A Spektroszkópia 2. kollokviumon használható képletek gyűjteménye (2007)

$$E(r,t)=\frac{1}{4\pi\varepsilon_0}\frac{\ddot{p}\left(t-\frac{r}{c}\right)\sin\theta}{rc^2}\quad B(r,t)=\frac{1}{4\pi\varepsilon_0}\frac{\ddot{p}\left(t-\frac{r}{c}\right)\sin\theta}{rc^3}$$

$$-\frac{dW}{dt}=\frac{\omega_0^4 e^2 z_0^2}{2}\frac{1}{6\pi\varepsilon_0 c^3}$$

$$\mathrm{E}(\omega)=\mathrm{FT}\{\mathrm{E}(\mathrm{t})\}\sim\left[\frac{1}{\mathrm{i}(\omega+\omega_0)-\left(\frac{\gamma_0}{2}\right)}+\frac{1}{\mathrm{i}(\omega-\omega_0)-\left(\frac{\gamma_0}{2}\right)}\right]$$

$$I(\omega)\sim|E(\omega)|^2\sim\frac{1}{(\omega-\omega_0)^2+\left(\frac{\gamma_0}{2}\right)^2}$$

$$\mathrm{z}_0=-\frac{\mathrm{e}}{\mathrm{m}}\frac{\mathrm{E}_0}{\omega_0^2-\omega^2+\mathrm{i}\gamma\omega}$$

$$\mathrm{P}=\mathrm{N}\frac{\mathrm{e}^2}{\mathrm{m}}\frac{\mathrm{E}}{\omega_0^2-\omega^2+\mathrm{i}\gamma\omega}$$

$$\mathrm{n}'=1+\frac{1}{2}\frac{\mathrm{Ne}^2}{\varepsilon_0\mathrm{m}}\frac{\omega_0^2-\omega^2}{\left(\omega_0^2-\omega^2\right)^2+\gamma^2\omega^2}$$

$$\kappa=\frac{Ne^2}{2\varepsilon_0 m}\frac{\gamma\omega}{\left(\omega_0^2-\omega^2\right)+\gamma^2\omega^2}$$

$$\alpha=\frac{\mathrm{Ne}^2}{\mathrm{c}\varepsilon_0\mathrm{m}}\frac{\gamma\omega^2}{\left(\omega_0^2-\omega^2\right)^2-\gamma^2\omega^2}$$

$$\sigma(\omega)=\frac{\mathrm{e}^2}{4\mathrm{m}\varepsilon_0\mathrm{c}}\frac{\gamma}{(\omega_0-\omega)^2+\left(\frac{\gamma}{2}\right)^2}$$

$$\int_0^\infty\sigma(\omega)\mathrm{d}\omega=\frac{1}{2}\frac{\mathrm{e}^2\pi}{\mathrm{m}\varepsilon_0\mathrm{c}}$$

$$I_a=\int_0^\infty dI_a=\int_0^\infty I(\omega)N\sigma x\,d\omega=NxI(\omega_0)\int_0^\infty\sigma\,d\omega=NxI(\omega_0)\frac{1}{2}\frac{e^2\pi}{m\varepsilon_0 c}$$

$$\mathrm{n}^2=1+\sum_{\mathrm{i}}\frac{\mathrm{a}_{\mathrm{i}}}{\lambda^{-2}-\mathrm{b}_{\mathrm{i}}}$$

$$\frac{dW}{dt} = \frac{\pi e^2}{2\varepsilon_0 m}\sum_j f_{ij}\overline{N}_i \rho(\omega_{ji})$$

$$\overline{\mathrm{N}}_{\mathrm{i}} = \frac{\mathrm{g_i}\exp\left(-\frac{\mathrm{E_i}}{\mathrm{kT}}\right)}{\mathrm{g_i}\exp\left(-\frac{\mathrm{E_i}}{\mathrm{kT}}\right)+\mathrm{g_j}\exp\left(-\frac{\mathrm{E_j}}{\mathrm{kT}}\right)}\overline{\mathrm{N}} \quad \overline{\mathrm{N}}_{\mathrm{j}} = \frac{\mathrm{g_j}\exp\left(-\frac{\mathrm{E_j}}{\mathrm{kT}}\right)}{\mathrm{g_j}\exp\left(-\frac{\mathrm{E_j}}{\mathrm{kT}}\right)+\mathrm{g_i}\exp\left(-\frac{\mathrm{E_i}}{\mathrm{kT}}\right)}\overline{\mathrm{N}}$$

