The Geometry of Particle Standing Waves

Jeff Yee* & Heinz-Dieter Hauger†

* *jeffsyee@gmail.com*
† *hdhauger@gmail.com*

August 2, 2020

Abstract: A particle's standing wave is modeled as a combination of two waves: incoming spherical waves that are reflected to produce outgoing spherical waves. The combination creates standing waves to the particle's radius, where such standing waves cease to form and then transition to traveling waves. This paper models wavelength distances that decrease from the core of the particle, to its transition point.

Introduction

In 2007, the electron was filmed showing its wave properties at Lund University [1]. The electron, along with all known standalone particles, have been modeled in Energy Wave Theory (EWT) as standing waves, with the summation of the energy of standing waves as the particle's energy and the transition point of standing waves to traveling waves as the particle's radius [2]. A standing wave contains energy, but there is *no net propagation* of energy [3], which becomes the definition of a particle as stored energy.

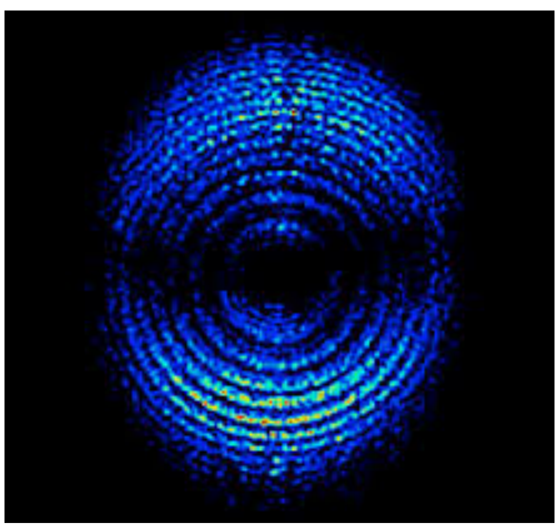

Fig. 1 – Electron captured on video using a quantum stroboscope (Lund University)

In Fig. 1, the electron clearly shows a separation of waves into wavelengths (dark rings), yet these wavelengths are not equally spaced. The geometry of these wavelengths, within the particle, is addressed in this paper in addition to the reason for the defined boundary of standing waves which becomes the particle's radius.

Spherical Standing Wavelengths

In EWT, traveling, longitudinal waves have a fundamental wavelength (λ_l), or simply λ for the purpose of this paper. The core of a particle contains a number of "wave centers", assumed to be neutrinos, that differentiates particles. The number of wave centers in the core of a particle is given the letter K. For ten wave centers at the core of a particle it would be K=10. Wave amplitude and wavelength are proportional to the number of wave centers at the core because of constructive wave interference (a greater number at the core reflects more waves increasing amplitude and wavelength).

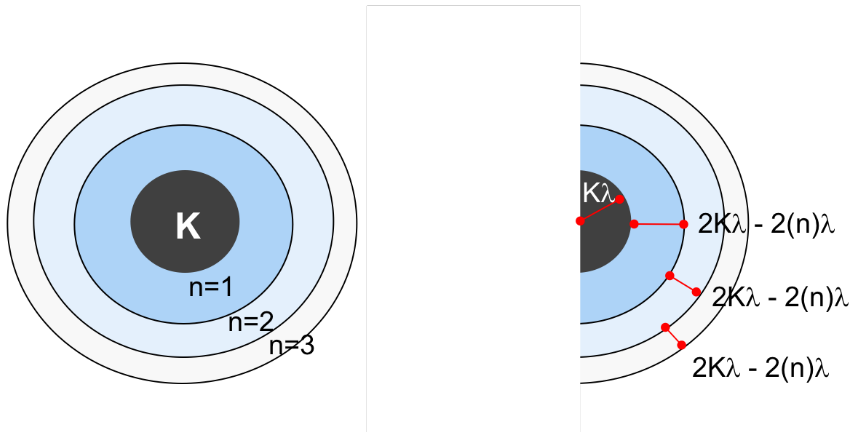

Fig. 2 – Spherical waves from a core number of particles (K) where each wavelength number (n) decreases

