Efectul fotoelectric - emisie de electroni de către metale sub act unde electromg.

$$\frac{m v^2}{2} = e \, U_f \qquad U_f\text{-tensiune franare}$$

Legi

1. $\nu = ct \Leftrightarrow I_s \sim Y$, Y radiație monocromatică incidentă

2. $\nu > \nu_0 \Rightarrow \lambda > \lambda_0, \qquad \nu_o = \frac{c}{\lambda_0}$

3. $\nu > \nu_0 \Rightarrow E_c \sim \nu$ și $E_c \propto$ nu depinde de φ

4. $\Delta t = 1 ns$

Fiecare foton are energia $\quad E = h \cdot \nu = \frac{h}{2\pi} \omega$

$$h\nu = L_{ext} + \frac{m v^2}{2}$$

$$h \cdot \nu_0 = L_{ext}$$

$$\nu_0 = \frac{L_{ext}}{h}$$

Marimi caracteristice foton

energia $\quad E = h\nu = m c^2 \qquad h = 6,626 \cdot 10^{-34}$ J·s

masa de mișcare $\quad m = \frac{E}{c^2} = \frac{h\nu}{c^2} = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$

viteza $\quad v = c \Rightarrow m_0 = 0$

impulsul $\quad p = m c = \frac{h}{\lambda} = \frac{h \nu}{c}$

sarcina electrică $\quad q = 0$

Teoria relativității Einstein

$$E = m c^2$$

Ecuații Maxwell - formă globală

$$\oint_S \bar{E}d\bar{S} = \frac{q}{\varepsilon_0}$$

$$\oint \bar{B}d\bar{S} = 0$$

$$\oint_{(c)} \bar{B}d\bar{l} = \mu_0 \left(\int_S \bar{j_c}\, d\bar{S} + \varepsilon_0 \frac{d}{dt}\int_S \bar{E}d\bar{S}\right)$$

$$\oint_{(c)} \bar{E}d\bar{l} = -\frac{d}{dt}\int_S \bar{B}d\bar{S}$$

$$\nabla \bar{E} = \frac{g}{\varepsilon_0} \qquad \text{Gauss flux electric}$$

$$\nabla B = 0 \qquad \text{Gauss flug magnetic}$$

$$rot\,\bar{B} = \mu_0\,\bar{j_c} + \varepsilon_0 \mu_0 \frac{\partial \bar{E}}{\partial t} \qquad \text{Ampere}$$

$$rot\,\bar{E} = -\frac{\partial \bar{B}}{\partial t} \qquad \text{Faraday}$$

câmpul electromagnetic se propagă cu $u = \frac{c}{n}$

$$u = \frac{c}{\sqrt{\varepsilon_r \mu_r}} \qquad c = 3\cdot 10^8 \, m/s$$

$$\varepsilon_0 = 8,85\cdot 10^{12}\,\frac{F}{m}$$

$$\mu_0 = 4\pi\, 10^{-4}\,\frac{Wb}{Am}$$

$$E = c\cdot B$$

Proprietăți unde electromagnetice

1. $\bar{E} \perp \bar{S}$ și $\bar{H} \perp \bar{S}$

2. $\bar{E} \perp \bar{H}$

vectorul Poynting $\bar{S} = \bar{E} \times \bar{H} = \sqrt{\frac{\varepsilon}{\mu}}\, E_0^2 \cos(\omega t - \bar{k}\bar{r})$ $[S]_{SI} = \frac{W}{m^2}$

3. $|\bar{E}| = Z|\bar{H}|$, $Z = \frac{Z_0}{n}$ $Z_0 = 377\,\Omega$

4. $J = <\bar{S}> = \frac{Z_0}{2n} H_0^2$

$$w = w_e + w_m = \frac{1}{\mu}\, BH$$

5. Domeniu larg λ și ν

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$$\Delta S = S_2 - S_1 = K \ln \frac{J_2}{J_1}$$

intensitatea sonoră $\quad I_S = \frac{1}{2} \omega^2 A^2 S u = \frac{1}{2} \frac{S^2_{max}}{S u}$

$I_{SO} = 10^{-12} \frac{W}{m^2}$ $\quad - \quad I_S$ la prag de audibilitate

$I_{Smax} = 100 \frac{W}{m^2}$ $\quad - \quad I_S$ prag dureros

Nivel sonor $\quad N_S (dB) = 10 \lg \frac{I_S}{I_{SO}}$

Nivel intensitate auditivă $\quad N_a = 10 \lg \frac{I_a}{I_{a_0}}$ $\quad , [N_a]_{SY} = 1$ fon

Efectul Doppler $\quad \omega = \omega_0 \frac{u \pm V_R}{u \mp V_S}$ $\quad V_R -$ viteză observator

$\quad V_S -$ viteză sursă

apropiere $\quad \omega = \omega_0 \frac{u + V_R}{u - V_S}$

depărtare $\quad \omega = \omega_0 \frac{u - V_R}{u + V_S}$