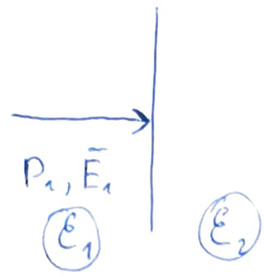
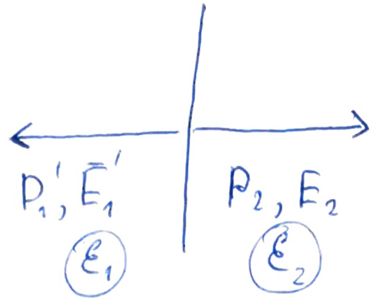
504 группа

2.8





Дано:

$R = \dfrac{P_1'}{P_1} = \dfrac{1}{2}$

Найти: $\varepsilon_1, \varepsilon_2$ - ?

Реш-е:

$P = S\Sigma$

$S = c\varepsilon\varepsilon_0 E^2$

$$\frac{P_1'}{P_1} = \frac{S_1'}{S_1} = \frac{E_1'^2}{E_1^2} \Rightarrow \frac{E_1'}{E_1} = \sqrt{R}$$

Р-им случай нормального падения:

$$\begin{cases} E_1 + E_1' = E_2 \\ H_1 - H_1' = H_2 \end{cases} \{E = Z_{эл} H\} \Leftrightarrow \begin{cases} E_1 + E_1' = E_2 \\ \dfrac{E_1}{Z_1} + \dfrac{E_1'}{Z_1} = \dfrac{E_2}{Z_2} \end{cases} \Leftrightarrow \begin{cases} \dfrac{E_1 + E_1'}{Z_2} = \dfrac{E_2}{Z_2} \\ \dfrac{E_1 - E_1'}{Z_1} = \dfrac{E_2}{Z_2} \end{cases} \Rightarrow$$

$$\Rightarrow \frac{E_1 + E_1'}{Z_2} - \frac{E_1 - E_1'}{Z_1} = 0 \Rightarrow (Z_1 - Z_2)E_1 = -(Z_1 + Z_2)E_1' \Rightarrow$$

$$\Rightarrow \frac{E_1'}{E_1} = \frac{Z_2 - Z_1}{Z_2 + Z_1} = \sqrt{R} \Rightarrow Z_1(1 + \sqrt{R}) = Z_2(1 - \sqrt{R})$$

$$Z_1^2 = Z_2^2 \left(\frac{1 - \sqrt{R}}{1 + \sqrt{R}}\right), \quad Z = \sqrt{\frac{\mu_0 \mu}{\varepsilon_0 \varepsilon}} \Rightarrow \frac{\mu_1}{\varepsilon_1} = \frac{\mu_2}{\varepsilon_2}\left(\frac{1 - \sqrt{R}}{1 + \sqrt{R}}\right)^2$$

$$\frac{\varepsilon_1}{\varepsilon_2} = \frac{\mu_1}{\mu_2}\left(\frac{1 + \sqrt{R}}{1 - \sqrt{R}}\right)^2 = \frac{\mu_1}{\mu_2}\left(\frac{1 + \sqrt{\frac{1}{2}}}{1 - \sqrt{\frac{1}{2}}}\right)^2 \approx 33{,}971 \frac{\mu_1}{\mu_2}$$

, причем μ_1 и μ_2 можно взять за 1

$$\boxed{\text{Ответ: } \frac{\varepsilon_1}{\varepsilon_2} = 33{,}971}$$