Possibly Useful Information

Constants & Conversions:

$c = 2.998 \times 10^{8}$ m/s $c^2 = 931.5$ Mev/u 1 u = 1.6605×10^{-27} kg

$h = 6.626 \times 10^{-34}$ J·s = 4.136×10^{-15} eV·s $hc = 1240$ eV·nm 1 eV = 1.602×10^{-19} J

$\hbar = h / 2\pi = 1.054 \times 10^{-34}$ J·s = 6.583×10^{-16} eV·s

1 μm = 10^{-6} m 1 nm = 10^{-9} m 1 pm = 10^{-12} m

$m_e = 9.11 \times 10^{-31}$ kg = 5.485×10^{-4} u Bohr radius, $r_1 = 52.92$ pm

$m_p = 1.67 \times 10^{-27}$ kg = 1.007276 u Ground state of H-atom = –13.6 eV

$m_n = 1.68 \times 10^{-27}$ kg = 1.008665 u

Special Relativity:

$$\gamma = \frac{1}{\sqrt{1-\beta^2}} \qquad \beta = \frac{v}{c} \qquad \Delta t = \gamma \Delta t_0 \qquad L = \frac{L_0}{\gamma} \qquad p = \gamma m v$$

$$u = \frac{u' + v}{1 + u'v/c^2} \qquad E_0 = mc^2 \qquad K = (\gamma - 1)mc^2$$

$$E = \gamma E_0 = E_0 + K \qquad E^2 = (pc)^2 + (mc^2)^2 \qquad (pc)^2 = K^2 + 2Kmc^2$$

Photons, Matter Waves & Quantum Mechanics:

$$E_{ph} = hf \qquad hf = K_{max} + W \qquad p = \frac{hf}{c} = \frac{h}{\lambda} \qquad \Delta\lambda = \frac{h}{mc}(1 - \cos\theta)$$

$$\frac{d^2\psi}{dx^2} + \frac{2m}{\hbar^2}[E - U(x)]\psi = 0 \qquad \Delta x \Delta p_x \geq \frac{\hbar}{2} \qquad \Delta E \Delta t \geq \frac{\hbar}{2}$$

$$r_n = r_1 n^2 = (52.92 \text{ pm})n^2 \qquad E_n = \frac{-13.6 \text{ eV}}{n^2} \qquad (n = 1, 2, 3\ldots)$$

$$E_{ph} = |E_{final} - E_{initial}|$$