On the left of Fig. 2, a particle with a core (K) has three wavelengths, where the wavelength number (n) illustrates each of the three wavelengths expanding spherically from the core. On the right of Fig. 2, the equations for each distance between wavelengths are shown. The particle's core contains particles that reflect waves. This core is assumed to be proportional to wavelengths based on the number of wave centers (K) as:

$$r_{core} = K\lambda \quad \textbf{(1)}$$

Note that the diameter of the core is 2Kλ. Beyond the core, each wavelength decreases in distance proportional to its wavelength number. The distance of each wavelength is:

$$r_{wavelength} = 2K\lambda - 2n\lambda \quad \textbf{(2)}$$

Eq. 2 is the distance of each wavelength. To calculate the distance from the center of the particle, to the furthest wavelength number, the following would be used. Using Fig. 2 as an example, x=3 if the calculation is from the core to wavelength number three (n=3). Eq. 3 is the sum of r_{core} and the summation of *each* $r_{wavelength}$ until reaching x.

$$r_x = K\lambda + \sum_{n=1}^{x} 2K\lambda - 2n\lambda \quad \textbf{(3)}$$

$$r_x = \left(K + 2\sum_{n=1}^{x} K - n\right)\lambda \quad \textbf{(4)}$$

Standing Wave Radius

Eq. 4 contains a maximum distance at which standing waves form. It reaches a point when x=K, which means that the increase in constructive wave interference due to a number of particles (K) at the core has a maximum influence. Beyond this distance, no standing waves form and waves should be traveling in form. The particle radius reaches a maximum distance at this point:

$$r_{particle} = \left(K + 2 \sum_{n=1}^{K} K - n \right) \lambda \qquad \textbf{(5)}$$

Eq. 5 is consistent with EWT calculations for particle radius, and for their energies. It will always resolve to the square of K times wavelength, or:

$$r_{particle} = K^2 \lambda \qquad \textbf{(6)}$$

For example, if K=10, both equations (Eq. 5 and 6) resolve to 100λ. Therefore, a particle's radius can be easily determined using Eq. 6, but if each wavelength distance is required, Eq. 4 should be used. Yet, knowing Eq. 5, the mathematical explanation for the particle's radius is better understood. It reaches a maximum distance for standing waves when x=K.

Plotting the Electron's Wavelengths

In EWT, the electron is value K=10. Using Eq. 4, each wavelength is plotted where x=1 to x=10 and the fundamental wavelength (λ) is set to one for simplicity as it would scale proportionally. For example, x=1 results in a radius of 28, x=2 results in a radius of 44, x=3 results in a radius of 58, etc. At x=10, a maximum radius of 100 is reached and a higher value of x will never exceed 100.

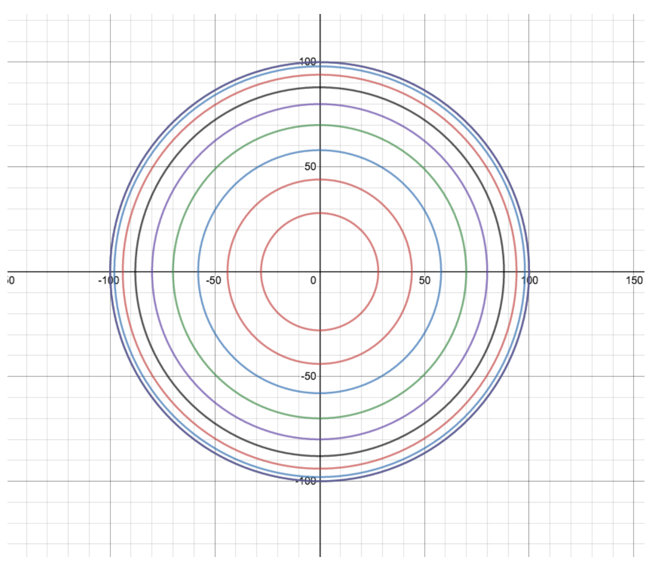

Fig. 3 – Electron wavelengths using Eq. 4

Conclusion

Wavelengths within a particle should not be assumed to be equal, as shown visually in the Lund University experiment of the electron. A function that decreases wavelength distances from the center of a particle explains why a particle has a defined boundary, as standing waves versus traveling waves. This paper highlights a potential equation that models this decreasing standing wavelength function and calculates a maximum radius that is consistent with calculation of particle energies and radii from Energy Wave Theory (EWT).

[1] Mauritsson, J., et al, 2007. Coherent Electron Scattering Captured by an Attosecond Quantum Stroboscope. Online: https://arxiv.org/abs/0708.1060.

[2] Yee, J., 2019. Particle Energy and Interaction: Explained and Derived by Energy Wave Equations. *Vixra*. Online: http://vixra.org/abs/1408.0224.

[3] Wikipedia, 2019. Standing Wave. Online: https://en.wikipedia.org/wiki/Standing_wave.