Report on the Evaluation
of Appendix VI
The Relative Angular Momentum Components
of Electron 1 and Electron 2 of Helium
to Determine the Magnetic Interactions
and the Central Magnetic Force
in
"The Grand Unified Theory of
Classical Physics"
by Dr. Randell L. Mills

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Executive Summary

In my analysis, I verified calculations and equations concerning diagrams of the angular momentum components of electron 1 and electron 2 in Helium. These angular momentum components were found for the four excited states Singlet l=0, Triplet l=0, Singlet l≠0, and Triplet l≠0 found in Appendix VI of the book "The Grand Unified Theory of Classical Physics" (January 2020 edition) by Dr. Randell L. Mills. Also verified were the central magnetic force and the force balance equation for each of the four excited states.

There is a remarkable agreement between the equations found in the chapter and the equations I get from my calculations. I verified that all the equations found in the chapter from Equation (1) through Equation (50) were in fact true, and reproducible. Equations (16). (37), (39), and (50) were found to have small typos in them (see below).

Purpose

In Appendix VI the momentum-vector orientations for the two possible excited spin states, singlet and triplet, are found, along with each of these states containing no orbital angular momentum (l=0) as well as those with orbital angular momentum (l≠0). The central magnetic force is derived in this appendix for each of the four excited states and is used in the Excited States of Helium section to calculate all of the excited states of the helium atom. The force balance equation involving the centrifugal and electric and magnetic forces is also found for each excited state. This is important to find since corresponding forces also arise in the interaction of multi-electron atoms as shown in the Three-Through Twenty-Electron Atoms section.

The first state considered in finding the momentum-vector orientations is the singlet excited state with l=0. The intrinsic and photon angular momentum vectors that describe this state are found in Figure AVI.1. These vectors are color-coded for easy reading. Based on these, the magnetostatic magnetic fields are found. Next, the average angular velocity ω and linear velocity **v** projections onto each Z/Z' axis are found. Based on the Lorentz force density, the central magnetic force F_{mag} is derived. And lastly, the force balance equation involving the centrifugal and electric and magnetic forces is found for this singlet l=0 excited state.

The second state considered in finding the momentum-vector orientations is the triplet excited state with l=0. The intrinsic and photon angular momentum vectors that describe this state are found in Figure AVI.2. These vectors are color-coded for easy reading. Based on these, the magnetostatic magnetic fields are found. Next, the average angular velocity ω and linear velocity **v** projections onto each Z/Z' axis are found. Based on the

Lorentz force density, the central magnetic force F_{mag} is derived. And lastly, the force balance equation involving the centrifugal and electric and magnetic forces is found for this triplet l=0 excited state.

The third state considered in finding the momentum-vector orientations is the singlet excited state with l≠0. The intrinsic and photon angular momentum vectors that describe this state are found in Figure AVI.3. These vectors are again color-coded for easy reading. This figure now includes the total angular momentum along the Z-axis due to both the spin and orbital contributions. It also includes the total angular momentum due to both the spin and orbital contributions along the Z'-axis as well. Based on these, the magnetostatic magnetic fields are again found. Next, the average angular velocity ω and linear velocity **v** projections onto each Z/Z' axis are found. Based on the Lorentz force density, the central magnetic force F_{mag} is derived. And lastly, the force balance equation involving the centrifugal and electric and magnetic forces is found for this singlet l≠0 excited state.

The fourth state considered in finding the momentum-vector orientations is the triplet excited state with l≠0. The intrinsic and photon angular momentum vectors that describe this state are found in Figure AVI.4. These vectors are again color-coded for easy reading. This figure now includes the total angular momentum along the Z-axis due to both the spin and orbital contributions. It also includes the total angular momentum due to both the spin and orbital contributions along the Z'-axis as well. And for this state, it includes **S** along the Y-axis, as well. Based on these, the magnetostatic magnetic fields are again found. Next, the average angular velocity ω and linear velocity **v** projections onto each Z/Z' axis are found. Based on the Lorentz force density, the central magnetic force F_{mag} is derived. And lastly, the force balance equation involving the centrifugal and electric and magnetic forces is found for this triplet l≠0 excited state.

Calculations

I have verified that Equations (1)-(50) in this appendix are in fact correct as listed in the GUTCP book.

Conclusion

I was able to verify the results of Appendix VI in excellent agreement with my own calculations and derivations of equations. I successfully reproduced all of the equations and derivations found in Appendix VI, up through Equation (50).

This appendix concerned itself with diagrams of the angular momentum components of electron 1 and electron 2 in Helium. These angular momentum components were found for the four excited states Singlet l=0, Triplet l=0, Singlet l≠0, and Triplet l≠0. I find my results and calculations to be confirmation that the derivations and equations of Appendix VI are indeed valid, reproducible, and accurate.