Cosmic Creation and Evolution of Matter, Energy, and Gravity

An Alternative to Big Bang Theory That Combines All of Its Common Features Into a Step by Step Evolutionary Creation Process for Today’s Cosmos

Living Universe Matter Creation Spiral

James Carter

This Model Depicts the Electron/Proton Bifurcation Stage of the Early Universe. It Replaces Big Bang’s Singularity with a Matter/Antimatter Duality and Instant Inflation with a Cosmic Reproduction Process Lasting Billions of Years.
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Gravity is merely an obscene dance between the changing absolute values of mass, space, and time.

The principle of Circlon Synchronicity makes the theoretical physics of science and cosmology both conceptually and structurally obsolete.

The Einstein bending of light is the real measurement of an apparent angle due to inertial changes in Earth’s gravitational momentum. It has nothing to do with the sun’s gravitational force and its value can be correctly calculated from measurements Earth’s gravity.

(see page 45)

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Physics Without Metaphysics

The Standard Model Theories of Physics and the Big Bang are based on four fundamental metaphysical assumptions that have never been experimentally verified.

**Eternal Electron Mass Constant**

All standard model Physics and Big Bang theories begin with the metaphysical assumption that the electron/proton mass ratio of 1/1836 is a universal and eternal constant that has not changed since the beginning of time and will remain the same in the future.

Numerous measurements of the cosmos and here on Earth conclusively show that this ratio has been gradually increasing from a time near the beginning of the cosmos when the electron/proton ratio was 1/1.

**Point Particles**

The theory of Quantum Mechanics makes the metaphysical assumption that electrons, protons, photons, and other particles of matter exist at points in uncertain locations and are surrounded by shapeless fields and waves that emanate to infinity from these points.

All measurements of the shapes of particles of matter and photons show the multi-dimensional, fractal, torus shape of the circlon on all levels of scale from the microscopic to the supernova. The Circlon Shape interpretation of quantum mechanics replaces the uncertainty principle with the physical circlon shapes of the electron, proton, and photon.

**E = MC^2 & Massless Photons**

The primary metaphysical assumption of Special Relativity theory is the idea that the mass of matter and antimatter can be converted into the pure energy of massless photons and also that the pure energy of massless photons can be converted into the pure rest mass of matter and antimatter.

“Pure energy” and “pure rest mass” can never be detected separately. Energy/mass is a single entity that is always locked together in equal quantities in both the measurement of photons e/m = cC) and atoms e/m = CC. The massless photon was just an idea Einstein had so he could believe in a spacetime continuum aether that can contain pure energy in the form of massless momentum.

**Equivalent Downward Force and Motion of Gravity**

The sole metaphysical assumption of general relativity theory is that the direction of the force and motion of gravity points down towards Earth’s center. Einstein called this assumption the equivalence of the motion and force of gravity with the motion and force of inertial momentum.

The force and motion of gravity has never been measured to be equivalent to the force and motion of inertia, but they are always calculated to be equal. All measurements with accelerometers and atomic clocks conclusively show the direction of gravitational motion and force is upward and points away from Earth’s center.

None of these four metaphysical assumptions are used in the Living Cosmos description of Big Bang physics and the measurements of matter and photons.
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Introduction

The Living Cosmos is a New Model of the Big Bang Creation

The Living Cosmos is based on the same astronomical observations used by Big Bang theories to explain the beginning and subsequent evolution of the cosmos. The two main differences is that first, the Living Cosmos begins with a matter/antimatter duality instead of a pure energy singularity and second, it rejects Big Bang theory’s fundamental assumption that the electron/proton mass ratio of 1/1836 is a universal and eternal constant. The evolution of the Living Cosmos is driven by a constant decrease in the mass of the electron relative to the proton and the changing electrodynamics between the two particles.

The Living Cosmos is about the physical interpretations of actual observations and measurements of the cosmos. The experimental evidence of cosmic phenomena is taken at face value and no metaphysical assumptions are made for unmeasured physical values.

An example of this is the Hubble constant. The undisputed conclusions of these measurements is that spectral photons emitted in the distant past had longer wavelengths and less energy than spectral photons emitted today. The electrodynamics behind these values is a predicted result of an evolving electron/proton mass ratio.

With Big Bang theory’s unquestioned eternal electron/proton mass ratio of 1/1836, theorists are forced to imagine that the Hubble effect is not a simple electrodynamic effect local to each atom but rather a universal direct Doppler effect produced by a general “explosion” of the cosmos in which the outer galaxies are moving away from one another at speeds approaching the speed of light. Theorists are divided as to the actual cause of the red shifts with some believing they are Doppler effects caused by receding galaxies and the others claiming the shifts to be non-Doppler effects caused by the photons becoming stretched as they traveled through expanding spacetime for billions of years.

The Living Cosmos is presented as a step by step evolutionary journey of discovery through the history of the cosmos from its beginning as a matter/antimatter duality to the estimated $2^{256}$ protons and electron that occupy the universe today. At each stage in these evolutionary sequences, the increasing electron/proton mass ratio is able to account for all of the otherwise unexpected phenomena.

The Living Cosmos is explained in terms of the principles and logic of the scientific method’s experimental measurement of mass, space, time, and gravity and their calculations of force, momentum, and energy. It has no equations much more complicated than $F = ma$, $p = mv$, and $e = mc^2$. 

The Cosmic Evolution of Matter

James Carter
The Standard Model Big Bang Theory is based on the unmeasured but unquestioned metaphysical assumption that the electron/proton mass ratio $e/p = 1/1836$ is an unchanging, universal constant. To support this idea, theorists are forced to imagine that the universe began with the sudden appearance of a singularity of “pure” energy. This unknown type of energy was then imagined to be transported instantly to the far reaches of the known universe, where it was transformed into electrons and protons at $e/p = 1/1836$. This matter was produced without any apparent creation of antimatter. These particles of matter then somehow managed to find one another in the vastness of space, couple together into atoms, and emit a universe-wide blast of photons with a constant 3000 K blackbody temperature corresponding to $e/p = 1/1836$. These photons are imagined to have “cooled” to the present temperature of 2.7 K through an imaginary process that violates the first and second laws of thermodynamics significantly. The universal homogeneous cloud of radiating atoms then slowly cooled, divided, and collapsed into stars, then galaxies, and finally great walls of galaxies. General Relativity has no explanation for this fractal accumulation of the original cosmic matter. The transition from a single point of energy to the present universe according to the Big Bang Theory requires cosmologists to make a whole series of metaphysical assumptions that have no counterparts in the conservation laws and principles for the scientific method of experimental measurement.

The Living Cosmos Principle is based on the principles and conservation laws of the scientific method for the experimental measurement of mass, space, time, and gravity. The initial physical assumption of cosmic evolution is the eternal, separate, and opposite existence of protons and electrons. These particles have always had a total mass equivalent to that of about $10^{80}$ protons and a total energy of about $10^{67}$ J. The total energy/mass $E/M = c^2$ of the atoms and photons in the cosmos has always been about $10^{67}$ J/$10^{50}$ kg, where $c$ is the speed of light in a vacuum.

The positive reality of the Living Cosmos begins as a single anti-hydrogen atom sitting at rest at the “center” of the negative reality of the universal void. What makes this anti-atom “alive” is that it first had eternal existence and then, in contrast to the constant size and mass of positrons, the antiprotons slowly increased in size with a proportional decrease in mass. To conserve energy and
angular momentum, this transformation eventually caused the anti-atoms to collapse into antineutrons and then bifurcate into pairs of high-energy stable antineutrons. This process began a series of 256 non-sequential antineutron bifurcations that lasted many billions of years. The process began very slowly, sped up, and then stopped when the mass and size of an antiproton equaled those of a positron. The cosmos then contained $2^{256}$ eternal electrons and protons, as it still does, that were bound together into stable neutrons. Because the bifurcation process began slowly and then became very rapid towards the end, it stopped with the last of the bifurcated antineutrons being mostly concentrated into large neutron clouds at the locations of the present galaxies, stars, and planets. The neutrons all eventually decayed into electrons and protons and coupled into atoms, and their kinetic and ionization energies filled the universe with 2.7 K spectral blackbody photons.

**Initial Conditions of a Living Cosmos**

The Living Cosmos is not a universal “theory” of either everything or anything. It is a physical model of the experimental measurements made on Earth and in the cosmos. The physical principles of the cosmos must be constructed from these calculations, and metaphysical theories must be used to propose ideas that cannot yet be confirmed with experimental values. The Living Cosmos is not a theory, but rather a physical model based on the scientific measurement method. It requires none of the unmeasured metaphysical assumptions used in the Big Bang Theory. The initial physical assumption of the Living Cosmos model of creation is based on the following two experimental principles of cosmic measurement.

**Protons and Electrons**

Electrons and protons are eternal and have always existed in equal numbers with a total energy/mass ratio $E/M = c^2$. Electrons evolve with decreasing $E/M$, while $E/M$ remains constant for protons. The rotational $E/M = CC$ lost by electrons provides the linear $E/M = c^2$ for the motion of atoms and the emission of photons throughout the cosmos.

**Photons**

Photons are eternal antimatter/matter dualities with $E/M = cC$ created from the combination of equal units of rotational and linear $E/M$ from an emitting atom. Photons were first formed during the evolution of the electron/proton mass ratio between $e/p = 1/146.5$ and the present value of $e/p = 1/1836$. Prior to $e/p = 1/146.5$, the neutrons remained stable with the electrons confined inside protons. After $e/p = 1/146.5$, the electrons were too large to fit inside the protons but could then attach to the outside of protons, form atoms, and emit photons.
These dual cosmic principles of experimental measurement are not metaphysical assumptions. The Living Cosmos model contains no metaphysical assumptions and only assumes the validity of the conservation laws established by the physical measurement process.

Big Bang theorists believe that the universe began as pure energy and that it now mostly contains mass. In the Living Cosmos model, energy and mass are always equal and complementary aspects of the units of E/M that we call electrons, protons, and photons. Individual units of energy or mass can only be conceptually separated from a unit of E/M. Energy and mass are equal, opposite, and inseparable parameters of E/M = CC for atoms, E/M = cC for photons, and momentum E/M = cc. In the Living Cosmos, there is absolute conservation of atomic and photon momentum, angular momentum, and E/M.

The Living Cosmos contains absolute motion but no “space,” “ether,” or “continuum” other than the negative reality of an imaginary universal void. This void is the position of zero momentum for all moving atoms and photons. Time is a measure of the relationship between the rotational and linear motion of E/M.

