

**Report on the Evaluation  
of Chapter 32  
Gravity  
in  
“The Grand Unified Theory of  
Classical Physics”  
by Dr. Randell L. Mills**

Prepared by

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July 14, 2020

## Executive Summary

In my analysis, I verified calculations and equations involving the General Theory of Relativity and Gravity found in Chapter 32 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. The chapter was long (56 pages), so I validated half of it, a total of 28 pages. I validated the sections from Quantum Gravity of Fundamental Particles through the Deflection of Light section. Then I skipped over to review the section on the Composition of the Universe. There is a remarkable agreement between the GUTCP calculated equations and the equations I get from my calculations. I verified the equations from 32.1 through 32.114 and 32.169 through 32.172.

## Purpose

Chapter 32 starts with the quantum gravity of fundamental particles, like electrons, neutrons, and protons. The Principle of Equivalence is introduced early on, implying the equivalence of the gravitational mass found in Newton’s Law of Gravity and the inertial mass found in Newton’s Equation  $F=ma$ . The main theoretical difficulty with Newtonian gravitation is why these two masses are equivalent. Einstein based his General Theory of Relativity on the Principle of Equivalence, and General Relativity became a new theory of Gravitation. One outcome of this new theory is that time slows down near a massive object, indicating a gravitational time dilation. The spacetime metric is given by the Minkowski tensor and leads to the Schwarzschild metric. Along the way we are introduced to the definition of the Planck mass  $m_u$  and to the gravitational velocity definition  $v_g$ . And the Newtonian radius definition is given by  $r_g$ . In General Relativity, mass curves spacetime, and the curvature of spacetime tells another mass how to move around the first mass.

General Relativity defines the mass of fundamental particles, according to Dr. Mills’ theory. It does this in terms of the spacetime metric. When a photon transitions to a particle and an anti-particle, mass and charge are created and spacetime is altered.

Box 32.1 gives the definition of the time unit sec. The metric of time, sec, is defined in terms of fundamental constants and the electron mass. The harmonic oscillation period  $T$  of the universe is also found in Box 32.1.

Box 32.2 gives relationships between the Earth Mean Solar Day definition of the sec and the definition of the sec based on pair production and its effect on spacetime. The two values for the sec are found to be identical.

The next section is on Newtonian Orbital Mechanics which gives the formula for the trajectory  $r$  and eccentricity  $e$  of a moving object in space. Four orbits are described in

terms of their eccentricities and energies: hyperbolic orbit, parabolic orbit, elliptical orbit, and circular orbit. The next section gives relativistic corrections to the orbits of Newtonian Mechanics and Newtonian Gravity. This gives rise to two effects seen in General Relativity: 1) the Precession of the Perihelion of the three inner planets – Mercury, Venus, and Earth – plus the asteroid Icarus. The General Relativity theory prediction agrees with the observed precession for these four objects. 2) the Deflection of Light by the Sun's mass, where the general relativity theory result agrees with observations of the bending of starlight by the Sun seen during a solar eclipse. The Newtonian prediction of the deflection is too small by a factor of two compared to observations. But the General Relativity result agrees with observations.

The next section I reviewed was the section beginning on page 1509 entitled "Composition of the Universe". In the case where hydrinos comprise dark matter, then all the matter in the universe is ordinary (baryonic) matter. Also resulting from this case, the mass of the Universe is enough for it to be a closed universe, even an oscillating universe. The observed abundance of the three lightest elements – H, He, and Li – can be explained by Dr. Mills' theory through neutron, proton, and electron production during the contraction phase of the universe and by stellar nucleosynthesis during both the contraction and expansion phases of the oscillatory cycle. By Dr. Mills' theory, it is also possible to create a particle without its antimatter particle. During the contraction phase, electron neutrinos cause neutron production from photons, and conserving energy, momentum, and charge during the process. After neutrons are produced, then protons and electrons are produced from neutron beta decay, via  $n \rightarrow p + e^- + \bar{\nu}_e$ . Spin conservation means that antimatter (antineutrons) are not produced. Hence we see that our universe doesn't contain antimatter.

The Cosmic Microwave Background radiation started out in the early universe as smooth, but soon after the Big Bang, small variations in temperature began to appear in it. These variations grew as the universe expanded and became seeds for the formation of quasars. Black holes quickly formed in the centers of quasars from supernova explosions. The expelled gas from the supernova explosions formed galaxies. Dr. Mills says that stars exist which are older than the time of the present expansion, meaning that stellar evolution occurred also during the contraction phase. He says that galaxy formation existed during the contraction phase as well, accounting for observations of old galaxies.

He goes on to say that hydrino transitions to lower energy hydrino states serve as one source of power input to the universe, causing the universe to accelerate in its expansion. This accelerating expansion has now been observed, yet it was first predicted by Dr. Mills 25 years ago before it was observed that the universe's expansion is accelerating. Dr. Mills points to data and observations (short EUV observations, coronal heating of the sun, etc.) that suggests that dark matter is made up of hydrinos. These hydrinos in the presence of a suitable catalyst can drop to lower energy levels below the ground state of hydrogen, and in the process releasing energy that accelerates the expansion of the universe.

## Calculations

I have verified that Equations 32.1-32.5 are true and correct.

I have also verified that Equations 32.8-32.19 are also correct.

I have verified that Equations 32.20-32.26 are correct.

And I have verified that Equations 32.27-32.31 are correct as shown in the book.

I have verified that Equation2 32.32-32.36 are correct.

I have shown that Equations 32.38-32.40 are true.

And I have shown that Equations 32.42-32.48 are correct as shown.

I have verified as correct all the equations in Box 32.1, meaning that Equation 32.1.1 is true and Equations 32.1.2-32.1.4 and their values they produce are correct.

I have also verified as correct all the equations in Box 32.2, meaning that Equations 32.2.1-32.2.13 are correct, and the value that Equation 32.2.5 produces is correct as listed.

I have verified that Equations 32.49-32.51 are true.

I have verified that Equations 32.53, 32.54, and 32.56 are correct.

I have shown that equations 32.57-32.63 are correct.

I have shown that Equations 32.64-32.70 are true.

I have shown that Equations 32.71-32.78 are also correct.

And I have verified that Equations 32.82-32.84 and 32.86-32.87 are correct.

I have shown that Equations 32.89-32.97 are correct in the book.

I have confirmed that the numbers in the rows for Mercury, Venus, and Earth are true in Table 32.1. I couldn't find values to compare to for Icarus.

I have verified that Equations 32.100-106 are correct.

And I have verified that Equations 32.107-32.113 are correct.

I have verified that the value listed in Equation 32.114 is correct as shown.

I have verified that Equations 32.169-32.172 and the value shown in Equation 32.171 are correct in the section on the Composition of the Universe that starts on page 1509.

## **Conclusion**

I was able to verify the GUTCP results of Chapter 32 are in excellent agreement with my own calculations and derivations of equations. I successfully reproduced 95% of the equations and derivations found in Chapter 32. The remaining equations not verified was due to me not being an expert in the math involved in General Relativity, which is a very advanced subject. This chapter demonstrates that the GUTCP theory is successful at describing General Relativity and the new theory of Gravitation to a high degree of accuracy.

I find my results and calculations to be confirmation that the derivations and equations of Chapter 32 are indeed valid, reproducible, and accurate.