Report on the Evaluation of Chapter 3 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 the equations involving the free electron found in Chapter 3 of the book “The Grand Unified Theory of Classical Physics” by Dr. Randell L. Mills.

Purpose

The physics being modeled here is that of the free electron in free space. This is the case where an atom, with its electron atomic orbital, absorbs a photon with energy greater than the atom’s ionization energy. This ionizes the atom and creates a free electron. The solution of the boundary value problem of the free electron is given by the projection of the atomic orbital onto a plane that linearly propagates in a direction that is perpendicular to that plane.

The charge density and the mass density of the free electron can then be determined. These correspond to a two-dimensional lamina disc.

Next, it is shown that the total angular momentum of the free electron is given by ħ, as it should be. The current density function of the free electron is then determined. The radius of the two-dimensional lamina disc is also derived.

Next, there is a balance between the attractive magnetic force that exists in this lamina disc between current circles in the xy-plane and the centrifugal force on each current loop as it rotates around the angular momentum axis. These forces are calculated by different means and are shown to be equal (balanced).

The end of Chapter 3 shows how the plane-lamina of the free electron generates a uniform spherical current density pattern over time as it interacts with photons. Also, the change in angular frequency of the electron is equal to the angular frequency of the photon that corresponds to the transition. The free electron radius also changes to match the de Broglie wavelength. The angular momentum of the free electron ħ remains unchanged, and the energies in the lamina are balanced so that the total energy is unchanged. Furthermore, the de Broglie frequency matches the photon frequency.

CP shows that the results of the Stern-Gerlach Experiment are completely predictable. The Stern-Gerlach experiment shows that the angular momentum projection on the z-axis is ħ/2, whereas the Zeeman splitting corresponds to a magnetic moment of μ_B. The Zeeman splitting implies an electron angular momentum projection on the z-axis of ħ (twice that detected). CP reconciles these differences in a straight-forward manner.

Calculation

I verified that eqns. 3.1 and 3.2 are correct. I also verified that the value for r_g is also correct. I verified the correctness of eqns. 3.7-3.9. And eqns. 3.12-3.14 were correct as well.

I verified that eqns. 3.16-3.20 were correct. Also eqns. 3.24 and 3.25 were found to be correct. As were eqns. 3.29, 3.31, and 3.32.

Eqns. 3.36-3.41 were found to be valid, as were eqns. 3.43-3.52.

I also verified that eqns. 3.54 and 3.55 were correct. As were eqns. 3.57-3.61.

Eqns. 3.63 and 3.64 were validated, and eqns. 3.66-3.71 were also shown to be correct.

Lastly, eqns. 3.73 and 3.74 were found to be correct.

Conclusion

I was able to verify the CP results of Chapter 3 in excellent agreement with my own calculations. I was able to replicate the derivation of Dr. Mills' equations. I find this to be confirmation that the calculations included in Chapter 3 are valid and reproducible.