When E/M = cC from a photon is absorbed by an atom, it maintains its rotational E/M = C and transfers its linear E/M = c (momentum) to the absorbing atom. When a photon is emitted, its remaining rotational E/M = C is divided between two photons and combined with the linear E/M = c of the atom to provide the photon with equal portions of linear E/M = c and rotational E/M = C.

Creation and Evolution of the Living Cosmos

There was never a hot initial explosion of pure energy from a singularity. Rather, we live in a very cold, eternal Living Cosmos containing only the pure rotational E/M = CC of spinning circlon-shaped particle dualities and the linear E/M of atoms, c², and of photons, cC.

A position with zero momentum defines the primordial initial temperature of the anti-atoms, absolute zero, i.e., 0 K. Rotational energy was generated due to their spinning with an equivalent linear speed equal to the speed of light C in different planes, but none of the linear energy needed to decay or create the momentum of photons existed.

The only constants in the Living Cosmos are the structural relationships among mass, space, time, and gravity and the values of force, momentum, angular momentum, and E/M.
Arbitrary Beginning for a Living Cosmos

Antiproton/positron mass ratio $a/p = 1836/1$ to $146.5/1$

Bohr radius $a_0 = \alpha \lambda_\infty / 4\pi = 1 = 5.292 \times 10^{-11}$

Fine structure constant $\alpha = 4\pi a_0 / \lambda_\infty = .0073$

Hydrogen ionization photon $= \lambda_\infty = 4\pi a_0 / \alpha = 9.11 \times 10^{-8}$

Neutron stability number $= M_p / M_e \sqrt{\alpha} = -157$

The universe does not contain any absolute three-dimensional space. All we can ever measure is an infinite number of one-dimensional values. With the second dimension of time, we can measure the two additional dimensions of motion, but these still occur within the one-dimensional space of the void. Absolute three-dimensional space cannot be measured and is purely imaginary. The four-dimensional space-time of gravitational force and motion is measured with an interval of time and along single vector in space. The four-dimensional phenomenon of gravity is best understood in terms of our three-dimensional senses and imaginations. The third gravitational dimension of the universe is not absolute like the first two, but rather is constantly changing with the gravitational transformation of mass, space, and time.

The Living Cosmos Principle is based on the single initial physical assumption of the eternal and separate existences of protons and electrons. These particles have always had a total mass equivalent to that of about $10^{80}$ protons and a total energy of about $10^{67}$ J. At this arbitrary initial point, the Living Cosmos was a single anti-hydrogen atom sitting at rest in the “center” of the universal imaginary void of zero momentum.

These two equal and opposite eternal particles were coupled together into an anti-hydrogen atom at 0 K. All of the rotational $E/M = CC$ of the universe was contained completely within the spinning coils of the Circlon shapes of these two particles.

The single eternal anti-atom had an evolving $a/p$ of $1836/1$. What makes the cosmos “alive” is that the antiproton is slowly growing in size with a proportional decrease in mass, while the mass and size of the positron remain absolute. In this process, the rotational $E/M = CC$ of the antiproton is slowly converted into the linear $E/M = c^2$ (vibration) between the two particles comprising the atom. The internal linear energy of the anti-atom continued to build up until $a/p$ reached $146.5/1$ and the positron was captured by the antiproton to form an antineutron.
The Cosmic Evolution of Matter

Era of Antineutron Bifurcation

Antiproton/positron mass ratio $a/p = 146.5/1$ to $1/1$

Bohr radius $a_o = \alpha \lambda_o / 4\pi = 12.5 = 6.615 \times 10^{-10}$

Fine structure constant $\alpha = 4\pi a_o / \lambda_o = 0.000465$

Hydrogen ionization photon $= \lambda_o = 4\pi a_o / \alpha = 0.00179$

Neutron Stability Number $= MP/ME \sqrt{a} = -137$

*The Living Cosmos process through which the universe became filled with electrons and protons that then accumulated into galaxies and stars is analogous to the manner in which a single diatom can continually divide until it eventually fills the oceans with different species of algae, each concentrated into many individual fractal plumes.*

Over eons, $a/p$ evolved from $1836/1$ to $146.5/1$. This increase in relative size of the circlon shape of the antiproton changes the way that the primary and secondary coils of the two particles physically align with one another.

The size ratio between the primary and secondary coils of the antiproton and the positron at their connection point is given by $P/S = \sqrt{\alpha}$. Today $P/S = \sqrt{\alpha} = 1/11.7$ for the electron and proton, and the ratio between the primary and tertiary coils $P/T$ is $\alpha = 1/137$.

At $a/p = 146.5$, $P/S$ reached $\sqrt{\alpha} = 1/1$. Thus, the primary coil of the positron was identical in size to the secondary coil of the antiproton. At $\sqrt{\alpha} = 1/1+$, the primary coil of the positron, which had been around the outside of the secondary coil of the antiproton, could fit inside the antiproton coil. The effect of this change in $P/T = \alpha$ caused the positron to be captured in-side the secondary coil of the antineutron and the anti-hydrogen atom be-came an antineutron. Essentially, the anti-hydrogen atoms was turned in-side out to become an antineutron.

This primordial antineutron now contained the tremendous amount of linear $E/M = c^2$ that had been building up in the structure of the anti-atom over eons, which caused the antineutron to bifurcate into a pair of identical antineutrons in the instant after it formed. The two new antineutrons contained no linear $E/M = c^2 = 0$. All of the $E/M = c^2$ contained in the parent particle had been divided between the equal momenta $Mv$ of the particles moving apart at virtually the speed of light. This period in cosmic evolution is analogous to Guth inflation in the Big Bang Theory, where in one instant, matter and energy suddenly appeared and in the next instant the matter with no momentum was transported billions of light years out into the universe. The only difference is that, in the Living Cosmos, it is momentum rather than magic that transports the matter billions of light years into the universal void.

With none of the $E/M = c^2$ needed for decay, these new antineutrons were completely stable as they traveled into the far reaches of the universe. Then,
after billions of years of the rotational $E/M = CC$ of the antiproton being converted to linear $E/M = c^2$, the antineutrons eventually had enough $E/M = c^2$ to simultaneously bifurcate and convert it into the equal momenta $Mv$ of the four antineutrons moving apart at less than the speed of light with vectors at opposite right angles to their original motion.

This bifurcation was caused when $E/M = c^2$ within the structure of the antineutrons became equal to the difference in rotational $E/M = CC$ between the two particles.

This process gave the total particle the exact amount of $E/M$ needed for matter/antimatter annihilation, but because $E/M = CC$ was not equal among the particles, the antimatter/matter pair bifurcated into a pair of antineutrons instead of photons. For photons, $E/M = cC$ can only be created from equal quantities of rotational $E/M = C$ and linear $E/M = c$.

These four particles remained stable for billions of years and then bifurcated simultaneously when the decreasing $E/M = CC$ of the antiproton became equal to the $E/M = CC$ of the positron plus the $E/M = c^2$ of the anti-neutron. The eight new particles were all moving with equal momentum along opposite vectors located in one of three imaginary and cosmic perpendicular two-dimensional planes.

These eight antineutrons had reproduced in less time than their parents, and the shared momentum of their decays was also proportionally less, because the percentage decrease of $E/M = CC$ of the antiproton relative to the constant $E/M = CC$ of the positron was constantly decreasing as the masses and sizes of their connected Circlon shapes approached one another.

These eight particles were the beginning of 256 non-sequential bifurcations of the cosmic antineutrons. This binary reproduction process increased the exact number of antineutrons in the cosmos by the powers of two $2^4, 2^5, 2^6, 2^7, \ldots 2^{256}$.

Each decay cycle occurred simultaneously with steadily decreasing particle lifetimes and was accompanied by proportional decreases in decay energy. This rapidly increasing reproduction process stopped abruptly when $a/p$ reached 1/1 and $e/p$ became 1/1+. For the antiproton, $E/M = CC$ was reduced to the same $E/M = CC$ as the positron and there was no more $E/M = c^2$ for decay. After 250 bifurcations, the antineutrons ran out of decay energy and reproduction stopped.

At this point in the evolution, the cosmos contained its present eternal total of $2^{256}$ electrons and protons with an eternal mass equivalent to that of about $1.158 \times 10^{77}$ protons or $1.67 \times 10^{27}$ kg. These particles were all fused together into stable neutrons and spread out to the far reaches of the universe. Most were concentrated in large clouds around the areas in which stars are located today. These clouds were separated by a few light years but were clustered together within the area of the present galaxies. The galaxies were hundreds of
light years apart but clustered together within great galactic walls.

The reason for the fractal accumulation of the antineutrons in the cosmos was the non-sequential bifurcation/decay process. The periodic rate of antineutron bifurcation increased from very slow to very fast. The increase in this periodic rate was accompanied by a proportional decrease in the equal momentum of ejected antineutron pairs.

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The non-sequential bifurcation process gave the first few antineutrons billions of years to spread out into the universal void while traveling at nearly the speed of light. After this first generation of great wall antineutrons had spread to the far reaches of the present cosmos, a second generation of galactic antineutrons began bifurcating, but these antineutrons were unable to move far away from the locations of the last great wall antineutrons. These galactic antineutrons eventually spread out within the cosmic locations of the present galaxies. A third generation of stellar antineutrons then continued bifurcating more rapidly but with even less momentum between them. When the stellar antineutrons had spread out into the galaxies until they were a few light years apart, they became Atomic Antineutrons as they began bifurcating. With less and less momentum to separate them, the last of the \(2^{256}\) bifurcated atomic antineutrons became concentrated in large stellar clouds at the locations of the last stellar antineutrons.

**Matter = Antimatter Equality**

Antineutron/positron mass ratio 1/1
Bohr radius \(a_o = a\hbar/4\pi = \infty\)
Fine structure constant \(\alpha = 4\pi a_o/\hbar = 1/\infty\)
Hydrogen ionization photon = \(\hbar = 4\pi a_o/\alpha = 4\pi\)
Neutron stability number at 1/1 = \(M_p/M_e \sqrt{\alpha} = 0\)

At \(e/p = 1/1\), the decreasing \(E/M = CC\) of the negative antiproton became equal to the constant \(E/M = CC\) of the positive positron. This instant was the only one in cosmic history at which matter and antimatter existed in exactly equal quantities. At \(e/p = 1/1+\), the antiprotons and positrons were conceptually transformed into electrons and protons when the negative particles became less massive that the positive particles.

