

$\langle L^2 \rangle = \sum_{l,m} |c_{lm}|^2 \hbar^2 l(l+1)$

$M_L = \frac{e \mu_B B}{\hbar} M_L$
 $M_S = \frac{g \mu_B B}{\hbar} M_S$
 $V_B = \mu_B B$
 $E^{(0)} = 14.006602 \text{ eV} + 12.0 \times 10^{-4} \text{ eV}$
 $K_{int} = \frac{M_S}{M_S + M_L} K_{ext}$
 $\psi_0(r) = A e^{-\alpha r}$
 $N(\theta) = 32 \times 10^{-4} \text{ m}^{-2} = 32 \times 10^{-7} \text{ nm}^{-2}$
 $V = c^2 / 4\pi \epsilon_0$
 $\frac{1}{4\pi \epsilon_0} \frac{e^2}{r^2} = \frac{m v^2}{r}$
 $v = 2.2 \times 10^6 \text{ m/s} < 0.01c$
 $E = \frac{1}{2} m v^2 = 2.2 \times 10^{-18} \text{ J}$
 $\lambda = \frac{h}{p} = \frac{h}{m v} = 2.8 \times 10^{-10} \text{ m}$

$\psi(r, \theta, \phi) = R_{nl}(r) Y_{lm}(\theta, \phi)$
 $E_n = -\frac{13.6 \text{ eV}}{n^2}$
 $N(\theta) = \frac{N_0 \sin^2 \theta}{2\pi r^2 \sin \theta d\theta}$
 $E = \frac{1}{2} m v^2 = \frac{1}{2} m \omega^2 r^2$
 $\Delta \phi = \frac{2\pi}{\lambda}$
 $\Delta x \Delta p \geq \frac{\hbar}{2}$
 $\Delta E \Delta t \geq \frac{\hbar}{2}$

$\nabla^2 \psi(r, \theta, \phi) + (E - V(r)) \psi(r, \theta, \phi) = 0$
 $\Delta \phi = \frac{2\pi}{\lambda}$
 $\Delta x \Delta p \geq \frac{\hbar}{2}$
 $\Delta E \Delta t \geq \frac{\hbar}{2}$
 $\psi(r, \theta, \phi) = R_{nl}(r) Y_{lm}(\theta, \phi)$
 $E_n = -\frac{13.6 \text{ eV}}{n^2}$
 $\lambda = \frac{h}{p} = \frac{h}{m v}$
 $v = \sqrt{\frac{2E}{m}}$
 $\lambda = \frac{h}{m \sqrt{2E}}$