# Energy Wave Equations: Correction Factors

Jeff Yee

jeffsyee@gmail.com

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## Summary

The equations in Energy Wave Theory accurately model particle energy, photon energy, forces, atomic orbitals and derive 23 fundamental physical constants from only five *wave* constants. Yet three correction factors are apparent in the equations. Because of their placement in the equations and similarities to known g-factors in modern physics, the correction factors were given the same names: electron orbital g-factor, electron spin g-factor and the proton g-factor. In this paper, a potential reason for these factors is discussed, based on the velocity of the Earth, which was neglected in the original construction of the Energy Wave equations.

## The Correction Factors

Three correction factors were added to the equations found in Energy Wave Theory, similar to the g-factors found in physics equations: electron orbital g-factor, electron spin g-factor and the proton g-factor.

The correction factors in Energy Wave Theory were also labeled after these three g-factors because of the similarities in where they occur in equations related to wavelength and amplitude. However, the values are different than the CODATA values for g-factors used in modern physics.[1] The value difference can be explained by the fact that different constants and values are used in energy and force equations, thus the correction factor value would also be different.

The g-factors for Energy Wave Theory appear in the papers: *Particle Energy and Interaction*[2], *Forces*[3], *Fundamental Physical Constants*[4], *Key Physics Equations and Experiments*[5] and *Atomic Orbitals*[6] These constants and their notation are found in the Appendix of this paper.

When drafting previous papers for Energy Wave Theory, the reason given for the two g-factors (orbital and spin) was an imperfect sphere as a result of motion and spin. The equations for particle energy rely on a perfectly spherical volume, and a perfect sphere may be an impossible shape given a particle's motion. Now, this imperfection is further explained as a result of the Earth's velocity through the universe, as seen in relativity, affecting the shape and energy of particles like the electron and proton. This approach could explain why the proton's orbital g-factor is slightly different than the electron's g-factor in Energy Wave Theory. These possibilities are discussed here in this paper.

## Earth's Velocity Relative to Universe

The Earth spins on its axis each day, while orbiting the Sun, which is spinning around the Milky Way galaxy. In addition, the Milky Way and other galaxies are expanding. A frame of reference is required to understand Earth's true speed in the universe, but when measured against other galaxies, it is found that nearby galaxies are rushing towards a *Great Attractor* at a speed of 1,000,000 meters per second.[7]

The potential velocity of Earth, as determined by the g-factors, is 33,000,000 meters per second ($3.3 \times 10^7$ m/s) when measured against the reference frame of a stationary universe. This is 33 times faster than the above-mentioned velocity and it is roughly 11% of the speed of light.

## Electron Orbital G-Factor (Longitudinal Wavelength)

The electron orbital g-factor, at least in Energy Wave Theory, should be appropriately named the longitudinal wavelength relativity factor. When the original Longitudinal Energy Equation was derived, it correctly measured the electron particle at rest to be $8.1871 \times 10^{-14}$ joules.

$$E_e = \frac{4\pi\rho K_e^5 A_l^6 c^2 O_e}{3\lambda_l^3} = 8.1871x10^{-14}J \tag{1}$$

While this value is correct, the fact that the Earth is moving in the universe was neglected. With relativity, the electron's energy increases with velocity, although it is only noticeable at relativistic speeds. However, an Earth velocity of 11% of the speed of light would be detectable. On Earth, the electron's energy is truly measured at $8.1871 \times 10^{-14}$ joules. However, at true rest (zero velocity in the universe's stationary frame), the electron's energy would be lower. Eq. 2 shows the Lorentz factor and how the electron's energy in Earth's frame of reference ($E_e$) would be greater than the electron's energy at rest in the stationary universe frame ($E_{e(rest)}$).

$$E_e = \gamma E_{e\,(rest)} \tag{2}$$

The Lorentz factor is based on velocity as seen in Eq. 3 where v is the velocity of Earth and c is the speed of light.

$$\gamma = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \tag{3}$$

Therefore, the rest energy of the electron in the stationary universe frame would be:

$$E_{e(rest)} = \frac{\frac{4\pi\rho K_e^5 A_l^6 c^2 O_e}{3\lambda_l^3}}{\gamma} \quad (4)$$

If one assumes that Earth's speed relative to the stationary universe is 3.3 x $10^7$ m/s, then the rest energy of the electron in the stationary universe frame can be calculated (Eq. 7). It is slightly less than the electron rest energy measured on Earth – at 8.1374 x $10^{-14}$ joules.

$$v_{earth} = 3.3 \cdot 10^7 \quad (5)$$

$$\gamma_e = \frac{1}{\sqrt{1 - \frac{v_{earth}^2}{c^2}}} \quad (6)$$

$$E_{e(rest)} = \frac{4\pi\rho K_e^5 A_l^6 c^2 O_e}{\gamma_e 3\lambda_l^3} = 8.1374x10^{-14} J \quad (7)$$

On Earth, due to a velocity in the universe of roughly 11% the speed of light, the electron's rest energy increased by **1.006 times**. Neglecting this increase in the original derivation of the Longitudinal Energy Equation for particle energy caused it to be compensated for elsewhere. This is one possible reason why the orbital g-factor appears. It is the inverse of the Lorentz factor when the Earth is in motion (11% of the speed of light). The inverse of the electron orbital g-factor is:

$$\frac{1}{g_\lambda} = 1.006 \quad (8)$$

And the Lorentz factor at Earth's potential velocity is:

$$\gamma_e = 1.006 \quad (9)$$

The imperfect particle sphere calculated in longitudinal energy and force equations may be a result of particles at relativistic speeds, affecting longitudinal wavelength in the direction of motion.

$$g_{\lambda} = \frac{1}{\gamma_e} \quad \textbf{(10)}$$

## Electron Spin G-Factor (Longitudinal Amplitude)

In addition to straight line motion which affects longitudinal wavelength, the longitudinal amplitude would also be affected in the direction of motion. The second g-factor is called spin, but in Energy Wave Theory it is often found to correct amplitude, which is associated with particle charge.