The essential difference between antineutrons and neutrons is that the negative particle producing the increasing internal \(E/M = c^2\) of a neutron is less massive than a constant and stationary positive proton. The result is that, unlike an antineutron, an electron can never build up enough \(E/M = c^2\) within a neutron to match the \(E/M = CC\) of a proton and initiate bifurcation or cause annihilation.
Tiny Nuclear Bombs
Electron/proton mass ratio e/p = 1/146.5
Bohr radius $a_0 = \alpha \lambda_\infty / 4\pi = 12.5 = 6.615 \times 10^{-10}$ m
Fine structure constant $\alpha = 4\pi a_0 / \lambda_\infty = .0000465$
Hydrogen ionization photon $= \lambda_\infty = 4\pi a_0 / \alpha = .000179$ m
Neutron stability number $= M_p/M_E \sqrt{\alpha} = 1$

These $2^{256}$ neutrons remained stable for millions of years while the linear E/M within their structures continually increased but never by enough to cause them to decay. What caused the particles to decay finally was not their increasing internal $E/M = c^2$, but rather a change in the geometry of their circlon shapes.
As \( P/S = \sqrt{\alpha} \) reached 1/1, the primary coil of the electron could no longer fit inside the secondary coil of the proton. The two Circlon shapes of the neutron became smaller with increasing e/p. As soon as the primary coil of the electron had grown too large to fit inside the secondary coil of the proton, the electron popped out from within the physical structure of the proton. In this decay, the electron and proton were ejected from one another with the tremendous amount momentum contained in the linear \( E/M = c^2 \) that had been building up within the neutrons from the time they were formed.

After this cosmic dimensional transformation of \( \alpha \), the larger electrons were able to couple to the outside of the proton with \( \alpha \) circlon shaped Bohr particle holding them together. This process formed a hydrogen atom that was able to emit photons into the cosmos for the first time. These photons \( E/M = cC \) were produced with equal units of \( E/M = CC \) and \( E/M = cc \) of the atom.

**Nuclear Synthesis**

In this high energy electron–proton plasma environment, it was easy for them to couple together into hydrogen atoms and fuse into neutrons. With a neutron stability number of slightly more than 1.0+, the neutrons were virtually stable with extremely long lifetimes.

The neutrons fused with protons to produce H-1, H-2, H-3, and H-4 isotopes. These transformed into He-4 alpha particles, and before long the cosmos was composed of mostly hydrogen and helium atoms, with the remainder consisting of nuclear isotopes of all the other elements.

In the high energy, neutron rich environment within the stellar clouds, nuclear fusion proceeded rapidly, and soon there were a couple thousand different nuclear isotopes of the various elements. Because the neutrons were stable, most of these newly created isotopes were also virtually stable. As the nuclear stability number continued to increase, the neutrons became less stable and the heavier of the newly formed nuclear isotopes began to decay. As this process continued, the cosmos lost more and more of its previously stable nuclear isotopes as they decayed into lighter and lighter stable atoms. Today, after billions of years of cosmic evolution and nuclear decay, the nuclear stability number has evolved to 157 and the cosmos now has only 282 stable isotopes with few very long-lived unstable ones, such as thorium and uranium.

**2.7 Kelvin Cosmic Frozen Fire**

\[
\text{Bohr radius } a_o = \alpha \lambda_x / 4\pi = 12.49 = 6.61 \times 10^{-10} \text{ m} \\
\text{Fine structure constant } \alpha = 4\pi a_o / \lambda_x = 0.0000468 \\
\text{Hydrogen ionization photon } = \lambda_x = 4\pi a_o / \alpha = 0.00177 \text{ m} \\
\text{Neutron stability number } = M_p / M_e \sqrt{\alpha} = 1+
\]
Instead of the giant explosion of pure energy from a singularity in the Big Bang Theory, the Living Cosmos began its active life with the detonation of $2^{256}$ tiny neutron bombs.

After the cosmic nuclear synthesis, the electrons coupled to atoms and began emitting photons. This process caused a sudden and enormous blast of blackbody photons from one end of the cosmos to the other. Before this dramatic event there were no photons in the cosmos.

At $e/p = 1/147$, atoms produce a blackbody distribution curve with a temperature of about 2.7 K. As $e/p$ increases, $a_0$ decreases, which decreases the wavelengths of photons and increases their $E/M = cC$ and momentum $p = Mc$. This cosmic process of increasing photon energy has proceeded until today, where $e/p = 1/1836$ and the blackbody distribution curve for atoms is at about 3000 K.

When the atoms emitted their last thermal photons and dropped down into their ground states, the cosmos consisted of a large variety of mostly ground state atoms whose ionization energies had been converted into photons. Among and between these great stellar clouds of atoms, the cosmos was filled with an intense blackbody radiation of 2.7 K spectral photons with wavelengths between 1 m and .0003 m. These same eternal photons still travel through the universe today with conserved momentum $p = Mc$, angular momentum $I\omega = M\lambda c/2\pi$, energy $e = McC$, and wavelength $\lambda = h/Mc$.

### Hubble Red-Shifted Galaxies

Electron/proton mass ratio $e/p \approx 1/900$

Bohr radius $a_0 = \alpha \lambda_\infty / 4\pi = 2.04 = 1.0796\times10^{-10}$ m

Fine structure constant $\alpha = 4\pi a_0 / \lambda_\infty = .00175$

Hydrogen ionization photon $= \lambda_\infty = 4\pi a_0 / \alpha = 7.75\times10^{-7}$ m

Neutron stability number $= M_p / M_E \sqrt{\alpha} = 37.6$

The Hubble red shift is caused by the individual expansion of electrons and not by the general expansion of the universal void.

After many billions of years, the stars and galaxies had become configured by the force and motion of gravity into the forms that we see with the Hubble telescope. The most distant galaxies that we can measure have red-shifted wavelengths in their spectral photons that are 7–10 times longer than the same spectral photons here on Earth. As $e/p$ increases with decreasing $E/M = CC$ of an electron, $a_0$ decreases and $P/S = \sqrt{a}$ decreases proportionally. This process gradually increases the energy and temperature at which atoms emit spectral photons. In this Hubble era of electron evolution, the spectral photons emitted by atoms with heavier electrons had wavelengths that were several times longer than those of the same spectral photons we measure here on Earth.
Dark Energy Myth
Electron/proton mass ratio e/p = 1/1600
Bohr radius \( a_o = \alpha \lambda_e / 4\pi = 1.148 \times 10^{-11} \text{ m} \)
Fine structure constant \( \alpha = 4\pi a_o / \lambda_e = 0.055 \)
Hydrogen ionization photon \( \lambda_e = 4\pi a_o / \alpha = 1.39 \times 10^{-7} \text{ m} \)
Neutron stability number = \( M_p / M_E \sqrt{\alpha} = 11 \)

It is from around this era in cosmic evolution that astronomers have recently observed that the most distant of the measurable supernova explosions have considerably less energy and intensity than supernova explosions in nearby galaxies. Big Bang theorists try to explain this decreased energy and intensity by imagining a whole new dimensional layer for their spacetime continuum. Unlike the Guth layer of dimensional reality that instantly expanded the entire cosmos and then disappeared, this new layer takes the form of an increasing anti-gravity force field that is somewhat stronger at long range than the gravitational force and causes the galaxies to accelerate gradually away from the bulk of the cosmos. This imagined antigravity repulsive force has been called everything from quintessence to dark energy.

This whole idea of dark energy is nothing more than an ad hoc assumption by the followers of Einstein to validate the dearly held but unverified belief in an eternally constant e/p of 1/1836. The well-established astronomical measurements of decreased supernova energy and intensity are not at all unsuspected in the Living Cosmos. The so-called dark energy effect is simply the expected result of decreasing rotational E/M and increasing linear E/M. At this interval on the e/p time clock, supernovas emitted spectral photons with less energy and longer wavelengths than they do today. These less energetic photons decreased the overall energy and intensity of supernovas from that time period.

Dinosaurs Running Along on the Continents
Electron/proton mass ratio e/p ≈ 1/1700
Bohr radius \( a_o = \alpha \lambda_e / 4\pi = 1.02 \times 5.506 \times 10^{-11} \text{ m} \)
Fine structure constant \( \alpha = 4\pi a_o / \lambda_e = 0.0702 \)
Hydrogen ionization photon = \( \lambda_e = 4\pi a_o / \alpha = 9.9 \times 10^{-8} \text{ m} \)
Neutron stability number = \( M_p / M_E \sqrt{\alpha} = 151 \)

At this stage of the Living Universe, the evolution of e/p can supply answers to some long contemplated paradoxes and mysteries in geological history of Earth. The constant transformation of electron rotational E/M into photon and atomic linear E/M not only explains the complete structural dynamics of observed cosmic evolution, but also is a basic cause of continental plate tectonics, the large size of dinosaur bones, the enormous energies of individual cosmic rays, and other phenomena.
**Enormous Dinosaur Bones**

This evolutionary decrease in \( a_0 \) combined with gravity can account for the extremely large size of dinosaurs. Millions of years ago, when \( a_0 \) was larger, atoms were larger and less dense. Dinosaurs, living in the reduced gravity on a larger and less dense Earth, were able to grow very large and while also not being too heavy to walk around. Today, their much heavier weight on a denser Earth would render them incapable of walking or running. If the radius of Earth were twice what it is today, its density would be 1/8 the present value and the gravitational acceleration at its surface would be 1/4 the actual value (2.4 m/s\(^2\)). This value is almost identical to the gravitational acceleration on the moon. Certainly, dinosaurs that were too heavy to be able to walk around on Earth would have been able to get up and run on the moon.

**Shrinking Atoms and Cracking Continents**

Electrons are attached to atoms at \( a_0 \). The \( a_0 \) link that holds the electron and proton together in hydrogen and other light elements is considerably larger than the 79 Bohr radius links that hold a gold atom together, which is basically why a gold atom is much denser than 79 hydrogen atoms. The greater the mass and number of electrons of an atom, the less its size is decreased in proportion to that of a hydrogen atom. Heavy atoms shrink considerably less due to the \( a_0 \) evolution than light atoms. When Earth was in a molten state, the heavy elements tended to sink toward its center, while the light elements floated to the surface. Once the surface of Earth had cooled to a semi-solid state, cracks began to develop in its outer crust, which is composed of mostly elements lighter than iron, such as silicon and oxygen. The continental plates of Earth appeared to spread apart in the observed processes of sea floor “spreading” and plate tectonics, which is actually an optical illusion. The surface layers of Earth are actually shrinking and cracking like mud on a drying lake bed. The uneven shrinking of the atoms on Earth is also a basic cause of earthquakes on Earth as well as the newly discovered quakes near the surface of the Moon.

