Constants and Equations

Wave Constants and Equations

Equations for particles, photons, forces and atoms on this site can be represented as equations using classical constants from modern physics, or new constants that represent wave behavior. On many pages, both formats are shown. In both cases – classical format and wave format – all equations can be reduced to be **derived from only five physical constants** (excluding mathematical constants). The five wave constants are: wave speed, wavelength, amplitude, density and one variable that is constant to the electron. The five classical constants come from four Planck constants and a constant for the electron, covered in a separate page.

This section highlights new energy wave equations used in the calculations on this site. The benefit of using these wave constants and equations compared to classical constants is that the wave equations can be used to calculate particle energies beyond the electron. The notation, including new constants and variables, and the equations are found below.

Energy Wave Equation Notation

The energy wave equations include notation to simplify variations of energies and wavelengths of different particles, in addition to differentiating longitudinal and transverse waves.

Notation	Meaning
K_e	Particle wave center count (e – electron)

λ_l, λ_t	Wavelength (l – longitudinal wave, t – transverse wave)
g_λ, g_A, g_p	g-factor (λ – wavelength, A – amplitude, p – proton)
F_g, F_m	Force (g – gravitational force, m – magnetic force)
$E_{(K)}$	Energy (K – particle wave center count)

Constants and Variables

The following are the wave constants and variables used in the energy wave equations, including a constant for the electron that is commonly used in this paper. The remaining constants are derived.

Symbol	**Definition**	**Value (units)**
	Wave Constants	
A_l	Amplitude (longitudinal)	$9.215405708 \times 10^{-19}$ (m)
λ_l	Wavelength (longitudinal)	$2.854096501 \times 10^{-17}$ (m)
ϱ	Density (aether)	$3.859764540 \times 10^{22}$ (kg/m^3)
c	Wave velocity (speed of light)	299,792,458 (m/s)

Variables

δ	Amplitude factor	variable – *dimensionless*
K	Particle wave center count	variable – *dimensionless*
Q	Particle count (in a group)	variable – *dimensionless*

Particle Constants

K_e	Particle wave center count – electron	10 – *dimensionless*
O_e	Outer shell multiplier – electron	2.138743820 – *dimensionless*
g_λ	Electron orbital g-factor (*revised*)	0.9873318320 – *dimensionless*
g_A	Electron spin g-factor (*revised*)	0.9826905018 – *dimensionless*
g_p	Proton orbital g-factor (*revised*)	0.9898125300 – *dimensionless*

Energy Wave Equations

Energy

The Longitudinal Energy Equation is used to calculate the rest energy of particles. The Transverse Energy Equation is used to calculate the energy of photons. Both are derived from the Energy Wave Equation.

$$E = \rho V \left(\frac{c}{\lambda_l} A \right)^2$$

Energy Wave Equation

$$E_{l(K)} = \frac{4\pi\rho K^5 A_l^6 c^2}{3\lambda_l^3} \sum_{n=1}^{K} \frac{n^3 - (n-1)^3}{n^4}$$

Longitudinal Energy Equation

(Particles)

$$E_t = \frac{2\pi\rho K_e^7 A_l^6 c^2 O_e}{3\lambda_l^2} \left(\frac{\delta}{r} - \frac{\delta}{r_0} \right)$$

Transverse Energy Equation

(Photons)

Forces

Forces are based on particle energy at distance (electric force). The remaining forces are a change in wave amplitude or wave form. The equation for magnetism is the electromagnetic force for an induced current (particles in motion). The equation for the strong force is further derived in *Atomic Orbitals* for an orbital force keeping an electron in orbit in an atom.

$$F_e = \frac{4\pi\rho K_e^7 A_l^6 c^2 O_e}{3\lambda_l^2} g_\lambda \left(\frac{Q_1 Q_2}{r^2}\right)$$

Electric Force

$$F_m = \frac{4\pi\rho K_e^7 A_l^6 O_e}{3\lambda_l^2} g_\lambda \left(\frac{Q_1 Q_2}{r^2} v^2\right)$$

Magnetic Force

$$F_g = \frac{\rho \lambda_l^2 c^2 O_e}{2K_e^{31}} \left(\frac{A_l}{36}\right)^2 g_\lambda^3 g_p^2 \left(\frac{Q_1 Q_2}{r^2}\right)$$

