Wien displacement law: wavelength $\lambda_{\text{max}}$ of maximum intensity on the Planck radiation curve:

$$\lambda_{\text{max}} T = 2898 \times 10^{-6} \text{ meter degree K}$$

($T$ is the absolute temperature.)

3D Fermi energy $E_F$:

$$E_F = \frac{\hbar^2}{8m} \left( \frac{3}{\pi n} \right)^{\frac{2}{3}}$$

($n$ is the number of particles per volume appropriate to the units used for $\frac{\hbar^2}{8m}$, $m$ is the mass of the electron, nucleon or ...?)

Average energy of a Fermi gas particle:

$$\overline{E} = \text{average energy of a particle} = \frac{3}{5} E_F$$

Quantum mechanical tunneling probability $T$:

$$T \approx e^{-2\kappa a}$$

($a$ is the width of the potential barrier, $\kappa$ is given by the expression below.)

$$\kappa = \sqrt{\frac{2m}{\hbar^2} (V - E)}$$

($V$ is the potential energy, $E$ is the total energy of the particle, $m$ is the mass.)

Quantum numbers in a hydrogen atom: (Four q. numbers: $\{n,l,m_l,m_s\}$. $n$ is the principal quantum number, $n = 1,2,\ldots$, $l = 0,\ldots,n-1$ is the orbital angular momentum q. number, $m_l = -l,\ldots,l$ is the projected orbital angular momentum on the $z$ axis, and $m_s = \pm \frac{1}{2}$ is the spin quantum number.)

Photoelectric equation:

$$\frac{1}{2} m_e v^2 = eV_0 = hf - \phi$$

($\phi$ is the work function of the material, $V_0$ is the stopping potential.)

Practical Formulas

deBroglie wavelength of an electron:

$$\lambda[\text{nm}] = \frac{1.226}{\sqrt{E[\text{eV}]}}$$

(For a free electron, $E$ is the kinetic energy.)

For an electron:

$$\frac{\hbar^2}{8m_e} = 0.376 \text{ eV nm}^2 \quad \frac{\hbar^2}{2m_e} = 0.038 \text{ eV nm}^2$$