**Solar Energy and Cosmic Rays**

Bohr radius \( a_0 = \alpha \lambda_\infty / 4\pi = 5.292 \times 10^{-11} \) m  
Fine structure constant \( \alpha = 4\pi a_0 / \lambda_\infty = .0073 \)  
Hydrogen ionization photon = \( \lambda_\infty = 4\pi a_0 / a = 9.11 \times 10^{-8} \) m  
Neutron stability number = \( M_p / M_E \sqrt{\alpha} = 157 \)

*The eternal steady transformation of electron rotational \( E/M = CC \) into atomic and photon linear \( E/M = cc \) supplies energy to the sun and stars and gives them their extremely constant output over billions of years that has made the slow evolution of life on Earth possible. The uncontrolled nuclear fusion of*
supernova explosions is far too sporadic to supply the constant and eternal energy output that stars need to support the evolution of life.

Today, free neutrons are unstable and split into electrons and protons after about 19 minutes because the buildup of linear E/M in their structures causes them to decay. When neutrons are contained within the structures of atomic nuclei, they continue to increase in linear E/M output, but before it can build up enough to make them decay, they are able to transfer the extra kinetic energy to the whole structure of the nucleus. The nucleus then uses its electrons to combine this excess linear E/M with rotational E/M from the atomic structure and emit it photons into space. Photons contain equal quantities of linear and rotational \( EM = cC \).

All atoms containing neutrons are constantly increasing in linear E/M but are able to use their electrons to release this excess energy in the form of photons. Ionized nuclei in deep space that are far away from any electrons cannot undergo this process. Without electrons to create photons, atomic nuclei have no way to release the linear E/M constantly building up within their structures. Ionized atomic nuclei moving through deep space devoid of electrons can build up tremendous amounts of linear E/M within their circlon-shaped structures. After billions of years, this increasing linear E/M = cc within a nucleus can approach its constant rotational E/M = CC.

Thus, a stable ionized Gold-197 nucleus that has been traveling through empty space since its creation would have built up the energy equivalent of a tiny nuclear bomb by the time it arrives at cosmic ray detectors on Earth. Think what would happen if a tiny gold nugget or a diamond crystal with millions of nuclei were to hit a detector. These nuclear “cosmic rays” do not have to travel at high velocity to deliver their tremendous amounts of internal linear E/M. Cosmic rays travel at far less than the speed of light and probably all come from the vicinity of the Milky Way because atomic nuclei traveling between galaxies are highly unlikely.
In an effort to be as exacting as possible in this mathematical equation of antineutron bifurcation, I have included the complete calculation that shows the exact number of god particles in the universe at every stage in the bifurcation process of particle creation. To maintain mathematical purity, I have included both the natural octal bifurcation math on the left and the more complex ten fingered decimal calculations on the right.

The mass of the cosmos is an eternal constant of about $10^{50}$ kilograms.

At bifurcation cycle $2^{166}$ the mass of each god particle was approximately one kilogram.

$2^{256} = 1.158 \times 10^{77}$

Concentration of Matter into the Stars Without Gravitational Force

The god particle antineutrons continued bifurcating for a long time but at a faster and faster rate until near the last $2^{256}$ bifurcation cycle, the particles had almost no energy and the cycles were just seconds apart. With the final 256th synchronous bifurcation, there was no energy left for further bifurcations. The process stopped and the cosmos contained its present eternal quantity of $2^{256}$ (1.158 x $10^{77}$) total protons and electrons concentrated around stars with their total mass at about $10^{50}$ kg.
Conclusions

Everything measured in the cosmos, from the 2.7 K cosmic background radiation (CBR) and the Hubble constant to the size of dinosaur bones and the energy of cosmic rays, proves conclusively that e/p has been evolving since the beginning of time and that the variation of this ratio is the only true measure of absolute time in the cosmos.

Measurements of e/p began just after the beginning of the last century and are now beginning to show that the e/p has increased from 1/1836.0 to approximately 1/1836.0+. With modern technology, we will someday be able to monitor the temporal variation of e/p on a yearly basis or maybe even monthly.

As E/M = CC continues to decrease for electrons, the increasing momentum and ionization energy of atoms is continually being converted into photons with more energy and shorter wavelengths, causing both camp-fires and stars to become hotter and warm the cosmos. However, the total increase in the temperature of the universe due to radiating stars is still only a tiny fraction of the original temperature of the CBR, 2.7 K.

Dynamic interactions within atoms are constantly combining units of rotational E/M with equal units of linear E/M to emit photons. As the cosmos cools, atoms emit photons with decreasing momentum, energy, and longer and longer wavelengths, which is the second law of thermodynamics. Cosmic entropy is due to the transfer of energy to the void through the emission of photons with longer and longer wavelengths. The cooling effect of the entropy of the universe is balanced by the warming effect of the decrease in ao causing decreasing photon wavelengths and increasing momentum and energy. If these warming and cooling forces are nearly equal, it is quite possible that the total entropy of the cosmos may actually be zero.

This whole process of cosmic evolution was accomplished with the absolute conservation of E/M, momentum, and angular momentum. At the present stage of the Living Cosmos, it contains the same total E/M, momentum, and angular momentum that it had at its beginning. The only difference is that during the process of electron evolution, almost half of the E/M = CC of the original anti-atom has been converted into the linear E/M = c2 of atoms, photons E/M = cC, and the momentum of moving atoms E/M = c2/2.

This description of the cosmic evolution of the observed universe was accomplished without any departure from the rules of quantum mechanics or electrodynamics, as they apply the principles and conservation laws of the scientific method of experimental measurement.

Seven Unmeasured Imaginary Paradoxes of the Big Bang Theory

1. The universe was largely formed at two consecutive instants in time. At the first instant, a singularity appeared from nowhere, and at the next instant, matter and energy created by the singularity spread out uniformly into space.
for billions of light years in all directions. These two imaginary events violate every principle and conservation law in the standard model of physics. In the Living Cosmos, these two events are standard quantum mechanical interactions.

2. Imaginary pure singularity energy \( E = Mc^2 \) that is not a photon. This pure energy has no relationship between momentum and angular momentum, unlike that of a photon. This idea of unstructured massless energy in the Big Bang Theory is in direct conflict with its assumption of massless photon angular momentum \( I_\omega = M\lambda c/2\pi \) and massless photon energy \( E = Mc^2 \). In the Living Cosmos, there is no “pure” energy that is separate from mass. A photon has two separate and equal energies \( E/M = cC \): its rotational and linear energies.

3. All matter in the universe was created without any detectable antimatter. The conservation of charge is a fundamental law of quantum mechanics. In the Living Cosmos, the numbers of matter and antimatter particles have always been equal.

4. Cooling of the cosmic blackbody photons from 3000 K to 2.7 K. This cooling is imagined to have occurred simply by 99.9% of the photon momentum \( p = Mc \) and energy \( E = McC \) ever produced in the universe disappearing without a trace. Big Bang theorists are desperate to solve this paradox because without the cooling effect of their imaginary expanding space, the whole universe would be too hot for any type of life to exist. There are no measured parameters in electrodynamics that would allow a photon to cool as it spins and travels through the void at \( E/M = cC \). In the Living Cosmos, the temperature of the CBR has always been 2.7 K.

5. The widely dispersed gold atoms accumulated into nuggets under the force of gravity, and the rest of the atoms accumulated into stars, galaxies, and great walls of galaxies. Neither the gravitational theory of Newton nor that of Einstein has any possible solution for the fractal separation in scale of the cosmic structure. In the Living Cosmos, the gravitational interaction plays no part in the fractal accumulation of matter into stars and galaxies. It was the weak nuclear interaction that ruled the division and fractal accumulation of the cosmic matter.

6. The Hubble red shift is caused by galaxies expanding into space at speeds approaching the speed of light. The source and nature of the tremendous amounts of momentum and energy \( E = Mv^2/2 \) required to accelerate the whole universe to these velocities is far beyond imagination. It can only be said that it is left over massless singularity energy. In the Living Cosmos, the Hubble shift requires no additional energy and is a simple electrodynamics effect of the e/p evolution.

7. The 1/1836 electron/proton mass ratio is an absolute and eternal constant. This is the fatal metaphysical assumption of the Big Bang Theory, which has been left completely unquestioned by the hundreds if not thousands of so-
called theoretical physicists that have been working on this theory. If this assumption is rejected, then all of the other Big Bang paradoxes simply disappear. In the Living Cosmos, the mass of an electron is constantly decreasing. This effect provides the mechanism for most of the unexpected phenomena that are observed in the cosmos.

**Big Bang Theory’s Three Major Violations of Natural Law**

*There are many ways that Big Bang theorists violate the laws of experimental physics by proposing natural phenomena that can be calculated but not measured or even detected. Of these, there are three in particular that have never been satisfactorily resolved by any experiment.*

**Creation of Matter Without Antimatter**

No experimental physicist has ever been able to create a particle of matter from Energy/Mass without also creating an equal particle of antimatter. Why do we not detect any leftover antimatter anywhere in the cosmos from the initial creation of all our protons and electrons? How could these particles have been created without their anti-particles? There are no experimental principles in physics that allow matter or antimatter to be created or destroyed except as identical pairs.

The answer is that what is called “matter and antimatter” is really positive magnetic matter (protons) and the negative electric matter (electrons). All of the original positive matter and negative antimatter particles (protons and electrons) are still with us in the Living Cosmos today in the same exact equal numbers. The electron was once the antiparticle to the proton when their mass, size, and shape were the same. The only difference between positive matter protons and positrons and the negative antimatter electrons and antiprotons are the opposite spin directions of their circlon shaped internal coils structures. The proton’s primary coils spin in the opposite direction from the electron’s primary coils. In the same way, the proton’s secondary coils spin opposite to the electron’s secondary coils.

**Cooling of the Cosmic Blackbody Radiation**

The assumption is made by theorists that the CBR has cooled from 3000 K to 2.7 K without any transfer of energy to the rest of the cosmos at large. How is it possible for the CBR to cool if the decreasing momentum and energy from its photons are not transferred to the rest of the matter in the cosmos? The first law of thermodynamics and the conservation of momentum and energy does not allow any form of energy to disappear without a trace. The CBR could not cool without heating up something else. Big Bang people claim the CBR photons originally had 1000 times more momentum and energy than they have today. Where did all of this non-conserved energy and momentum disappear?
to? Almost all of the original photons are still here but they have somehow lost 1000% of their momentum and energy and increased their wavelengths by 1000 times. There is no phenomenon within the scientific method of measurement that would allow photons to lose momentum and energy as they travel through space. Also there is no electrodynamic effect that would allow adjacent photons to move farther and farther apart as they move through space.

The answer to this paradox is that the Cosmic Blackbody Radiation had a temperature of 2.7°K when it was formed and it still has the same temperature today. These photons have not changed their wavelength, momentum, or energy since they were emitted nor have they moved apart to cool their temperature.

