

**Report on the Evaluation
of Chapter 34
Equivalence of Inertial and Gravitational
Masses Due to Absolute Space and
Absolute Light Velocity
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 calculations and equations involving the Equivalence of Inertial and Gravitational Mass due to Absolute Space and Absolute Light Velocity found in Chapter 34 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 these subjects. I also verified the values for the mass ratios listed in Table 34.1 are true as listed. There is a remarkable agreement between the GUTCP calculated equations and the equations I get from my calculations. I verified the equations from 34.1 through 34.73.

Purpose

Chapter 34 starts with an argument being made for reinstating absolute space in relativity. Absolute space would help resolve problems in the Twin Paradox, for example. Relativity implies that these two scenarios are the same: Case I - For the Earth to see a moving spaceship go by it at near- c speeds, and the case (Case II) where the spaceship observers think they're at rest and see the Earth moving by it with the same velocity as Case I but with the Earth moving in the opposite direction. Special relativity sees these two cases as equivalent. But they're not equivalent from a mass/energy viewpoint. A moving Earth moving at velocity $-v$ (Case II) has much more energy than the spaceship moving in Case I at velocity $+v$. Energy between the two cases aren't the same, or conserved. However, an absolute space allows the energy to be conserved, or the same, in the two cases. There must be an absolute frame for each object in order to conserve the mass/energy of the Universe as well as to resolve paradoxes such as the twin paradox. Before, the idea of Absolute Space had been abandoned by Special Relativity, but Dr. Mills sees a place for the concept of Absolute Space to come back.

Next, the Lorentz Transformations of Special Relativity are reviewed. The metric tensor and Schwarzschild metric of General Relativity are reviewed as well. The gravitational escape velocity v_g and Newtonian gravitational radius r_g are defined, too. It is pointed out that the Schwarzschild metric gives the relationship where matter causes spacetime to curve and is the origin of gravity. v in the Lorentz Transformation can be replaced by v_g when the Schwarzschild metric is considered. It is shown in Chapter 34 that in the case where $v_g \ll c$, the gravitational energy E_g goes to that given by Newton's Law of Gravity.

Spacetime is seen to undergo time dilation and length contraction at the particle production event as a gravitation front propagates out as a light-wave front at light speed. The photon's effect on spacetime and spacetime's effect on the corresponding production particle then determine its inertial and gravitational mass and charge e . The Schwarzschild metric gives the relationship whereby matter causes relativistic corrections

to spacetime that determines the masses of the fundamental particles. This leads to the equivalence of the mass energy, the Planck equation energy, the electric potential energy, the magnetic energy, the gravitational potential energy, and the mass/spacetime metric energy from Chapter 32. This then leads to the mass ratios of fundamental particles (mostly leptons) that are listed in Table 34.1, namely m_μ/m_e , m_τ/m_μ , m_τ/m_e , and m_N/m_e , where m_μ = mass of the muon, m_e =mass of the electron, m_τ =mass of the Tau particle, and m_N =mass of the neutron. Pair production leads to the mass of the electron from the GUTCP theory, which is in remarkable agreement to m_e experimental.

Next, Q , the ratio of mass/energy to expansion/contraction of the Universe is found, in units of kg/sec. The Universe is closed (by the findings of Chapter 32) and it is finite with no boundary, and the Universe oscillates. The formula for the oscillation period, T , of the Universe is reviewed, and T is given in both seconds and in years.

The differential equation for the radius of the Universe is found. And from it, we can determine the maximum radius and the minimum radius (which corresponds to the gravitational radius r_g). These are given in units of light-years. When the radius of the Universe is the gravitational radius r_g , it is seen that the proper time is equal to the coordinate time and the gravitational escape velocity v_g of the Universe is equal to the speed of light c .

From the differential equation for the radius of the Universe, the formula for the radius of the Universe is found as a function of time. It once again is shown that the period of spacetime expansion/contraction and particle decay/production for the Universe are equal (these were also shown to be equal in Chapter 33 as well). The equation of the radius of the Universe turns out to also be a solution of the Wave Equation. Maxwell's Equations, Planck's Equation, the de Broglie equation, Newton's Laws, Special Relativity, and Gravity are all shown to be unified.

Inertial mass arises from the impedance of spacetime η . The resistance of mass to motion is seen to be based on absolute energy conversion. Force is given by the change in energy over distance, or $F=dE/ds$. It is shown in this chapter that this relation leads to the correct force law from Special Relativity that's based on the generalized form of Newton's Second Law of Motion, namely $F=dp/dt$. Thus we see that the application of a force causes acceleration to a new final absolute velocity that corresponds to the final absolute mass, where the mass difference is equal to the increased kinetic energy. Since the absolute-mass-energy of the source of the force decreases by that of the increase of the accelerated body, the mass-energy inventory of the Universe is conserved, by using absolute space. We saw before that this was not the case in Special Relativity in the example of a spaceship moving past the Earth (paragraph 1 above), where energy is not conserved in different frames. Mass-energy can't be created by simply selecting alternate frames to observe in.

The production of a particle from a photon defines the absolute inertial frame at rest for the particle. The Twin Paradox is easily resolved since the Earth is identified as a good approximation to an absolute frame at rest for the almost-light-speed travel of the

travelling twin. The travelling twin's retarded clock was at the expense of the energy required for the acceleration/deceleration of his spaceship – energy is conserved with the concept of absolute space reinstated, unlike the argument from Special Relativity.

The Twin Paradox is real and has been experimentally verified by accurate clocks. One clock was Earth-bound and the other clock was flown around the Earth. The two clocks were brought back together on the Earth and their times compared. And in fact, the travelling clock kept less time on it than the Earth-bound clock – as expected. Also, absolute space has been confirmed recently experimentally by the observation that quasars don't exhibit time dilation but supernovas in them do show time dilation.

Calculations

I have verified that Equations 34.1-34.3 are true and correct.

I have verified that the value in the second line after Eqn. (34.3) is true as listed.

I have also verified that Equations 34.4-34.13 are also correct.

I have verified that Equations 34.14-34.20 are correct.

And I have verified that Equations 34.21-34.27 are correct as shown in the book.

I have verified that Equations 34.28-34.34 are correct.

I have shown that Equations 34.35-34.41 are true.

And I have shown that Equations 34.42-34.48 are correct as shown.

I have shown that Equations 34.49-34.51 are correct.

And I have shown that Equations 34.52-34.54 and the values they produce are correct.

I have verified that the values of the mass ratios listed in Table 34.1 are in fact correct as listed.

I have verified that the value of p_u in the 10th line above Eqn. (34.54) is correct.

I have verified that Equations 34.56-34.57 are correct.

I have shown that the Equations 34.58-34.59 and the values they produce are correct.

I have verified that Equations 34.60-34.70 are correct.

I have shown that the value for η in the third line above Eqn. (34.71) is correct.

And I have verified that Equations 34.71-34.73 are true.

Conclusion

I was able to verify that the GUTCP results of Chapter 34 are in excellent agreement with my own calculations and derivations of equations. I successfully reproduced all of the equations and derivations found in Chapter 34. This chapter demonstrates that the GUTCP theory is successful (to a high degree of accuracy) at describing a new argument for Absolute Space and as a result, Absolute Light Velocity exists, which gives rise to the Equivalence of Inertial and Gravitational Mass from General Relativity. I also verified that the values for the mass ratios listed in Table 34.1 are in fact true as listed.

I find my results and calculations to be confirmation that the derivations and equations of Chapter 34 are indeed accurate, reproducible, and valid.