

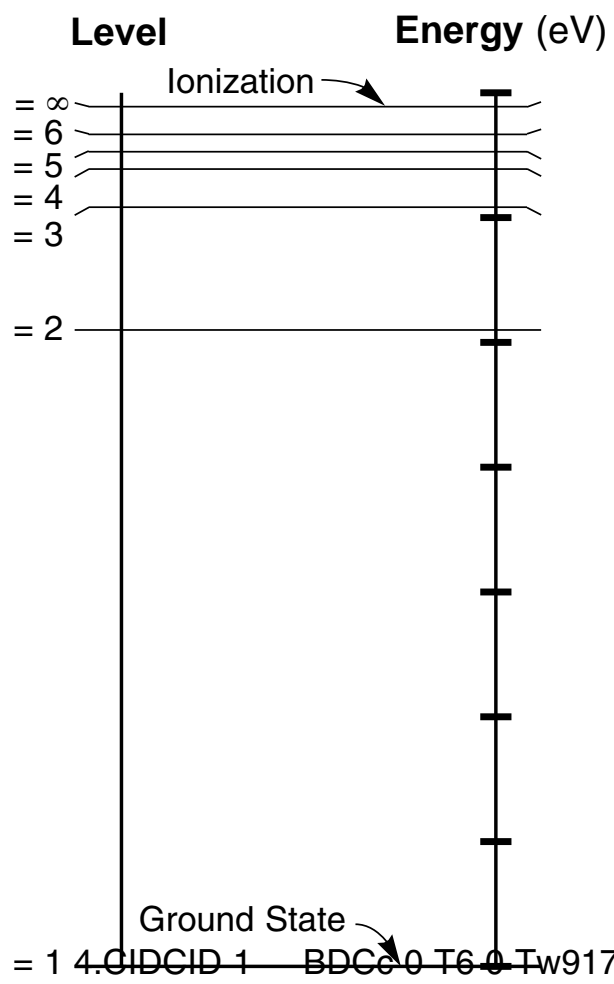
The Electromagnetic Spectrum

Wavelength in a vacuum (m)

10^{-13} 10^{-12} 10^{-11} 10^{-10} 10^{-9} 10^{-8} 10^{-7} 10^{-6} 10^{-5} 10^{-4} 10^{-3} 10^{-2} 10^{-1} 10^0 10^1 10^2 10^3 10^4

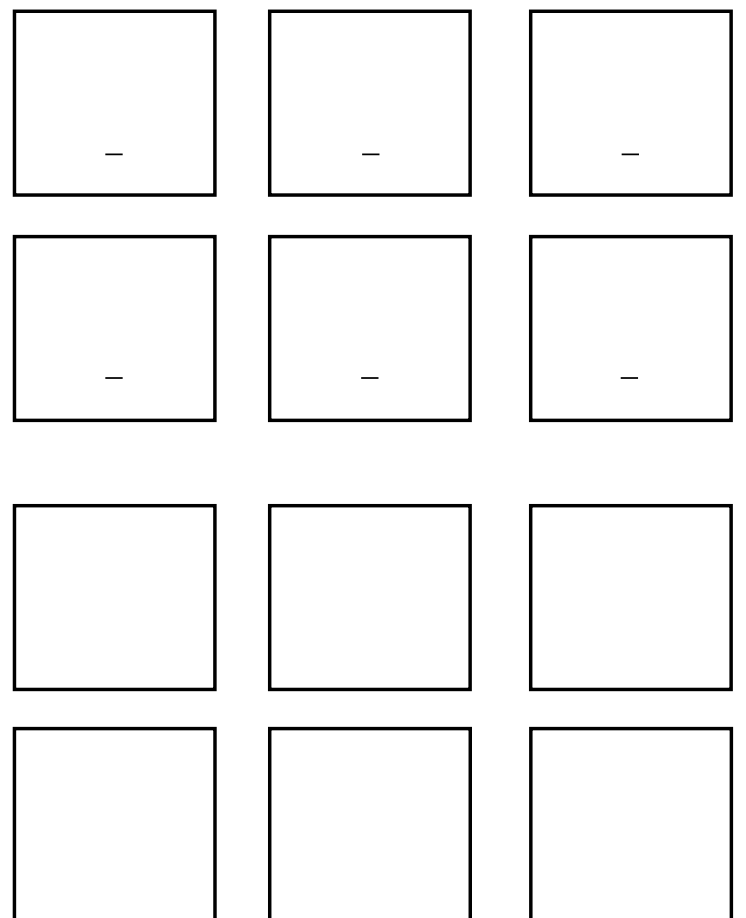
Energy Level Diagrams

Hydrogen



Level

= 1 4.C1DC1D 1 BDCc 0 T6 0 Tw917 B-ogen 4.C19CID 1 BDCc 0 T606 0 T9627 B-ogen



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Mechanics

$$v = \frac{\Delta x}{\Delta t}$$

$$a = \frac{\Delta v}{\Delta t}$$

$$v_f = v_i + at$$

$$v_f^2 = v_i^2 + 2a\Delta x$$

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$$A_y = A \sin \theta$$

$$A_x = A \cos \theta$$

$$F_f = \mu F_N$$

$$F_g = \frac{GMm}{r^2}$$

$$J = F\Delta t$$

=

$$J = F\Delta t = \Delta p$$

$$J = F\Delta t = \Delta p$$

$$F = \frac{\Delta p}{\Delta t}$$

$$E_k = \frac{1}{2}mv^2$$

$$F = \frac{\Delta E}{\Delta x}$$

$$F = \frac{\Delta E}{\Delta x}$$

$$\Delta E = F\Delta x$$

$$E = \frac{1}{2}kx^2$$

$$W = Fd = \Delta E$$

$$E = E_k + E_p + E_{int}$$

$$W = Fd = \frac{F_f}{F} = F^{-}$$

= acceleration

= centripetal acceleration

A = any vector quantity

x = displacement or distance

E = total energy

F = force

F_c = centripetal force

F_f = force of friction

F_g = weight or force due to gravity

F_N = normal force

F_net = net force

F_s = force on a spring

g = acceleration due to gravity or gravitational field strength

G = universal gravitational constant

h = height

J = impulse

k = spring constant

E_k = kinetic energy

m = mass

p = momentum

P = power

E_p = potential energy

E_s = potential energy stored in a spring

U = internal energy

r = radius or distance between centers

\Delta t = time interval

v = velocity or speed

\bar{v} = average velocity or average speed

W = work

\Delta x = change in spring length from the equilibrium position

\Delta = change

\theta = angle

\mu = coefficient of friction