**Paradox Between Red Shifts of Hubble and CBR Photons**

Cosmic photons comprise two distinct groups. More than 99% make up the 2.7 K CBR and the other less than 1% are the spectral photons produced by overheated atoms in stars. The first group consists of a virtually perfect blackbody distribution spectrum with a single temperature of 2.7 K. The second group consists of mostly spectral photons from atoms at all possible temperatures. While most of these thermal photons were emitted in blackbody radiation environments of several thousand degrees Kelvin, their present cosmic-wide temperature is far less than one degree Kelvin. These individual stellar photons have about a thousand times more momentum and energy than individual CBR photons but because the CBR photons out-number the Hubble photons by about a million to one, the overall temperature of the light from the stars is just a little above absolute zero and at much less than 1 K.

Big Bang theorists imagined and then believed in the assumption that both the CBR photons and the highest red shifted Hubble photons from galaxies at the edges of the universe were emitted from the same atoms during the first billion years of cosmic history. Big Bang theorists also assume that all of the photons from both groups were emitted from atoms with temperatures of around 3000°K. They believe that about 300,000 years after the Singularity, the CBR photons were emitted in a sudden burst. Then after about a billion years, these same atoms from the expanded singularity had accumulated into stars and galaxies and began emitting the spectral photons that we see today with the Hubble telescope.

One of the great paradoxes in Big Bang theory is how the Hubble group of photons acquired only modest red Doppler shifts of less than $Z = 10$, while the CBR photons acquired enormous red shifts of $Z = 1000$. According to theory, both groups of photons traveled a similar distance through the same space during nearly 14 billion years since the singularity was imagined to have occurred.
This paradox is easily resolved in the Living Cosmos by the evolution of the electron/proton mass ratio. Neither group of photons is Doppler shifted and both received their “shifts” from the evolving energy/mass of the electron. The CBR photons were emitted from a time much further in the past than were the Hubble photons.

Let there be Atoms

The first known invention of an instant universe creation process occurred when the author of Genesis wrote “Let there be Photons”. This simple statement is still the basic assumption for Big Bang’s singularity. The problem with this assumption is that it is upside down. The first law for the creation of photons should be, “Let there be Atoms”. Photons are secondary to atoms. Atoms emit and absorb photons. Photons do not emit and absorb atoms. The singularity is upside down and backwards because it tries to make atoms out of photons instead of the making photons from atoms. If we begin the Living Cosmos with atoms instead of photons, we can arrive at today’s cosmos without making any metaphysical assumptions or violating our accelerometer measurements of mass, space, time, and gravity.

The really weird rule followed by theoretical cosmologists is that they are totally free to construct any number complicated and convoluted theories to explain a process by which vast amounts of pure massless energy could have appeared from nowhere at the beginning of the universe and then quickly transformed into the atoms and photons of today. By contrast, it is strictly taboo for cosmologists to propose that only atoms appeared from the singularity and that the only photons back then were those emitted by atoms. This is an electrodynamic law that all cosmologists fail to heed.

Any experimental physicist will tell you that it is very easy to get photons from atoms but nearly impossible to get atoms of matter from photons. Certainly, electron/positron pairs and proton/antiproton pairs can be produced from the E/M of photons, but it is difficult to make atoms out of them and when you do, you must make equal numbers of atoms and anti-atoms. If these come in physical contact they will annihilate back into pairs of photons with half the energy of the original photon. Experimental physicists have long known that you cannot create a large quantity of stable matter from photons without physically separating the antimatter from the matter so it cannot annihilate back into photons.

Astronomical measurements show that the cosmos contains almost no positrons and antiprotons. The best example of this is the measurement cosmic rays. Cosmic rays give us a very good picture of the physical contents within the cosmos at large. Cosmic rays consist of photons and high speed particles of matter coming from all directions. They are mostly electrons, protons and
alpha particles but there is a sprinkling of stable nuclear isotopes from all the elements. The abundance of individual isotopes in cosmic rays is quite similar to the relative abundance of elements here on earth. If there were any quantities of positrons and antiprotons within the cosmos, they would show up in cosmic rays. Believing that the cosmos could have been created without antimatter is an impossible thing.

Some Big Bang theorists claim that a slight violation in parity caused the singularity to produce slightly more matter than antimatter. A great annihilation of matter and antimatter into photons then occurred leaving the universe with its present quantity of matter and no antimatter. The glaring problem with this idea is where did this tremendous amount of photon energy go? There is still a near perfect record of the cosmic blackbody photons but no trace has ever been detected of the far more energetic photons from this imaginary gigantic matter/antimatter annihilation.

Other Beliefs in Impossible Things

*Experimental physicists measure all possible things and theoretical physicists imagine all the impossible things that cannot be measured.*

The first impossible things imagined by all theoretical physicists are the spacetime aether fields and the continuum dimensions. Theorists define one or more of these to explain non-local forces and motion but these forces are impossible to measure by experimentalists. For example, imagined gravitational fields are believed to produce downward force and motion but no such downward force and momentum have ever been measured.

Big Bang theorists imagine a spacetime field in their theories of massless photons and then go on to invent several more similar but distinctly different entities to explain the features of their imaginary and impossible cosmic creations such as Guth inflation, Hubble Doppler shifts, Dark Energy and their imagined cooling of the cosmic blackbody radiation.

Besides the pure energy singularity itself, the next big impossible thing they come up with is the Guth inflation. Inflation was invented and developed by impatient cosmologists who did not want to wait the billions of years that it would take for the galaxies in the universe to move from their point of creation to their present locations. Instead of waiting, theorists spread matter and photons throughout the universe in a virtual instant of time with Alan Guth’s idea of matter expanding out into inertial space without any momentum. Guth inflation is an impossible thing that violates the constant speed of light and all other physical laws of force, acceleration/deceleration, momentum, energy, and gravity.

Perhaps the favorite impossible thing invented and believed by all Big Bang theorists is the idea that 2.7˚K Cosmic Blackbody Radiation has cooled
from an original temperature of about 3000°K. Experiments show that their is no way that blackbody radiation can be cooled without destroying its blackbody distribution curve. The physical way to cool radiation is to move the photons farther apart. Since this changes their distribution curve, theorists believe the wavelengths of CBR photons are constantly increasing while their momentum and energy are decreasing by proportionate amounts. The most amazing impossible thing about this expanding space is that it has three different kinds of expansion that all happen at the same time. In the first type of expansion, the wavelengths of photons increase, and their momentum and energy decreases. In the second type of expansion the distance between photons is increased to match the blackbody temperature curve. In the third type of expanding space, the space between the galaxies expands but the space within matter and galaxies does not expand. Both photons and the universal void of space expands while atoms, stars, and galaxies remain a constant size. It seems impossible that this imagined expanding space could cause some things to expand and not others. Also, how is this expanding space able to absorb more than 99% of the momentum and energy ever produced in the cosmos and have no effect on the speed of light or the energies of atoms or stars?

There is a strong controversy among Big Bang theorists as to the true cause of the Hubble red shift. One groups says it is left over outward velocity from the original Guth inflation and the other group claims the galaxies are inertially stationary and it is the CBR expanding space that is increasing the wavelengths and decreasing the momentum and energy of the Hubble photons. The crucial problem here is that the Hubble photons have increased in wavelength by a maximum of about 10 times and the CBR photons have increased by about 1000 times.

The cosmologists next big impossible thing is the idea of a new type of spacetime continuum called Dark Energy. Unlike the CBR expanding space, this new Dark Energy is a repulsive force that accelerates all matter away from the center of the cosmos. The only reason for these ideas and beliefs about Dark Energy and other impossible things is the cosmologists’ unquestioned faith in the constant and eternal 1/1836 electron/proton mass ratio.

It seems the standard solution for all modern cosmology problems and paradoxes is for theorists to immediately invent a new spacetime continuum field and adjust its parameters to solve each new problem. There seems to be no limit to the number of new and exotic spacetime aethers that Big Bang theorists can imagine. The only way to make progress in theoretical physics is to eliminate impossible metaphysical assumptions entirely and concentrate on the physical assumptions made by experimental physicists. The first step towards understanding the true nature of the cosmos is to realize that the Hubble red shift is caused by the expansion of the electron and not the expansion of the galaxies.

*The Cosmic Evolution of Matter*  
James Carter
The Cosmic Evolution of Matter

The Big Bang Theory Begins

It wasn’t until well into the 20th century that George Lamaitre began to apply scientific principles to the idea that the universe had a sudden beginning created by God. His initial idea was essentially to create the universe from a single giant atom that somehow split apart into the atoms of today. George had the idea of the Living Cosmos basically figured out but since he didn’t know about photons, neutrons, antimatter, nuclear energy, Hubble red shifts, or the 2.7˚K CBR, he was unable to fill in many of the details.

However, his followers soon took his ideas of creation and turned them upside down into an expanding universe model that began with the arbitrary idea of a Big Bang singularity that created atoms from photons. This was followed by a long list of metaphysical assumptions describing parameters and principles that painted a somewhat coherent picture of a creation of atoms, stars and galaxies. What came to be called the Standard Model Big Bang Theory contained many contradictions and violations of the physical laws of nature but these were explained away with such ideas as complementarity and relativity. The standard model of the Big Bang combines astronomical measurements with a large number of theories and contradictory assumptions about the existence of unmeasured parameters and certain imagined ancient laws of physics that are no longer in effect today. All of the Big Bang theory’s structural problems stem from its assumptions of eternal electron mass and the idea that atoms can be constructed from photons.

According to some quantum mechanical Big Bang inventions, 2.7˚K is regarded as a random temperature point in the cooling process of the CBR that began long ago in a much hotter and denser cosmos. In the circlon model of atomic structure, 2.7˚K is the only possible temperature for this predicted homogeneous event that transformed a cosmos full of neutrons into atoms radiating photons.

Electrodynamics of Circlon Synchronicity

The main feature of circlon electrodynamics calculations is that Planck’s constant $h = m\lambda c$ is not a single metaphysical constant but a combination of the two physical constants of photon masslength $Y = m\lambda$ and the speed of light $h = Yc = m\lambda c$. This eliminates the need for the idea of a massless photon as well as the transformation between mass and energy as in $m = e/c^2$ & $e = mc^2$. The correct form of the photon equation is $cC = e/m$ and the mass of matter is $m = e/CC$. The photon’s equal linear and rotational kinetic energies are $e = mc^2/2 + mC^2/2 = mcC$. Mass is the absolute and constant measured component of energy $e = mv^2/2$, momentum $p = mv$ and angular momentum $I\omega = mvr$.

