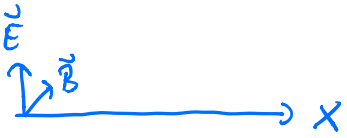
$\vec{E} = \vec{E}_0 \sin(kx - \omega t)$

$\vec{B} = \vec{B}_0 \sin(kx - \omega t)$

$\vec{B} \perp \vec{E}$



$\vec{E} \parallel \hat{z}$

$\vec{E} \parallel \hat{y}$

} 2 polarizaciji

$S = 1$

Stefan-Boltzmannov zakon (1879): $j = \sigma T^4$ $\quad \sigma = 5{,}67 \cdot 10^{-8}\ W/m^2K^4$

$\sigma = \frac{2\pi^5 k_B^4}{15 c^2 h^3}$

$c = 3 \cdot 10^8\ m/s$ svetlobna hitrost

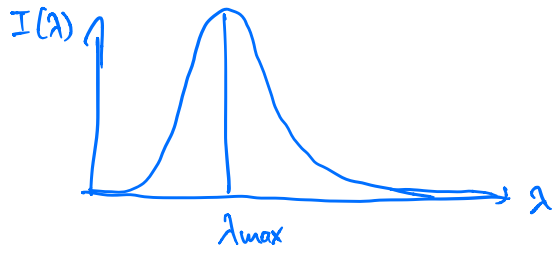
$k_B = 1{,}39 \cdot 10^{-23}\ J/K$ Boltzmannova konst.

$h = 6{,}63 \cdot 10^{-34}\ Js$ Planckova konstanta.

$\hbar = \frac{h}{2\pi} = 1{,}05 \cdot 10^{-34}\ Js$ reducirana Pl. konst.

j: gostota energijskega toka $\quad P = j \cdot S$

$j = 1360\ W/m^2$



$j = \int I(\lambda)\, d\lambda$

I ↑ intenziteta

Planckov zakon:

$$I(\lambda) = \frac{2\pi h c^2}{\lambda^5} \frac{1}{e^{\frac{hc}{\lambda k_B T}} - 1}$$

$E = nh\nu \quad n \in \mathbb{Z}$

$\updownarrow$

$E = n\hbar\omega$

Wienov zakon: $\lambda_{max} \cdot T = 2{,}9 \cdot 10^{-3}\ mK$

$5800K \rightarrow 500nm$ modra

(hν)

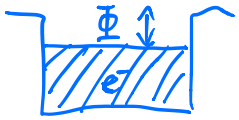
$\int I(\lambda)\, d\lambda = \sigma T^4$

FOTON: γ bozon $m=0$ $v=c$ → 2 polarizacji
$S=1$

1905: A. Einstein

$e_0 = 1{,}6 \cdot 10^{-19}\ As$

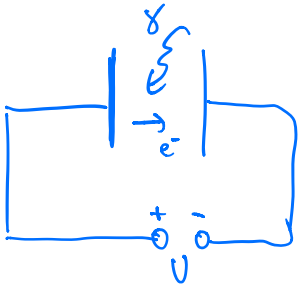
FOTOEFEKT



Φ izstopno delo

$1eV = 1{,}6 \cdot 10^{-19}\ J$ elektronvolt

Al 4,2 eV



$E_{kin} \sim e_0 U$

Millikan 1916

$$\hbar\omega = \Phi + E_{kin}$$

$E = h\nu = \hbar\omega$

1) Večja intenziteta → več izbitih elektronov, E_{kin} konst.

2) Večja frekvenca → enako št. elektronov, E_{kin} večja

1921 Nobelova Einstein

1923 Nobelova Millikan

$v=c$ $m=0$ $E = mc^2$ $E^2 = (mc^2)^2 + p^2c^2$

$E = pc$ $E = h\nu = \frac{hc}{\lambda}$ $c = \lambda\nu$

$$p = \frac{E}{c} = \frac{h\not{c}}{\not{c}\lambda} = \frac{h}{\lambda} = \frac{h}{2\pi}\frac{2\pi}{\lambda} = \hbar k$$

$$E = \hbar\omega$$
$$p = \hbar k$$

Pritisk svetlobe

$$\text{pritisk} = \frac{1}{c}(\text{prejeta energija na enoto površino}) = \frac{j}{c}$$

$j = 1360\,W/m^2$ $\quad 10\,\mu Pa$ $\quad 1\,bar = 10^5\,Pa$