

Fra Maxwells ligninger: $\vec{E} \perp \vec{k}$ og $\vec{B} \perp \vec{k}$ og $\vec{B} \perp \vec{E}$
 $\Rightarrow$ e.m. bølger er transversale ($\hat{k}$ = forpl.retn.)

$$\vec{k} \times \vec{E} = \omega \vec{B}$$

$$E = \frac{\omega}{k} B = c B$$

Grenseflatebetingelser:

$$\Delta E_{\parallel} = 0$$

$$\Delta B_{\perp} = 0$$

$$(\vec{D} = \epsilon_0 \epsilon_r \vec{E}; \vec{H} = \frac{\vec{B}}{\mu_0 \mu_r})$$

$$\Delta D_{\perp} = 0$$

$$\Delta H_{\parallel} = 0$$

Energi pr volumenhed: $u = u_E + u_B = \frac{1}{2} \epsilon_0 E^2 + \frac{1}{2 \mu_0} B^2 = \epsilon_0 E^2$

Intensitet: $I = v \cdot \bar{u} = c \epsilon_0 \overline{E^2}$

Poyntings vektor: $\vec{S} = \frac{1}{\mu_0} \vec{E} \times \vec{B} \Rightarrow S = |\vec{S}| = c \epsilon_0 E^2$

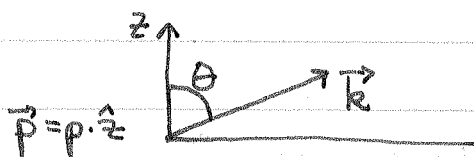
$$\Rightarrow I = \bar{S} = \langle S \rangle \quad [\langle \vec{S} \rangle = I \hat{k}]$$

Impuls pr volumenhed: $\pi = u/c = \mu_0 \epsilon_0 S \Rightarrow \vec{\pi} = \mu_0 \epsilon_0 \vec{S} = \frac{S}{c^2} \hat{k}$

Stråling:

Aksererte ladninger sender ut e.m. bølger (stråling)

Eks: oscillerende dipoler $\vec{p}(t)$ eller $\vec{m}(t)$



(ert. $\vec{m} = m \hat{z}$)

$$I(\theta) \sim \sin^2 \theta$$

$$I(\omega) \sim \omega^4$$

$\Rightarrow$ Blå himmel, rød solnedgang / -oppgang

Polarisering:

Lineærpol: $\vec{E} = \hat{y} E_0 \cos(kx - \omega t)$

Sirkulærpol: $\vec{E} = \hat{y} E_0 \cos(kx - \omega t) + \hat{z} E_0 \sin(kx - \omega t)$

Elliptisk pol: $\vec{E} = \hat{y} E_0 \cos(kx - \omega t) + \hat{z} \alpha E_0 \sin(kx - \omega t) \quad (\alpha \neq 1)$