Photon Energy $e = hf = m\lambda cC/\lambda = mcC = mc^2/2 + mC^2/2 = e$
Photon Angular Momentum $I\omega = h/2\pi = m\lambda C/2\pi$
Today, when the Bohr radius is \( a_o = 5.2 \times 10^{-11} \text{m} \) and the fine structure constant is \( \alpha = 0.007 \), the electrodynamics of the Hydrogen atom produces its intrinsic Lyman spectral photon \( \lambda_{\infty} = \frac{4\pi a_o}{\alpha} \) at a wavelength of \( 9.11 \times 10^{-8} \text{m} \). This is the shortest possible wavelength in the hydrogen spectrum and when it is emitted, it leaves the Hydrogen atom at its ground state.

The angular momentum of the ground state Hydrogen atom is \( I \omega = m e a_o c = 1.06 \times 10^{-34} \). This constant for angular momentum is the same for all photons \( I \omega = m \lambda C/2\pi = 1.06 \times 10^{-34} \). This value is the universal constant for the masslengths of photon and atomic structure. Unlike the Bohr radius constant and the fine structure constant, Planck’s constant and the speed of light are not changed by the evolution of electron/proton mass ratio. As electron mass decreases, the fine structure constant \( \alpha \) increases and the Bohr radius \( a_o \) decreases to maintain a constant value for this so called “quantum” of angular momentum. This is the angular momentum at an atom’s Bohr radius as well as the angular momentum of all photons. An atom, must have at least this quantity of angular momentum \( I \omega = h/2\pi = M e a_o c \) between its proton and electron in order to emit a photon. The wavelengths of spectral photons are transformed as decreasing electron mass causes decreases in the Bohr radius. These changes are required by the conservation of angular momentum.

These electrodynamics explain the value of the Hubble constant and are also able to calculate both the 2.7°C temperature as well as the precise timing of the of the initial burst of 2.7°C cosmic blackbody photons. As electron mass decreases, it increases the fine structure of the Circlon shape of the Bohr radius. This, in turn, decreases the wavelengths of spectral photons. Decreases in an electron’s mass within the structure of a neutron decreases the neutron’s stability and increases its decay energy.

**Points in Space and Time**

Time is not a real thing in the same way that a point, by its very definition, is not a real thing. Time is only an idea used to quantify and unite the linear and rotational motion of mass. The negative reality of space is the idea that divides time into intervals.

Philosophically, the idea of a beginning of time is kind of an oxymoron. Time is experienced through the thought process and while thoughts have beginnings and ends, a beginning or end of the idea of time itself cannot be imagined. The idea if time began when the first living organism experienced motion and ended when the last living organism bought a Rolex.

The same is true for the ideas of the point and infinity. We cannot logically begin the cosmos at either a point in space or a point in time. Points in space and a beginning of time are even more difficult to imagine than infinity. At
least you can look far into the heavens with a telescope and imagine you can see infinity. However, a point cannot be seen or even imagined with the most powerful of microscopes. From this, we can only conclude that the universe could not begin as photons and particles appearing with a “bang” from a point within a spacetime aether that had always existed.

The Living Cosmos always contained individual circlon shaped particles of electric (negative) and magnetic (positive) matter within a featureless void.

To discover the true nature of what was happening to electrons and protons during the reproduction stage of their evolution, we must begin by studying what is happening in the interaction of matter today and then work our way back into the past toward this event. In this way, we can examine the forensic measurements of matter’s evolution in terms of physical laws rather than make metaphysical assumptions about imagined and unmeasured initial conditions to create the idea of a beginning. The only evidence presented here is the measurable dynamics of matter and photons. From these first principles of measurement, we can trace the evolution of matter back to its existence long before the so called Big Bang singularity that ultimately produced the Cosmic Blackbody Radiation.

The first clue in our quest for the evolution of matter is the discovery that the mass of the electron is slowly decreasing while its size has been increasing by a proportionate rate. This decrease has been detected in a general way by measurements of electron and proton mass going back to their discoveries at the turn of the 20th Century. This is an experimental measurement that we can make here on Earth. I have no doubt that if we develop the technology to make extremely precise measurements of proton mass, electron mass, the Bohr radius, and the fine structure “constant”, it will not be too many years before we will be able to detect and then measure the rate of electron evolution in the laboratory.

When we look away from Earth and point our telescopes deep into the cosmos, the Hubble red shift becomes the first independent confirmation of this discovery. It shows us that spectral photons emitted by atoms today have much shorter wavelengths than the same spectral photons emitted by the same atoms in the distant past.

We must not make any assumptions or theories about the cause of the Hubble shift and instead accept these measurements at face value. What these shifted photons obviously tell us is that atoms in long ago galaxies emitted spectral photons with less momentum and longer wavelength than they do today. This is what we measure, but not what Big Bang cosmologists want to believe.

These theorists imagine these large red shifts are direct Doppler shifts caused by distant galaxies rushing into the void at speeds approaching the
speed of light. However, to propose such an idea without any collaborating evidence seems quite preposterous. When cosmologists hear hoof beats in the distance, they will immediately insist that it has to be unicorns. The theorist has the choice between trying to account for the tremendous energies of an exploding universe or just calculating the changes in energy produced by evolving electron mass. The experimental physicist must make conclusions from what can be measured while the theoretical physicist is free to imagine impossible things that no one has ever detected.

Unless one makes the initial metaphysical assumption of eternal electron mass, there is no logical reason to conclude that Hubble shifts are Doppler shifts caused by the rapid motion of distant galaxies. They are simply the electrodynamic effects of expanding electrons and not the Doppler shifts of an expanding universe.

Measurements conclude that in the past, atoms emitted photons with longer wavelengths than they do today. The Hubble shift does not require any special explanation because such a shift is required by electron energy/mass transformation. The reason for the cosmological red shift is that as the electron’s energy/mass decreases, the electrodynamics of atoms require them to radiate photons with shorter and shorter wavelengths.

The Hubble shift and the cirkon shapes of electrons, protons, and neutrons are all we need to trace the evolution of matter and energy back to its earliest beginnings without inventing metaphysical assumptions or theories that are not supported by today’s measurements of quantum mechanics or electrodynamics. Matter’s cosmic evolution is driven by decreasing electron mass $m_{E}$ that in turn decreases the Bohr radius $a_{o}$ with an accompanying increase in the fine structure constant $\alpha$. These three values change in a complementary way in order to maintain the universal value of the atomic angular momentum constant $I = h/2\pi = m\lambda C/2\pi = M_{E} a_{o} \alpha C$.

Conservation of Momentum

One of the great unsolved paradoxes of Big Bang theory concerns the simple conservation of momentum. If all of the universe’s protons and electrons were ejected from a singularity point at extremely high velocities, their momentum vectors would all be one dimensional voids pointing away from the singularity point. Since adjacent particles would be traveling on virtually parallel momentum vectors, they would have almost no relative momentum or virtual angular momentum to form atoms and emit photons. They would constantly be moving farther apart from one another and there would be little chance of any of them colliding or interacting on their long journeys toward the edge of the void. The physical mechanics of the Big Bang theory completely eliminates any physical mechanism that could gather together these speeding particles of matter into clouds, stars, galaxies, and eventually people.
In Big Bang theory, all of its momentum and energy are used to send particles of matter speeding away in all directions from a single point.

In the Living Cosmos, the great explosive decay of neutrons that created the electrons and protons and produced the CBR occurred not at a single point, but from $2^{256}$ separate locations throughout the universe.

When the neutrons decayed, they were moving in many different directions. The energy of these decaying neutrons put all of the electrons and protons on different high energy trajectories where they could crash into and interact with one another rather than in the Big Bang where all the particles were moving away from the point of a universal singularity.

**The Chemical Era**

As the mass/size ratio between the proton and electron grows, there are subtle changes in the chemical reactions that occur from protons and electrons coupling together. Because of a much larger Bohr Radius, chemical compounds in the distant past had somewhat different properties than they do today. Perhaps the chemicals that make up dinosaur bone were stronger then than they are now.

It is possible there was a point in cosmological chemistry about three billion years ago when the chemistry was just right for the spontaneous formation of DNA and other organic molecules. Since then, these molecules have reproduced, diversified, and joined together to preserve themselves. Perhaps, there was only a small window of time in electron evolution when the chemistry was just right for the spontaneous formation of DNA molecules. After this “sweet spot” in cosmic history, DNA molecules were able to reproduce but they could no longer be produced spontaneously. All life on Earth is directly connected to these original DNA molecules. As Timothy Leary said in a lecture I once attended, “Each one of us are the result of an unbroken chain of life that is over three billion years old.” There is no place along this chain where at least some portion of our present bodies was not part of a living organism. At least in principle, our bodies could still contain atoms from one of the original DNA molecules.

In the Living Cosmos, the evolution of life is driven by the changing parameters of cosmological chemistry. In the future, molecules that do not exist today may be possible. Certainly, the energy and intensity of chemical reactions will change as the mass of the electron evolves.

There is another factor that may very well have a significant effect on the evolution of life in both the past and in the future. This is the increasing instability of the neutron and its link to the decreasing stability of atomic nuclei. At one time in the distant past, common and widespread radioactive nuclei such as Thorium and Uranium may have been stable and this may also have been
true of many other radioactive isotopes of other elements. The end result of this evolving process of increasing nuclear instability is that today we have only 282 stable isotopes and a small number of radioactive isotopes with very long lifetimes. As the stability of the neutron decreases with electron evolution, the least stable of these 282 isotopes will become radioactive.

Knowledge of this effect will also change the way we measure things like the age of Earth. One way to determine the age of Earth is to study and quantify the rate that Thorium and Uranium decay through a series of steps into Lead. It is possible that these weakly radioactive elements may have been stable when Earth was first formed. Also, there may have been many more than just today’s 282 stable isotopes. If Thorium and Uranium were once stable or had much longer half lives, then Earth could be much older than previously estimated based on the decay of these elements.

The Era of Conscious Thought $T_{EE} = 1/1700$ to $T_{EE} = 1/1836$

Perhaps the most remarkable thing about the whole scenario of a Living Cosmos is that we are here to try and figure it out and discuss it. The great unexplained mystery of the universe is not so much the existence of the chemical elements of matter but the existence and origin of consciousness.

Since the only identifiable activity in the observable universe is the interaction between electrons, protons, and photons, it must be concluded that the activity of consciousness must also play some part of these interactions. The basic units of consciousness are somehow contained within the individual structures of protons and electrons. If each of our atoms contains a basic unit of awareness, then our higher degree of consciousness results from the connections of the many atoms and molecules within our bodies. These individual atomic senses of awareness are all organized into symmetrical patterns of interactions within our atoms that we sense as feeling and experience as both consciousness and unconsciousness thought. Our total consciousness is the result of the $10^{29}$ possible connected interactions between the atoms in our bodies and brains.

