Report on the Evaluation of Chapter 4 in "The Grand Unified Theory of Classical Physics" by Dr. Randell L. Mills

Prepared by

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Executive Summary

In my analysis, I verified the steps involved in deriving equations involving photons found in Chapter 4 of the book “The Grand Unified Theory of Classical Physics” by Dr. Randell L. Mills. There were no computed values to verify in this chapter and no tables of values to verify either. This chapter consisted mainly of theory involving photons and the equations associated with them. In the course of these calculations, I replicated the derivation of his equations to a very high degree of accuracy.

Purpose

The physics being modeled is that of photons in free space. The equation of the photon in free space is derived here as a boundary value problem of a transition from an excited state of hydrogen to the ground state of hydrogen. In the process, a photon is emitted. The excited state is modeled as an atomic orbital with a resonant trapped photon, and the ground state is modeled as only an atomic orbital. The boundary condition imposed is that the angular momentum of the photon = $\hbar$.

The equation of the photon can then be determined. From this equation, Right Handed Circularly Polarized (RHCP) and Left Handed Circularly Polarized (LHCP) solutions can be found. These solutions are shown visually in the chapter. A superposition of the RHCP and LHCP solutions yields the case of the linearly polarized photon. A visual pattern of the linearly polarized photon is included in Chapter 4 as well.

Next, the general photon equation for the electric field of the photon is given. Equations for energy, momentum, radius of the photon, photon wavelength, and photon frequency are also given.

Next, Dr. Mills sees the wave-particle duality of light arising naturally from his equation of the photon. When photons add together in time or space (the far-field case), then these photons combine to yield wave properties, such as interference and diffraction. The classical wave theory based on Dr. Mills’ equation of the photon is then shown to be consistent with the photon explanation of the Photoelectric Effect. Dr. Mills gives a very accurate summary of the important aspects of the Photoelectric Effect. I enjoyed reading this section of the chapter very much

One surprising, yet interesting, prediction of the equation of the photon is that of photon torpedoes. Since the CP model of the photon is derived based on atomic orbitals, energy emitted as a photon is not diminished in intensity as the electromagnetic wave moves through space. This results in photon torpedoes. There could be many applications of photon torpedoes in the military, communications, and power generation and transfer industries. There is a body of evidence that these photon torpedoes should exist, as pointed out by Dr. Mills here in Chapter 4.

Another section of this chapter that I enjoyed reading was Dr. Mills' description of the Compton Effect. The classical wave theory based on Dr. Mills' equation of the photon is shown to be consistent with the photon explanation of the Compton Effect. The older classical wave theory of light could not correctly predict the results of the Compton Effect since this older theory thought of the light wave producing a Doppler effect once the wave interacted with the free electron. But the Doppler Effect didn't correctly describe the experimental observations, leading to a general perception that the classical wave theory of light was incapable of explaining the Compton Effect. Dr. Mills, I think, gives a very accurate summary of the Compton Effect.

One result from the proponents of quantum mechanics that I found to be quite interesting was that the laser should not exist since its operation violates the Heisenberg Uncertainty Principle. Both Bohr and Von Neumann denied that the laser (and maser) was possible, until Charles Townes showed them one in operation. This shows the shortcomings of the older quantum theory, as pointed out in footnote 1 in Chapter 4 on page 201 of CP.

Calculation

I have verified the algebra involved in equations 4.2, 4.3, 4.4, and 4.5. Likewise I verified that equations 4.8 and 4.9 are correct. Equations 4.11, 4.13, 4.15, and 4.16 were correct as well.

I was able to accurately reproduce equations 4.20, 4.21, and 4.23-4.28.

All of the equations in the Photoelectric Effect section were familiar and accurate results that I recognized from the photon description of the Photoelectric Effect.

Likewise with the equations in the Compton Effect section – the equations were all familiar and accurate. I verified equations 4.29-4.35. They are correct. I also verified the value of 0.0485 found in equation 4.34 and found it to be correct. From equation 4.33, $2h/(m_e c)$ should equal 0.0485 Angstroms, and it does.

Conclusion

I was able to verify the CP results of Chapter 4 in excellent agreement with my own calculations. I was able to replicate the derivation of Dr. Mills' equations to an excellent degree of accuracy. I find this to be confirmation that the calculations included in Chapter 4 are both valid and reproducible.