$$\rho(\omega) = \frac{\hbar\omega^3}{\pi^2 c^3\, exp\left(\frac{\hbar\omega_{ji}}{kT}\right)-1}$$

$$W_{ij} = \frac{1}{\hbar}\left\langle \phi_i \middle| H' \middle| \phi_j \right\rangle$$

$$\mathrm{V_{12}} = \mathrm{E_{0x}}\frac{\mathrm{e}}{\hbar}\left\langle \phi_1 \middle| \mathrm{D_x} \middle| \phi_2 \right\rangle$$

$$\mathrm{i}\dot{\mathrm{c}}_1 = \mathrm{c_2 V_{12}}\exp(-\mathrm{i}\omega_{21}\mathrm{t})\cos\omega\mathrm{t}$$

$$i\dot{c}_2 = c_1 V_{12}^* \,exp(i\omega_{21}t)cos\,\omega t$$

$$\left|\mathrm{c_2(t)}\right|^2 = \left|\mathrm{V_{12}}\right|^2 \frac{\sin^2\frac{\omega_{21}-\omega}{2}\mathrm{t}}{(\omega_{21}-\omega)^2}$$

$$\frac{d\left\langle \left|c_2(t)\right|^2\right\rangle}{dt} = \frac{\pi e^2}{\varepsilon_0\hbar^2}\left|\left\langle \phi_1 \middle| D_x \middle| \phi_2 \right\rangle\right|^2 \rho(\omega_{21})$$

$$\mathrm{B_{12}} = \frac{\pi \mathrm{e}^2}{3\varepsilon_0\hbar^2}\left|\left\langle \phi_1 \middle| \vec{\mathrm{D}} \middle| \phi_2 \right\rangle\right|^2$$

$$\frac{\mathrm{dN_2}}{\mathrm{dt}} = -\mathrm{A_{21}N_2}\int_0^\infty \mathrm{g}(\nu)\mathrm{d}\nu + \mathrm{B_{12}N_1}\int_0^\infty \mathrm{g}(\nu)\rho(\nu)\mathrm{d}\nu - \mathrm{B_{21}N_1}\int_0^\infty \mathrm{g}(\nu)\rho(\nu)\mathrm{d}\nu$$

$$\frac{\mathrm{dI_\nu}}{\frac{\mathrm{c}}{\mathrm{n}}\mathrm{dt}} = -\mathrm{B_{12}N_1}\frac{\mathrm{I_\nu}}{\frac{\mathrm{c}}{\mathrm{n}}}\mathrm{g}(\nu)\mathrm{h}\nu$$

$$\sigma_{\mathrm{a}} = \frac{B_{12}g(\nu)h\nu}{\frac{c}{n}}$$

$$\frac{\mathrm{dI_\nu}}{\mathrm{dx}} = -\sigma_{\mathrm{a}}\mathrm{N_1 I_\nu} + \sigma_{\mathrm{e}}\mathrm{N_2 I_\nu} + \frac{\mathrm{h}\nu}{\tau}\mathrm{N_2}$$

$$g(h\nu) = \int_{-\infty}^{\infty} P_1(E) P_2(E + h\nu) dE$$

$$g(h\nu) = \frac{1}{2\pi} \frac{\Delta E_1 + \Delta E_2}{\left[h\nu - (E_2 - E_1)\right]^2 + \left(\frac{\Delta E_1 + \Delta E_2}{2}\right)^2}$$

$$\frac{dN}{N} = \sqrt{\frac{m}{2\pi kT}} \exp\left(-\frac{mv_z^2}{2kT}\right) dv_z$$

$$g(\nu) = \sqrt{\frac{m}{2\pi kT}} \frac{c}{\nu_{21}} \exp\left[\left(-\frac{m}{2kT}\frac{c^2}{\nu_{21}^2}\right)(\nu - \nu_{21})^2\right]$$

$$r_n = \frac{e^2}{8\pi\varepsilon_0 hcR} \cdot \frac{n^2}{Z}$$

$$\frac{d^2(rR)}{dr^2} + \frac{2\mu rR}{\hbar^2}(E - E_{TK} - V(r)) = \Lambda^2 \frac{R}{r}$$

$$-\left(\frac{\partial^2 Y}{\partial\theta^2} + \mathrm{ctg}\theta \frac{\partial Y}{\partial\theta} + \frac{1}{\sin^2\theta}\frac{\partial^2 Y}{\partial\varphi^2}\right) = \Lambda^2 Y$$

$$Y_{l,m_l}(\theta,\varphi) = \sin^{|m_l|}(\theta) P_{l,m_l}(\cos\theta) e^{im_l\varphi}$$

$$E_n = -\frac{Z^2\mu e^4}{32\pi^2\varepsilon_0^2\hbar^2} \cdot \frac{1}{n^2} + E_{TK}$$