The amplitude for the Planck charge without the g-factor is calculated to be:

$$\frac{K_e A_l}{2} = 1.8314 \cdot 10^{-18} \quad \textbf{(11)}$$

Considering an Earth in motion, the amplitude for Planck charge is corrected to be Eq. 12. This matches the Planck charge. The same correction factor is used for the elementary charge in Energy Wave Theory, showing that the correction factor is consistent across constants with longitudinal wave amplitude.

$$q_P = \frac{K_e A_l}{2} g_A^{-1} = 1.8755 \cdot 10^{-18} \quad \textbf{(12)}$$

## Proton G-Factor

The proton g-factor is only used to correct the proton mass and is not used elsewhere in Energy Wave Theory. It is assumed to be similar to the electron spin g-factor – that the longitudinal wavelength in the direction of motion changes. Since the proton has a different radius and mass than the electron, the g-factor is also different. The value without the g-factor is in Eq. 13. The corrected value of the proton's mass with the g-factor is Eq. 14.

$$\frac{8\pi\rho K_e^7 A_l^6 O_e}{3\lambda_l^3} \sqrt{\frac{\lambda_l}{A_l}} = 1.6031 \cdot 10^{-27} \quad \textbf{(13)}$$

$$m_p = \frac{8\pi\rho K_e^7 A_l^6 O_e}{3\lambda_l^3} \sqrt{\frac{\lambda_l}{A_l}} \cdot g_p^{-1} = 1.6726 \cdot 10^{-27} \quad \textbf{(14)}$$

## Conclusion

The possibility of the Earth moving at high velocity throughout the universe, and its effect on particle energy, was not considered in the original equations for Energy Wave Theory. Although it is a possibility, a velocity of $3.3 \times 10^7$ m/s (11% of the speed of light) would be significant for the Earth to be traveling at this speed relative to a reference frame of a stationary universe, affecting longitudinal wavelength and amplitude.

# Appendix:
# Energy Wave Constants and Variables

### 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) |
| $\lambda_l$ $\lambda_t$ | Wavelength (l – longitudinal wave, t – transverse wave) |
| $g_\lambda$ $g_\Lambda$ $g_p$ | g-factor (λ – electron orbital g-factor, Λ – electron spin g-factor, p – proton g-factor) |
| $F_g$, $F_m$ | Force (g - gravitational force, m – magnetic force) |
| $E_{(K)}$ | Energy (K – particle wave center count) |

**Table A.1 – Energy Wave Equation Notation**

### Constants and Variables

The following are the wave constants and variables used in the energy wave equations:

| Symbol | Definition | Value (units) |
|---|---|---|
| **Wave Constants** | | |
| $A_l$ | Amplitude (longitudinal) | $3.662748116 \times 10^{-19}$ (m) |
| $\lambda_l$ | Wavelength (longitudinal) | $2.835967539 \times 10^{-17}$ (m) |
| ρ | Density (aether) | $9.605125782 \times 10^{24}$ (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** | | |

| | | |
|---|---|---|
| $K_e$ | Electron particle count | 10 - *dimensionless* |
| $O_e$ | Electron outer shell multiplier | 2.138743820 – *dimensionless* |
| $g_\lambda$ | Electron orbital g-factor (*revised*) | 0.993643364 – *dimensionless* |
| $g_A$ | Electron spin g-factor (*revised*) | 0.976448541 – *dimensionless* |
| $g_p$ | Proton orbital g-factor (*revised*) | 0.958447450 – *dimensionless* |

**Table A.2 – Energy Wave Equation Constants and Variables**

**Method for calculating the values of the constants**

The method used for deriving and calculating each of the constants is found in the *Fundamental Physical Constants* paper. The values may continue to be refined, and if so, will be posted online at: http://energywavetheory.com/equations.

[1] Mohr, P., Newell, D. and Taylor, B., CODATA Recommended Values of the Fundamental Physical Constants 2014 Rev. Mod. Phys. 88, 035009 (2016).

[2] Yee, J., Particle Energy and Interaction, Vixra.org 1408.0224 (2019).

[3] Yee, J., Forces, Vixra.org 1606.0112 (2019).

[4] Yee, J., Fundamental Physical Constants, Vixra.org 1606.0113 (2019).

[5] Yee, J., Key Physics Equations and Experiments, Vixra.org 1705.0101 (2019).

[6] Yee, J., Zhu, Y. and Zhou, G., Atomic Orbitals, Vixra.org 1708.0146 (2019).

[7] Scientific American, *How Fast is the Earth Moving*, https://www.scientificamerican.com/article/how-fast-is-the-earth-mov/ (Accessed March 15, 2018).