While the atoms of a rock may have primitive individual awareness, it cannot really be called consciousness. It is possible that true consciousness did not arrive in the Living Cosmos until the spontaneous formation of DNA molecules about three billion years ago.

The Idea of Entropy

Cosmic evolution is derived from just two physical ratios. The constant Energy/Mass ratio 1/1 of individual electrons and protons and the evolving electron/proton mass ratio $e/p = 1/1836$ of today. The interaction of these two ratios is the substance of entropy.
Entropy is the process by which total cosmic energy is irreversibly transformed from the rotational Energy/Mass = CC of atoms to the linear Energy/Mass = cC of photons and other moving bodies. In the beginning, there was no linear Energy/Mass = cc and all rotational Energy/Mass = CC was contained in the opposite internal motions of the Circlon shapes of the original antiproton/positron pair. In the bifurcation process that divided the single anti-hydrogen atom into $2^{256}$ neutrons, the rotational energy/mass (angular momentum) lost by the antiproton becomes the linear energy/mass (momentum) of all moving bodies in the cosmos. Entropy is a function of the general conservation of momentum, angular momentum, and energy.

**The Yin and Yang Deities of Creation**

The eternal existence of a matter/antimatter atom is the initial condition of the Living Cosmos. A religious person, who wants to begin cosmic creation with God, might want to consider that the universe consists of a god of matter and a goddess of antimatter. Protons and electrons are an eternally living Yin/Yang dichotomy of deities that could be logically referred to as goddesses and gods. This duality of gods has always existed beginning with the antiproton as a yin goddess and the positron as a yang god. This god and goddess first coupled together into an atom and then merged into an antineutron, that began a very long serial reproduction process that eventually filled the universe with $2^{256}$ electron and proton deities that contained all the consciousness of today’s Living Cosmos. The god consciousness that we experience stems from the basic connected awareness of these countless atomic and chemical deities within our bodies.

<table>
<thead>
<tr>
<th><strong>Living Universe Equations</strong></th>
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<tr>
<td>Electron/Proton Mass Ratio Today</td>
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<td>Electron Angular Momentum</td>
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<td>Electron kinetic energy</td>
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Mathematical Dimensions of the Foundation of Reality

Space is the Non-Dimensional Negative Reality
Momentum is the One-Dimensional Reality
Angular Momentum is the Two-Dimensional Reality
Energy is the Three-Dimensional Reality
Gravitational Force and Motion is the Four-Dimensional Reality
Gravitational Time is the n-Dimensional Positive Reality
One-dimensional Forces and Motions can be on any Vector
Two-dimensional Centripetal Forces are on a Circular Plane
Three-dimensional Forces of Gravity are measured on a Spherical Plane

Mass Exists in Space = ms
Momentum Moves Mass through Space = ms/t
Space Exists as a Negative Reality and Does Note Change s = t/m
Time Quantifies the Motion of Mass t = ms
Angular Momentum Spins Mass in Space = mrs/t
Force Measures Momentum Through Time = ms/t²
Centripetal Force Measures Angular Momentum in Time = mrs/t²
Energy Divides Force with Velocity = ms/t²/2
Photon Momentum Moves Photon Mass = mc
Photon Kinetic Energy Moves Mass Through Space = mc²/2
Photon Spin Energy Moves Mass in Space = mC²/2
Gravitational Momentum Creates Orbital Motion = mrs/t
Gravitational Force Pushes Us All Up = mrs/t²
Gravity Forces Mass Through Time and Space Gravity = Inertia

Photon Energy & Momentum
\[ E = mc^2/2 + mC^2/2 = mcC \]
\[ p = mc \]

Photon Angular Momentum = M\(\lambda\)C/2\(\pi\)
Photon Momentum = Mc

The photon’s angular momentum is contained in the wave-like motion of the two oppositely spinning bodies of positive magnetic matter and negative electric matter. The opposite spins at \(C\)f this positive and negative hollow string contain the photon’s absolute rotational energy and the kinetic energy contained in the photon’s linear momentum is relative to an observer’s absolute motion.
The Secret Lives of Quasars

Ever since they were first discovered, the true nature of quasars has long been one of the most difficult paradoxes in cosmology and astrophysics. There is nothing in the initial assumptions of the Big Bang and Relativity theories that would lead to the creation of quasars. Also, the principles of quantum mechanics offer no solutions to the gigantic energies that quasars are purported to produce. The experimental observations of over two thousand quasars leads to a firm conclusion that all of these peculiar stars reside within the Milky Way.

Quasar Parameters

Quasars were first observed and identified as very dim stars with spectral photons that had redshifts that were many orders of magnitude greater than any Doppler shifts observed in the Milky Way or other nearby galaxies. In fact, the only galaxies with red shifts as large as quasars were located billions of light years away in the far reaches of the cosmos. Big Bang cosmologists made the metaphysical assumption that the extreme red shifts of quasars and distant galaxies were direct Doppler shifts caused by the imagined enormous outward linear momentum caused by the Big Bang singularity. They did not imagine that the quasar shifts could be the transverse Doppler shifts of radial gravitational momentum because they believed that gravitational momentum could not produce transverse Doppler effects because it was only “equivalent” to “real” momentum.

Because of their unquestioned acceptance of the equivalence principle, Big Bang and relativity theorists are forced to conclude that the extreme red shifts of quasars are caused by the high recessional momentum of an expanding universe instead of just the real measured gravitational momentum of atoms at a star’s surface.

This extremely large outward linear momentum led to the problem of a quasar’s enormous energy. Even though quasars are very dim compared to stars in the Milky Way, if they are really many billions of light years away, then they would have to be many orders of magnitude brighter than whole galaxies to even be seen.

Super Luminal Velocity of Quasars

Both Newton’s laws and Einstein’s assumptions of motion are violated by the enormous transverse velocities of some quasars that have been calculated to move sideways at velocities that are orders of magnitude greater than the speed of light. The Living Cosmos principle of stelar evolution leads directly to quasars and “black holes” as the very largest stars in the evolutionary process. The Living Cosmos would have predicted the existence and nature of
quasars had they not already been observed. It is concluded that quasars are very large and very dim stars that exist throughout the Milky Way. Also, they are so dim that they have not yet been observed in other galaxies.

Once the imaginary and unmeasured idea of the equivalence principle is abandoned and measurements of gravitational momentum are taken at face value, most of cosmology’s difficult problems and paradoxes simply disappear. This is particularly true when it come to quasars. The principles of the Living Cosmos lead directly to the creation of quasars and to a simple explanation of the true nature. In short, quasars are very large ordinary stars that appear very dim. We need not look for them outside our own galaxy because they would be too difficult to see. The largest of quasars are so dim from our perspective that they become invisible black holes.

The prime example of a quasar that must reside in the Milky Way is Quasar 3C 345. This a multiple body quasar system that was observed moving apart over a period of five years. With a red shift of \( z = .549 \), equivalent momentum relativity cosmologists are forced to conclude that 3C 345 is 5.5 billion light years away. If this is true, it would mean that the components of this quasar system were moving apart by at a velocity at least 7 times greater than the speed of light. However, if 3C 345 resides in the far side of the Milky Way about 75,000 LY away from Earth, the separation velocity would be calculated to be about 30 km/s. At 5.5 billion LY away, 3C 345 was as bright as a dozen galaxies but here within the Milky Way, you need a very good telescope just to see it. Several other quasar systems have been observed with far greater superluminal angular separation velocities but if these are all within the Milky Way,
instead of at the ends of the universe, their proper motions would be in keeping
with normal stelar motions within galaxies.

It is a conclusion of 3C 345 measurements that this quasar is located in the
Milky Way. If its extreme red shift is not caused by extreme distance, it then
follows that all quasars are located in the Milky Way because they are way too
dim to be easily identified in other galaxies. If one quasar exists in our galaxy,
it follows that their common characteristics would require that they all reside
in the Milky Way. Despite their larger size, quasars get dimmer and dimmer the
higher their red-shifts. This has to do with extreme gravitational momentum.

**Linear Momentum vs Gravitational Momentum**

There are two opposite Doppler shifts measured in astronomy. The direct
Doppler shift of the relative linear momentum of stars and galaxies and the
transverse motion Doppler shifts of both linear and gravitational momentum.
Direct shifts can be red or blue but transverse shifts are always red on emission
and blue on absorption. As stars become more massive, the increase in their
upward gravitational momentum causes their spectral photons to be transverse
shifted to red. This shift is non-directional and has the same value in all di-
rections. All photons are transverse red-shifted by the measured gravitational
escape/surface velocity at the star’s surface. As we measure larger and more
massive stars, we see that their gravitational velocities can become a significant
fraction of the speed of light. This causes the star to emits spectral photons that
are highly transverse red shifted.

**The Belief that Quasars Do Not Exist Today**

Perhaps the most difficult thing about quasars for Big Bang theorists to ex-
plain is their belief that quasars only existed in the early stages of the Big Bang
creation. They are unable to imagine the physical processes by which quasars
were formed nor what would make them disappear from early galaxies and
never to form again. Why are there no quasars in the inner galaxies? The answer
to this is that quasars form like any other stars and exist sprinkled throughout all
galaxies. They are just too dim to be seen outside of the Milky Way.

Quasars radiate spectral photons exactly like any other stars. Quasar light
consists of the same spectral photons that have been transverse red shifted by
extreme gravitational momentum. As quasars get very large and massive, their
atomic interactions are slowed by time dilation caused by Lorentz transforma-
tions of gravitational momentum. Larger and larger quasars become dimmer
and dimmer to the observer both because they are emitting increasingly red
shifted photons with less and less energy and because atoms are also emitting
photons at a slower and slower rate so that the overall star is producing less and
less heat energy. This is the same absolute radial gravitational momentum that
is measured in the Pound-Rebka experiment and GPS clock measurements.
When a quasar is so massive that its escape/surface velocity approaches the speed of light, its gravitational momentum becomes enormous. Atoms emit photons that are transverse red-shifted by this momentum \( \lambda' = \lambda/\sqrt{1-v^2/c^2} \). For example, if a quasar’s escape/surface velocity is \( 1/2 \) the speed of light, the atoms at its surface would increase in linear \( \text{Energy/Mass} = c^2 \). The photons transverse shifted by this momentum would have a Mass of \( M = .87 \), a wavelength of \( \lambda = 1.15 \), a momentum of \( p = mc = .87 \), and an Energy of \( (E = Mc^2/2 +MC^2/2 = McC = .87) \). Clocks on the quasar’s surface would be slowed to intervals of \( (t = T/\sqrt{1-v^2/c^2} = 1.15) \).

