Report on the Evaluation of Chapter 29 Pair Production in "The Grand Unified Theory of Classical Physics" by Dr. Randell L. Mills

Prepared by

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June 18, 2020

Executive Summary

In my analysis, I verified calculations and equations involving Pair Production of electrons and positrons from a photon of pure energy found in Chapter 29 of the book "The Grand Unified Theory of Classical Physics" (January 2020 edition) by Dr. Randell L. Mills. I verified equations and calculations to a high degree of accuracy that are associated with this process. There is a remarkable agreement between the GUTCP calculated equations and the equations I get from my calculations. I verified all the equations from 29.1 through 29.22.

Purpose

As Dr. Mills states in Chapter 28 and now in Chapter 29, in the conversion of energy into matter, a transition state atomic orbital is required. In this chapter, this transition state atomic orbital is derived. In pair production, a photon of energy ≥ 1.02 MeV can become two particles of mass, an electron and a positron. Each particle has a rest energy of 0.511 MeV, so 2(0.511 MeV) = 1.022 MeV, the minimum energy of the photon (due to conservation of mass/energy). In pair production, four quantities are conserved during the process: mass/energy, charge, linear momentum, and angular momentum. Linear momentum is conserved since pair production takes place in the presence of a third particle, assuring the conservation of linear momentum. This process must also rely on the equations of electromagnetic radiation and the properties of spacetime since matter is created from electromagnetic radiation (a photon) and is an event occurring in spacetime.

The radius of the transition state electron atomic orbital is shown to be $r=\alpha a_o$, where α=the fine structure constant and a_o=the Bohr radius. It is also shown in the chapter that the energy stored in the magnetic field E_{mag} of the transition state electron atomic orbital equals the electric potential energy of the transition state atomic orbital.

We know that the energy stored in the Electric field and Magnetic field of a photon are exactly the same. The chapter also shows that two other energies are also equal due to this fact. The electric potential energy and the magnetic energy in the transition state atomic orbital are also equal to each other.

Dr. Mills derives the capacitance C and the inductance L of the transition state atomic orbital. He states again (as he also did in Chapter 28) that spacetime is an electrical LC circuit with angular resonance frequency given by $\omega=[LC]^{-1/2}$. He goes on to show that the LC resonance frequency for a transition state electron atomic orbital equals the frequency of the photon which forms the transition state atomic orbital. Hence we see that the electron transition state atomic orbital is an LC circuit that is excited at the resonance frequency of free space. In pair production, the impedance of free space becomes infinite and electromagnetic radiation can no longer propagate. That's when an

electron and a positron are produced (two particles now with mass). And the photon ceases to exist.

Angular momentum is shown to be conserved in the process of Pair Production in this chapter. And Figure 29.1 shows a schematic of the process of pair production, as outlined by Dr. Mills' theory.

Calculations

I have verified that Equations 29.1-29.8 are true and correct.

I have verified that the three equations (1)-(3) in footnote 1 at the bottom of page 1450 are also correct.

I have also verified that Equations 29.9-29.15 are correct.

I have verified that the value that comes from Eqn. 29.16 is correct.

And I have verified that Equations 29.18-29.22 are true and correct.

Conclusion

I was able to verify the GUTCP results of Chapter 29 in excellent agreement with my own calculations and derivations of equations. I successfully reproduced all of the equations and derivations found in Chapter 29. This chapter demonstrates that the GUTCP theory is successful at describing the Pair Production of an electron/positron pair from a photon of pure energy to a high degree of accuracy.

I find my results and calculations to be confirmation that the derivations and equations of Chapter 29 are indeed valid, reproducible, and accurate.