Gravitational Force

$$F_s = \frac{16\rho K_e^{11} A_l^7 c^2 O_e}{9\lambda_l^3} g_\lambda \left(\frac{Q_1 Q_2}{r^2}\right)$$

Strong Force

$$F_o = \frac{64\rho K_e^{17} A_l^8 c^2 O_e}{27\pi\lambda_l^3} g_\lambda^2 \left(\frac{Q^2}{r^3}\right)$$

Orbital Force

Photon Frequency and Wavelength

Photon energies are often preferred over wavelengths beyond hydrogen, which uses the Transverse Energy Equation. Frequency and wavelength can be calculated using the following equations. See the following for: variables for amplitude factor (δ) and distance (r).

$$f = \frac{3\lambda_l c}{16K_e^4 A_l}\left(\frac{\delta}{r} - \frac{\delta}{r_0}\right)$$

Photon Frequency

$$\lambda_t = \frac{16K_e^4 A_l}{3\lambda_l}\left(\frac{1}{\frac{\delta}{r} - \frac{\delta}{r_0}}\right)$$

Photon Wavelength

Relativity & Motion

A particle in motion with velocity (v) changes wavelength. The **complete form** of the in-wave and out-waves are used for Longitudinal Energy (particle energy) at relativistic speeds. The complete form also includes the slight loss of amplitude due to particle spin, used in the equations for gravity and magnetism. The magnetic energy equation uses classical terms for the fine structure constant, Planck length and gravitational coupling constant for the electron in this form, but it can be derived in pure wave constants. It is used in this form to show relationship between gravity and magnetism.

$$E_{l\,(in)} = \frac{1}{2}\rho\left(\frac{4}{3}\pi\,(K_e\lambda_l)^3\right)\left(\frac{c}{\lambda_l\sqrt{\left(1+\frac{v}{c}\right)}}\frac{(K_eA_l)^3}{(K_e\lambda_l)^2}\right)\left(\frac{c}{\lambda_l\sqrt{\left(1-\frac{v}{c}\right)}}\frac{(K_eA_l)^3}{(K_e\lambda_l)^2}\right)$$

Longitudinal In-Wave Energy – Complete Form

$$E_{l\,(out)} = \frac{1}{2}\rho\left(\frac{4}{3}\pi\,(K_e\lambda_l)^3\right)\left(\frac{c}{\lambda_l\sqrt{\left(1+\frac{v}{c}\right)}}\frac{(K_eA_l)^2K_e\,(A_l-A_l\sqrt{\alpha_{Ge}})}{(K_e\lambda_l)^2}\right)\left(\frac{c}{\lambda_l\sqrt{\left(1-\frac{v}{c}\right)}}\frac{(K_eA_l)^2K_e\,(A_l+A_l\sqrt{\alpha_{Ge}})}{(K_e\lambda_l)^2}\right)$$

