Report on the Evaluation of Chapter 35 The Fifth Force in "The Grand Unified Theory of Classical Physics" by Dr. Randell L. Mills

Prepared by

Randy A. Booker, Ph.D.
57 Azalea Drive
Weaverville, NC 28787
(828) 251-6269
Booker@unca.edu

October 27, 2020

Executive Summary

In my analysis, I verified calculations and equations involving the properties of pseudoelectrons and a new Fifth Force found in Chapter 35 of the book "The Grand Unified Theory of Classical Physics" (January 2020 edition) by Dr. Randell L. Mills. There is a remarkable agreement between the GUTCP calculated equations and the equations I get from my calculations. I verified the vast majority of the equations from 35.1 through 35.106. Some equations and derivations involved some math that I was not familiar with, so I couldn't verify those few equations. But these were few and far between, and I was glad that I could verify the majority of the equations in the chapter. This branch of physics was quite new to me.

Purpose

The electron angular momentum is quantized in terms of h-bar. This intrinsic motion defines a two-dimensional current surface that can be positively curved, flat, or negatively curved. The positively curved and flat cases are the case of a bound electron and a free electron, respectively. The third case makes up an interesting state of matter called a pseudoelectron. It's a case where the gravitational mass is negative and it defines a Fifth Force.

Gravity is described by the metric of spacetime. All ordinary matter (comprised of leptons and quarks) has positive curvature of spacetime. Here the sum of the angles in a triangle is greater than 180^o. For some surfaces, the sum of the angles in a triangle are less than 180^o and those surfaces are said to have negative curvature. A saddle, a cantenoid, a hyperboloid, and a pseudosphere are all negatively curved surfaces. Figures 35.1, 35.2, 35.3, and 35.4 in the chapter show what a saddle, a hyperboloid, a conic, and a pseudosphere look like.

In Chapter 35, the Schwarzschild metric for negative curvature is found, and that metric describes the pseudoelectron. Negative gravity, the Fifth Force, can be created by forcing matter into such a negative curvature. One property of a psedoelectron would be that it would experience a repulsive force (opposite to that of gravity, which is normally attractive) with matter of positive curvature (that is, regular matter). It is predicted that the Fifth Force would lead to the deflection of a pseudoelectron in the upward direction.

Mills says that it is possible to give an electron such a negative curvature, with negative gravitational mass characteristics from the Fifth Force. Let's say we have a particle that is the source of local spacetime curvature that is negative. Then a pseudoelectron in its presence would be given a trajectory that is hyberbolic. Here, the gravitational mass of the pseudoelectron behaves as negative and the inertial mass m_e is held constant. The actual trajectory can be solved rigorously by solving the orbital equation that results from the negative Schwarzschild metric. The rigorous solution is equivalent to that given for

the case of a positive gravitational velocity except that now the gravitational velocity is imaginary. Matter, energy, and spacetime are all conserved with respect to the creation of the pseudoelectron. Such a pseudoelectron would be repelled from a normal gravitational body like the Earth. The ejection of such a pseudoelectron from the Earth would result in an infinitesimal decrease in the radius of the Earth. Furthermore, the amount that the gravitational potential energy of the Earth is lowered is equivalent to the total energy gained by the repelled pseudoelectron. Momentum would also be conserved for the interaction of the pseudoelectron and the Earth.

Next, the properties of constant negative curvature and pseudoelectrons are found mathematically. A pseudosphere is shown in Figure 35.6 and a pseudoelectron is shown in Figure 35.7.

Next, a review of hydrino theory is presented in Chapter 35. Now, a free electron may form an inverse spherical bound state of pseudoelectron mass, charge, and surface current density. And the pseudospherical electron state is referred to as a pseudoelectron. Mills says that the formation of a pseudoelectron requires the presence of a gravitating body where the gravitational energy is conserved between the gravitating body and the pseudoelectron. Here, the positive curvature of spacetime due to the gravitating body is increased causing a more negative gravitational energy in response to the negative curvature of the pseudoelectron, which causes a force to eject it from the vicinity near the gravitating body.

