Tilsvarende: $\nabla \cdot \vec{B} = 0 \Rightarrow \boxed{\vec{k} \perp \vec{B}}$

$\Rightarrow$ $\vec{B}(\vec{r},t)$ er også <u>transversal</u> bølge

Videre: $\nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}$

$$\nabla \times \vec{E} = \left(\hat{x}\frac{\partial}{\partial x} + \hat{y}\frac{\partial}{\partial y} + \hat{z}\frac{\partial}{\partial z}\right) \cos(k_x x + k_y y + k_z z - \omega t + \varphi_E) \times \vec{E}_0$$

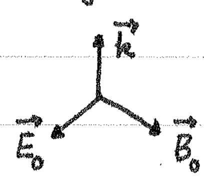
$$= -\left(k_x \hat{x} + k_y \hat{y} + k_z \hat{z}\right) \times \vec{E}_0 \sin(\vec{k}\cdot\vec{r} - \omega t + \varphi_E)$$

$$= -\vec{k} \times \vec{E}_0 \sin(\vec{k}\cdot\vec{r} - \omega t + \varphi_E)$$

$$-\frac{\partial \vec{B}}{\partial t} = -\vec{B}_0 \frac{\partial}{\partial t} \cos(\vec{k}\cdot\vec{r} - \omega t + \varphi_B)$$

$$= -\omega \vec{B}_0 \sin(\vec{k}\cdot\vec{r} - \omega t + \varphi_B)$$

Velger



$\Rightarrow$ retningen til $\vec{k} \times \vec{E}_0$ $= (\pm)$ retningen til $\vec{B}_0$

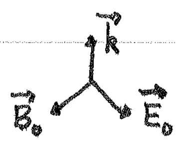
$\Rightarrow$ $\vec{B}_0 \perp \vec{E}_0$ og $\vec{B}_0 \perp \vec{k}$

$\Rightarrow$ $\vec{B} \perp \vec{E}$ og $\vec{B} \perp \vec{k}$ og (fra før) $\vec{E} \perp \vec{k}$

Kan skrive $\vec{k} \times \vec{E}_0 = k \cdot E_0 \cdot \hat{B}_0 = k E_0 \frac{\vec{B}_0}{B_0}$

$$\Rightarrow \quad k E_0 \frac{\vec{B}_0}{B_0} \sin(\vec{k}\cdot\vec{r} - \omega t + \varphi_E) = \omega \vec{B}_0 \sin(\vec{k}\cdot\vec{r} - \omega t + \varphi_B)$$

Oppfylt for alle $\vec{r}$ og t kun dersom $\varphi_E = \varphi_B$

(Valget  gir $\varphi_E = \varphi_B + \pi$)