Planckov zakon sevanja črnega

$$B_\lambda = \frac{2hc^2}{\lambda^5} \times \frac{1}{e^{hc/\lambda kT} - 1}$$

$$B_f = \frac{2hf^3}{c^2} \times \frac{1}{e^{hc/kT} - 1}$$

$$k = 1{,}38 \times 10^{-23} JK^{-1}$$

$$boltz.k.c = 2{,}99793 \times 10^8 ms^{-1}$$

$$Planck.k., h = 6{,}624 \times 10^{-34} Js$$

Raylegh - Jeansov približžek plan. z.

$$B_f = \frac{2kTf^2}{c^2} = \frac{2kT}{\lambda^2} \text{ za T} = 300^0$$

Wienov kratkovaln i približek

$$B_\lambda = \frac{2hc^2}{\lambda^5} \times e^{-hc/\lambda kT}$$

Kohernca

$$\text{E(r,t)} = \frac{\text{Ae}^{\text{j)}\omega\text{t-kr)}}}{\text{r}}$$

$$k = \frac{2\pi}{\lambda} faznoštevilo$$

Polarizacija

$$P = \sqrt{1 - \frac{4D}{(J_{11} + J_{22})^2}}$$

Kvantni načaj svetlobe

$$\text{E} = \text{hf} = \text{h}\omega$$

$$\text{G} = \frac{\text{h}}{\lambda} = hK$$

$$h = \frac{\square}{2\pi}$$

$$K = \frac{2\pi}{\lambda}, fazno\ število$$

Načelo nedoločlji vosti

$$\Delta f \Delta t \geq \frac{1}{4\pi}$$

Zrnati (kvantni) šum

$$N_k = hf\Delta f \rightarrow Rayleigh - Jeansovaaproks.$$

$$N_t = kT\Delta f \rightarrow k = 1.38 \times 10^{-23} JK^{-1}$$

Pri običajni temp. T = 300K imata oba šuma

enako gostoto moči pri $f = 6 \times 10^{12}, \lambda = 50 \mu m$

Temeljne enačbe EM polja

$\mathrm{rot}\vec{H} = \vec{J} + \mathrm{j}\omega\varepsilon\vec{E} = \vec{J} + \mathrm{j}\frac{k}{z}\vec{E}$

$rot\vec{E} = -j\omega\mu H = -jkzH$

$div\varepsilon E = \rho$

$K = \omega\sqrt{\varepsilon\mu}$

$Z = \sqrt{\frac{\mu}{\varepsilon}}$

$J =$ gostota toka

$\rho =$ gostota elektrine

$\mu =$ magnetna permabilnost

$\varepsilon =$ dielektričnost

$\mathrm{n} = \sqrt{\frac{\varepsilon\mu}{\varepsilon_0\mu_0}} = \sqrt{\frac{\varepsilon}{\varepsilon_0}} = \sqrt{\varepsilon_r}$ *Lom..k.*

Poenostavljeni valovni enačbi

$\Delta\vec{E} + \mathrm{n}^2 k_0{}^2 \vec{E} = 0$

$\Delta H + \mathrm{n}^2 k_0{}^2 H = 0$

Popolni notranji odboj

$\mathrm{n}_1 \sin\theta_1 = \mathrm{n}_2 \sin\theta$

$\mathrm{n}_1 \sin\theta_{mejni} = \frac{n_2}{n_1}$

Zgradba atoma

planetarni model

$\mathrm{F} = Z\frac{\mathrm{e}_0{}^2}{4\pi\varepsilon_0 r^2} = \frac{mv^2}{r}$

$a_r = \frac{v^2}{r}$

$rv^2 = \frac{Ze_0{}^2}{4\pi\varepsilon_0 m}$

Bohrov _ mod*el*

$\Gamma_n = r_n m v_n = \frac{nh}{2\pi}$

Bohrov model za vodik

$$W_e = \frac{\mathrm{e}_0^{\,2}}{4\pi\varepsilon_0 r_n} = \frac{m v_n^{\,2}}{2} - \frac{\mathrm{e}_0^{\,2}}{4\pi\varepsilon_0 r_n}$$

$$a_r = \frac{v^2}{r}$$

$$v_n = \frac{e_0^{\,2}}{4\varepsilon_0 h n}$$

$$r_n = \frac{\varepsilon_0 h^2}{\pi m e_0^{\,2}} n^2 = r_1 n^2$$

$$r_1 = 0.53 \times 10^{-10} m = 0.53 A$$

$$r_2 = 4 r_1, r_3 = 9 r_1$$

$$W_n = \frac{\mathrm{m e}_0^{\,4}}{8\varepsilon_0^{\,2} h^2 n^2}$$