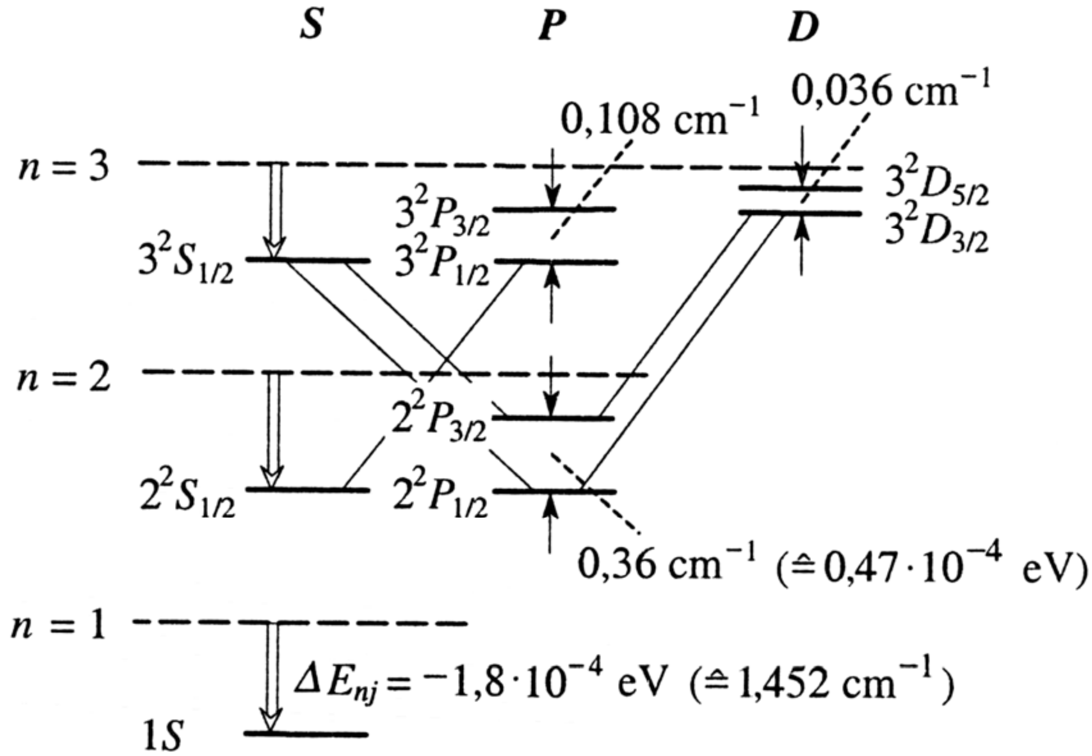
$$R_{n,l} = \rho^l L_{n,l}(\rho) e^{-\frac{\rho}{2}}$$

$$|\Psi|^2 4\pi r^2 dr = P(r) dr$$

$$d = s\frac{\frac{\partial B}{\partial z}}{m_a}\frac{l}{v_0^2}\mu_z$$

$$\boldsymbol{\mu} = -g\frac{e}{2m}\mathbf{L}$$

$$T = \frac{RZ^2}{n^2} + \frac{\alpha^2 RZ^4}{n^3}\left(\frac{1}{j + \frac{1}{2}} - \frac{3}{4n}\right) = T_0 + \Delta T$$



S
P
D
0,108 cm⁻¹
0,036 cm⁻¹
n = 3
3²D5/2
3²P3/2
3²D3/2
3²S1/2
3²P1/2
n = 2
2²P3/2
2²S1/2
2²P1/2
0,36 cm⁻¹ (≙ 0,47 · 10⁻⁴ eV)
n = 1
ΔEnj = −1,8 · 10⁻⁴ eV (≙ 1,452 cm⁻¹)
1S