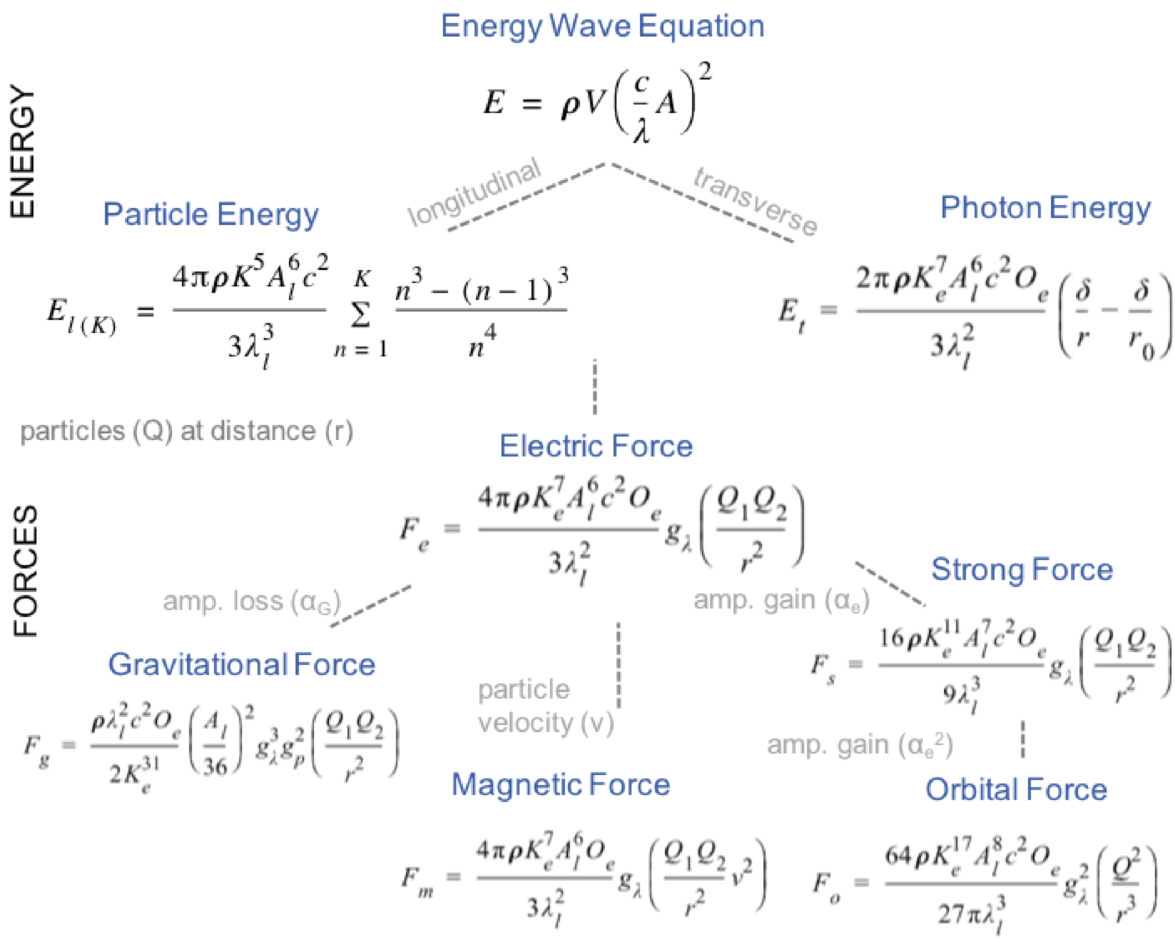
Longitudinal Out-Wave Energy – Complete Form

$$E_{m\,(out)} = \frac{1}{\alpha_e}\rho l_P^3\left(\frac{c}{K_e^2\lambda_l\sqrt{\left(1+\frac{1}{c}\right)}}\frac{(K_eA_l)^3}{(K_e^2\lambda_l)^2}\right)\left(\frac{c}{K_e^2\lambda_l\sqrt{\left(1-\frac{1}{c}\right)}}\frac{(K_eA_l)^3}{(K_e^2\lambda_l)^2}\sqrt{\frac{1}{\alpha_{Ge}}}\right)g_\lambda g_A$$

Magnetic (Transverse) Out-Wave Energy – Complete Form

Equations Derivation Summary

The following is a derivation of the common equations used in Energy Wave Theory and how they are derived from the energy wave equation.



Constants Derivations

Wave Constants – derivations:

There are four fundamental, universal wave constants. The speed of light (c) is a known and measured value, leaving three constants that needed to be derived against a known and measured property.

- **Wavelength** (longitudinal) is set to the well-measured classical electron radius $\{r_e\}$.

$$\lambda_l = \{r_e\} \frac{1}{K_e^2} g_\lambda^{-1}$$

- **Amplitude** (longitudinal) is set to the well-measured fine structure constant $\{\alpha_e\}$ and using wavelength calculated from above.

$$A_l = \{\alpha_e^{-1}\} \frac{3\pi\lambda_l}{4K_e^4}$$

- **Density** is set to the well-measured Planck constant {h} and using wavelength calculated from above.

$$\rho = \{h\} \frac{9\lambda_l^3}{32\pi K_e^{11} A_l^7 c O_e} g_\lambda^{-1}$$

Particle Constants – derivations:

There are two constants used in the equations for the electron. In addition there are three g-factors (two for the electron and one for the proton.

