GGÜ2

Dienstag, 12. April 2011
14:03

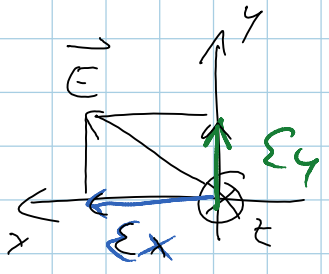
A.1

$$\lambda_0 = \frac{c}{f}$$

$$k_x = k_1 = \frac{\omega}{c_0}\sqrt{\varepsilon_{r,x}}$$

$$k_y = k_2 = \frac{\omega}{c_0}\sqrt{\varepsilon_{r,y}}$$

a)



$$\vec{E}_x = |\vec{E}|\cos\varphi\,\vec{e}_x$$

$$\vec{E}_y = |\vec{E}|\sin\varphi\,\vec{e}_y$$

$$\underline{\vec{E}}_x(z=z_n) = E\cdot\cos\varphi\, e^{-jk_0 z_n}\vec{e}_x \qquad k_0 = \frac{\omega}{c_0}$$

$$\underline{\vec{E}}_y(z=z_n) = E\cdot\sin\varphi\, e^{-jk_0 z_n}\vec{e}_y$$

$$\underline{\vec{E}}_x(z=z_n+d) = E\cos\varphi\, e^{-jk_0 z_n}\cdot e^{-jk_x d}\vec{e}_x$$

$$k_x = \frac{\omega}{c_0}\sqrt{\varepsilon_{r,x}}$$

$$\underline{\vec{E}}_y(z=z_n+d) = E\sin\varphi\, e^{-jk_0 z_n} e^{-jk_y d}\vec{e}_y \qquad k_y = \frac{\omega}{c_0}\sqrt{\varepsilon_{r,y}}$$

$$\underline{\vec{E}} = \underline{\vec{E}}_x + \underline{\vec{E}}_y = E\cos\varphi\, e^{-jk_0 z_n} e^{-jk_x d}\vec{e}_x +$$

$$E\sin\varphi\, e^{-jk_0 z_n} e^{-jk_y d}\vec{e}_y$$

$$= E\, e^{-jk_0 z_n} e^{-jk_x d}\left[\cos\varphi\,\vec{e}_x + \sin\varphi\, e^{-j(k_y-k_x)d}\vec{e}_y\right]$$

1) $\vartheta = 0°$

↳ $\underline{\vec{E}}(z = z_n + d) = E\, e^{-j(k_0 z_n + k_x d)}\, \vec{e}_x$

2) $\vartheta = 90°$

$\underline{\vec{E}}(z = z_n + d) = E\, e^{-j(k_0 z_n + k_y d)}\, \vec{e}_y$

3) $\vartheta = 45°$

$\underline{\vec{E}}(z = z_n + d) = \frac{E}{\sqrt{2}}\, e^{-j(k_0 z_n + k_x d)} \left[\vec{e}_x + e^{-j(k_y - k_x) d}\, \vec{e}_y\right]$

3a) $(k_x - k_y)\, d = 0 ; 2\pi ; 4\pi \ldots$

$[\ldots] = [\vec{e}_x + \vec{e}_y] \Rightarrow |\underline{\vec{E}}(z > z_n + d)| = E$

b) $(k_x - k_y) d = \pi ; 3\pi ; 5\pi \ldots$

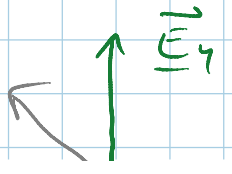
$[\ldots] = [\vec{e}_x - \vec{e}_y] \Rightarrow |\underline{\vec{E}}(z > z_n + d)| = E$

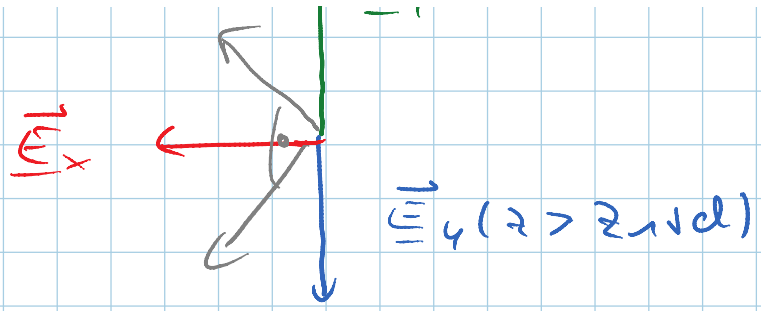
zu a) $d = \frac{2\pi}{(k_x - k_y)} = \frac{2\pi}{k_0 (\sqrt{\varepsilon_{rx}} - \sqrt{\varepsilon_{ry}})}$

$= \frac{2\pi}{\frac{\omega}{c_0} (\sqrt{\varepsilon_{rx}} - \sqrt{\varepsilon_{ry}})} = \underbrace{\frac{c_0}{f}}_{\lambda} \frac{1}{\sqrt{\varepsilon_{rx}} - \sqrt{\varepsilon_{ry}}}$

„Lambda – Platte"

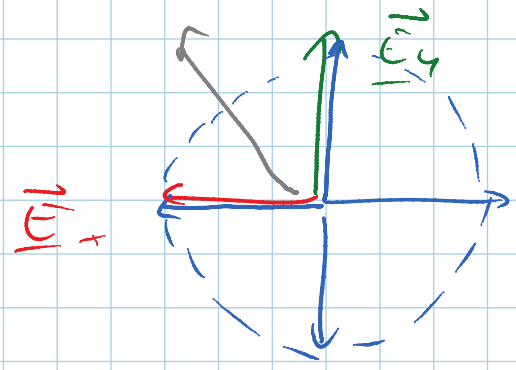
zu b) $d = \frac{\lambda}{2} \frac{1}{\sqrt{\varepsilon_{rx}} - \sqrt{\varepsilon_{ry}}}$





c) $(k_x - k_y)\, d = \frac{\pi}{2}, \frac{3}{2}\pi, \frac{5}{2}\pi$

$$d = \frac{\pi/2}{k_x - k_y} = \frac{\lambda}{4} \frac{}{\sqrt{\varepsilon_{rx}} - \sqrt{\varepsilon_{ry}}}$$



zirk. Polarisation