Next in this chapter (Chapter 35), the pseudoelectron is derived mathematically. The pseudosphere turns out to be a solution of the Sine-Gordon equation. The Sine-Gordon equation can also be derived using the Lagrangian, and this method is shown in the chapter. Also discussed is the Fourier Transform of the Pseudoelectron current density.

It does turn out that the Potential Energy and the Kinetic Energy of the pseudoelectron are both positive. But the Total Energy must be negative for the pseudoelectron to be stable. The negative energy for stability is satisfied when the negative gravitational energy exceeds the total energy.

Next, the force balance of the pseudoelectron is taken into account. First, the centrifugal force that is normal to the surface of the pseudosphere is found. Then, the opposing electric force is found, and the outward Electric Force is equated to the inward Centrifugal Force (a force balance). This yields the pseudoelectron force balance equation. Then, the Electric Potential V is found from the R that results from the force balance equation. The relativistic Kinetic Energy T and the Binding Energy $E_B = V + T$ are found. Next, the self-field energy of the pseudoelectron is found. As a result, the Total Energy to form the pseudoelectron is given by $E_T = E_B + E_{self}$. For the pseudoelectron to have negative energy and be energetically stable, the negative gravitational energy must be greater in magnitude than E_{Total}. So $|V_G| \geq E_{Total}$. What's found is that pseudoelectron production may be achieved by irradiating electrons having zero gravitational mass with photons of energy ≥ 44.2 eV in the presence of a black hole, where the incoming photons excite the electrons to pseudoelectrons.

Another method discussed in the chapter for the formation of pseudoelectrons is the collision of free electrons with the Tri-hydrogen cation H_3^+. The details of the mechanism are shown explicitly in the chapter.

In the field of Astronomy, relativistic electrons are seen ejected from the center of black holes in jets. These jets are aligned along the poles of the black hole's accretion disk, where the strongest gravitational fields exist. There could be pseudoelectrons that are being ejected in these jets, as well. Experimentally, black hole plasma jets have been linked to H_2 molecular hydrogen gas moving at extraordinary speeds. The free electron collision method with H_3^+ can account for pseudoelectrons colliding with H_3^+ that can in fact produce such fast H_2.

Calculations

The value of r_g in the 9th line, on page 1557, is correct.

And the two values in the 10th line, on page 1557, are also correct.

I have verified that Equations 35.1-35.3 and their values are correct.

I have verified that Equations 35.5-35.6 are also correct.

I have also verified that Equations 35.8-35.17 are correct, as are Equations 35.18-35.23.

I have verified that Equations 35.24-35.27 are correct.

And I have verified that Equations 35.29-35.37 are true and correct.

I have shown that the Equations 35.38-35.42 are correct as listed, as is Equation 35.44.

I have shown that Equations 35.51-35.56 are correct.

I have shown that Equations 35.58-35.59 are correct, as is Equation 35.61.

And I have shown that Equations 35.64-35.66 are correct as listed.

I have also shown that Equations 35.73-35.74 are correct, as is Equation 35.77.

Equations 35.80-35.82 and Equations 35.84-35.97 are correct.

I have shown that Equations 35.98-35.102 and their values are correct.

And I have shown that Equations 35.103-35.106 are correct as written.

Conclusion

I was able to verify the GUTCP results of Chapter 35 in excellent agreement with my own calculations and derivations of equations. I successfully reproduced the vast majority of the equations and derivations found in Chapter 35. Some equations and derivations involved some math that I was not familiar with, so I couldn't verify those few equations. This chapter demonstrates that the GUTCP theory is very successful at predicting the nature of pseudoelectrons to a high degree of accuracy.

I find my results and calculations to be confirmation that the derivations and equations of Chapter 35 are indeed valid, reproducible, and accurate.