1 k_0^2 - k_x^2} = -k_{rz}$$











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$$\frac{k_{iz}}{\mu_1} E_{iy} + \frac{k_{rz}}{\mu_1} E_{ry} = \frac{k_{tz}}{\mu_2} E_{ty}$$





$$\frac{k_{iz}}{\mu_1} - \frac{k_{iz}}{\mu_1} r = \frac{k_{tz}}{\mu_2} t,$$

$$1-r = \frac{\mu_1}{\mu_2} \frac{k_{tz}}{k_{iz}} t$$

$$\begin{cases} 1+r=t \\ 1-r=\frac{\mu_1}{\mu_2}\frac{k_{tz}}{k_{iz}}t \end{cases}$$





$$t_{12}^s = \frac{2\mu_2 k_{z1}}{\mu_2 k_{z1} + \mu_1 k_{z2}}, \quad r_{12}^s = \frac{\mu_2 k_{z1} - \mu_1 k_{z2}}{\mu_2 k_{z1} + \mu_1 k_{z2}}.$$

$$t_{12}^s = \frac{2}{1 + K_s}, \quad r_{12}^s = \frac{1 - K_s}{1 + K_s}, \quad K_s := \frac{\mu_1}{\mu_2} \frac{k_{z2}}{k_{z1}}$$





$$\rho_{12}^p = \frac{\varepsilon_2 k_{z1} - \varepsilon_1 k_{z2}}{\varepsilon_2 k_{z1} + \varepsilon_1 k_{z2}} = \frac{1 - K^p}{1 + K^p}, \quad r_{12}^s = \frac{\mu_2 k_{z1} - \mu_1 k_{z2}}{\mu_2 k_{z1} + \mu_1 k_{z2}} = \frac{1 - K^s}{1 + K^s}$$

$$\tau_{12}^p = \frac{2\varepsilon_2 k_{z1}}{\varepsilon_2 k_{z1} + \varepsilon_1 k_{z2}} = \frac{2}{1 + K^p}, \quad t_{12}^s = \frac{2\mu_2 k_{z1}}{\mu_2 k_{z1} + \mu_1 k_{z2}} = \frac{2}{1 + K^s}$$

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$$\frac{E_1 N_2 + E_2 N_1}{E_1 N_1 + E_2 N_2}$$

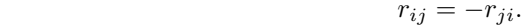
Ne

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Ne 2

Ne 1







$$r^p = \frac{n_2 \cos \theta - n_1 \sqrt{1 - \frac{n_1^2}{n_2^2} \sin^2 \theta}}{n_2 \cos \theta + n_1 \sqrt{1 - \frac{n_1^2}{n_2^2} \sin^2 \theta}}$$