- **Electron particle count** is set to 10 based on calculations of K values found for particles (see electron).

$$K_e = 10$$

- **Electron outer shell multiplier** is a constant for readability replacing the summation in the electron's particle energy.

$$O_e = \sum_{n=1}^{K_e} \frac{n^3 - (n-1)^3}{n^4}$$

- **Electron orbital g-factor** is set to the well-measured classical electron radius $\{r_e\}$.
  Note that the derivation of this constant and the wavelength constant is circular. The final value was determined through iteration until all constants resolved correctly.

$$g_\lambda = \{r_e\} \frac{1}{K_e^2 \lambda_l}$$

- **Electron spin g-factor** is set to the Planck charge $\{q_P\}$.

$$g_A = \{q_P^{-1}\} 2A_l$$

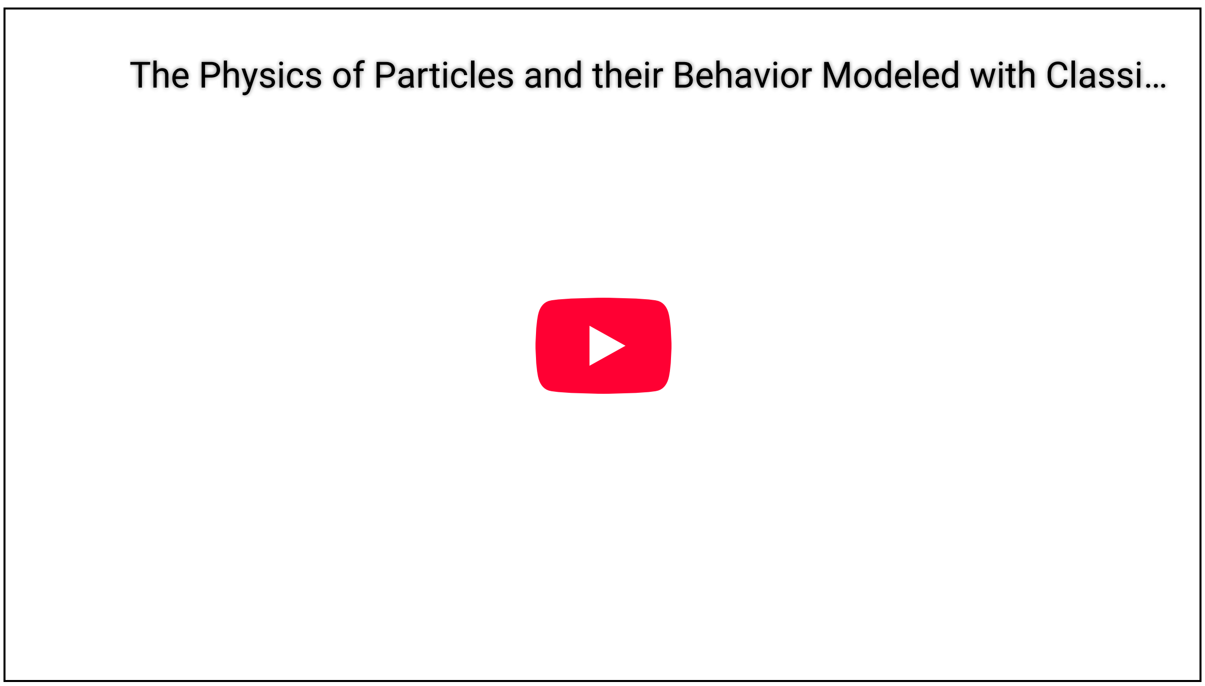
- **Proton orbital g-factor** is set proton's mass $\{m_p\}$.

$$g_p = \{m_p^{-1}\} \frac{4\pi\rho K_e^8 A_l^6 O_e}{9\lambda_l^3} \sqrt{\frac{\lambda_l}{A_l}}$$

In *Energy Wave Equations: Correction Factors*, a potential explanation for the values of these g-factors is presented as a relation of Earth's outward velocity and spin velocity against a rest frame for the universe.

Examples: *Examples of the energy, forces and photon equations matching experimental data can be found in the downloadable spreadsheet*.

Video Summary



Next: Classical Constants