**Photon Electrodynamics**

The actual physical mechanics of what happens to the emitting atom as it gains momentum is a function of the Lorentz transformation. As the electron’s Energy/Mass increases with greater gravitational momentum, the Bohr radius increases by a proportional amount and this causes the atom to emit photons with longer wavelengths. The wavelength of an atom’s emitted spectral photons \( \lambda = 4\pi a_o/\alpha \) are increased by the electron’s increased mass from its gravitational momentum. This in turn is caused by conservation of electron and photon angular momentum \( (I\omega = M_e\alpha a_oC = m\lambda C/2\pi) \). This same mechanism of increased electron mass produces the Hubble shift. Ancient spectral photons have longer wavelengths because they were emitted by electrons that were more massive than today’s electrons. The 2.7 K cosmic blackbody photons were produced when the electron/proton mass ratio was \( e/p = 1/146 \).

**Equivalent Force and Momentum**

The simple reason that General Relativity cosmologists are not able to account for the measured properties of quasars lies in their unquestioned belief in the metaphysical assumption of the equivalence of gravitational force and momentum. They believe that measured gravitational momentum is not real and therefore cannot produce a Lorentz transformation. This unmeasurable assumption imagines that the direction of the equivalent gravitational momentum of falling bodies points down. This leaves the quasar with very little intrinsic gravitational momentum to transverse shift its atomic emissions. In the Living Cosmos, the true measured vector of gravitational momentum is up and the whole surface of the star has the extra absolute radial momentum necessary for its atoms to emit red-shifted photons according to Lorentz transformations. Lorentz transformations are always produced by absolute momentum and never by equivalent momentum. For example, the increasing equivalent momentum of a falling clock does not slow its rate. Only when the clock conserves its momentum with Earth does its clock begin to slow. This slowing begins to occur when the falling clock enters the atmosphere and then increases when it opens a parachute. Its rate becomes constant when it lands and acquires the upward momentum of Earth’s surface.
Quasar Rotation

Another feature of quasars that has never been explained by standard cosmology theories are the many observations of individual quasars that show not just one red shift for the whole star but a range of related red shifts. These varied values are what would be expected in the Living Cosmos description of quasar dynamics.

Varying red shifts can be explained quite easily with quasar rotation. Consider a quasar with an escape/surface velocity of 0.5c and a transverse red shift of 1.15. If it was rotating on its axis at a velocity of 0.1 c, it would produce direct Doppler blue shifts of -0.01 on one side and red shifts of +0.01 on the other. Measured shifts from the approaching side would be $\lambda = 1.14$ and $\lambda = 1.16$ on the receding side. The center would still have a shift of $\lambda = 1.15$.

The Torus Shape of Quasars

One aspect of quasars that has been very difficult for relativity theorists to explain is the observation of some quasars that periodically change their brightness over a period of just several days. This is explained by the shape of quasars. When these extremely large and massive bodies rotate at high velocities approaching the speed of light, their decelerating gravitational force pulls them first into a disk shape and then into a torus where the quasar’s center of gravity is far removed from its actual physical structure. While these donut shaped bodies are spinning very rapidly like a wheel, they can also slowly rotate on a perpendicular axis. This allows the observer to periodically see the full face of the torus shape and then see just its edge. The would allow the observer to see a periodic change in a quasar’s brightness even though it remained unchanged.

Relativistic Dimming of Quasar Light

Quasars are the largest and potentially brightest stars in the Milky Way. However, when we observe them, they are very much dimmer than the stars surrounding them. The reason for this has to do with the electrodynamics of photon emission. When atoms are at rest and have zero momentum, the probability that they will emit spectral photons in any particular direction is even. Then when they are accelerated to a substantial momentum, the probability increases that more photons will be emitted on vectors closer to the atom’s momentum vector. This effect is negligible for ordinary velocities but for velocities approaching the speed of light, it becomes significant. Without resorting to complex quantum mechanical probability calculations, I will just say that for atoms on quasars with extremely high radial momentum the probability is extremely high that they will emit photons very near to their upward momentum vector and extremely low that photons will be emitted at right angles to it.

Atoms at the surface of quasars with extremely high momentum emit almost all of their photons within small angles of their up/down momentum vec-
tor and very few at larger angles. When we observe the sun, we see pretty much equal numbers of photons from every point on its disk. However, when we view a quasar, we mostly see only photons from a small region in its center and extremely few from its outer disk. Even though the quasar’s center might appear bright, the light from the rest of its disk would be minimal because these photons were emitted straight up and not in a line of sight with our telescope.

From Quasars to Black Holes

The enormous red shifts of photons from quasars are not direct Doppler shifts of receding momentum as is commonly assumed. Rather they are enormous transverse Doppler shifts produced by the high escape/surface velocities of very large stars. These transverse shifts are caused by the slowing of time resulting from escape/surface velocities that are substantial percentages of the speed of light.

Even though they are very large, quasars also appear quite dim compared to smaller stars and get dimmer and dimmer the larger they get. They emit spectral photons of greatly reduced energy due to transverse shifts caused by increases in electron mass from Lorentz transformations. Also, these photons are greatly reduced in intensity due to the slowing of inertial time. A third factor in dimming is the reduced temperature at the quasar’s surface. The very largest quasars, with escape/surface velocities $V_e$ very near the speed of light, become so dim from transverse shifts, and the slowing of time that they are very difficult to observe. When quasars become too dim to observe they are called black holes.

Conclusions

Even though quasars are intrinsically quite bright like other stars, they appear extremely dim for three reasons.

1. The transverse red shifts of their photons greatly reduces their energies.
2. The transverse slowing of time by high gravitational momentum reduces the intensity of the atomic emissions of photons.
3. We only see photons emitted near to gravitational momentum vectors. We can see photons from near a quasar’s geometric center but most of the photons emitted from the rest of its surface are directed straight up and away from Earth.

For the above reasons, all of the 2000 or so carefully measured quasars must reside in the Milky Way. Even though they are intrinsically bright, they are observed to be very dim and would be extremely difficult to isolate in other galaxies. The fact that we have yet to observe any quasars in Andromeda supports this conclusion and the discovery of a quasar in that galaxy would validate it.
The Andromeda Galaxy (M 31)

The above photo is definitive proof there is absolutely no change in the momentum vectors of any photons when they pass through the extended gravitational fields of stars. If each photon in this picture was not lined up perfectly in Euclidian space and time with its emitting star, the photo would appear as a quite dim homogenous grey cloud. Any photons moving through a non-Euclidian curving gravitational spacetime would completely blur astronomical observations beyond recognition. There can be no gravitational deflection of any photon’s path through empty space without the ultimate destruction of astronomy. All photons, from gamma rays to radio waves, would be jumbled together and coming to us on trajectories far removed from their original emission vectors.

Actual physical measurements of the solar deflection of photons show the effect to be an optical illusion without any change in a photon’s actual path through Euclidian space. The apparent angle of curvature is measured as changes in the gravitational momentum of Earth and not by any gravitational effect of the sun. These measurements show conclusively that the downward pointing gravity of Einstein’s equivalent principle is false and verify that Earth falls up.
Experimental Rejection of the Equivalence Principle

It is ironic that the 1919 experiment measuring starlight appearing to curve as it passed the sun was what gave General Relativity its tremendous burst in popularity and now today in 2019, it is this same experiment that provides the ultimate disproof of its experimental validity.

If the Einstein deflection of starlight really was caused by the curving of non-Euclidian space at the sun, it would make most astronomy impossible. Beyond the planets, the whole of the cosmos would appear as an impenetrable gray fog of diffuse starlight. We would still be able measure the dominant background of the 2.7 K blackbody photons and the directions of cosmic rays but most other cosmic observations would be blurred beyond recognition. The following experimental measurements conclude that the apparent deflection is an optical illusion caused by measured changes in the geometry of Earth’s gravitational momentum and not by imagined changes in a gravitational spacetime continuum surrounding the sun.

Author’s Note

I must state here that I am exclusively an experimental physicist. I do conduct actual physical experiments but my primary activity is in the calculations of experimental values before they are measured. While my predictions might be classed as thought experiments, I accept all measurements at face value and I never engage in the speculations of theoretical physicists that predict results that are contrary to the conservation laws of the scientific method of physical measurement. All of my measurements are primarily based on changes in momentum vectors as measured by force and calculations of force and energy as measured by changes in both linear and angular momentum and radial gravitational momentum. Gravity is represented here as a single accelerometer measurement. No theory of gravity beyond the extrapolation of accelerometer readings is used in this explanation. This model of starlight deflection contains only local measurements of gravitational deceleration and cosmic measurements of mass, space, and time. These are principles of physical measurement that are the opposite of theories. Theories are used to make predictions of measurements based on metaphysical assumptions. A theory is used before the measurement of any assumption. If the prediction is correct, the theory becomes a principle of measurement and if the prediction is wrong the theory remains a metaphysical assumption. I make no metaphysical assumptions other than in the physical accuracy of my accelerometers, clocks, and measuring rods.
Experimental Measurements of Solar Deflections and Time Delays

The following thought experiments are based on calculations of Einstein’s predicted bending of starlight as it passes the sun and other bodies of mass. The first two show the calculated angles for General Relativity’s starlight deflections. The third is an actual measurement of the apparent deflection of photons as they pass by the surface of the sun and the fourth is a measurement of the Shapiro Time Delay in which radar signals appear to curve and slow as they pass near the sun back and forth between Earth and Mercury. These last two measurements conclusively show that gravity has exactly no effect on the perfectly straight Euclidian momentum vectors of all photons. The measured deflection results from the curvature of the gravitational space and time of Earth and not from any curvature of the inertial space and time of photons.

A Space Alien’s View of Our Solar System

In the first observation, space aliens on a planet orbiting Alpha Centuri have focused in on our solar system with a 200 inch telescope identical to the Hale telescope on Palomar mountain. They are attempting to measure the mass of our solar system by measuring the gravitational deflection of starlight photons that passes outer edge of the solar system at Pluto’s orbit.

**Einstein’s Predictions**

\[
\begin{align*}
\text{Deflection at sun’s surface} &= 4GM/C^2R = 1.75 \text{ arc second} \\
\text{Deflection at Pluto’s orbit} &= 4GM/C^2R = 0.0002072 \text{ arc second} \\
\text{Deflection at 1 LY from sun} &= 4GM/C^2R = 0.00001286 \text{ arc second}
\end{align*}
\]

At their location, 4 light years from the sun, the starlight deflection at Pluto’s orbit (.0002 arc sec) would displace the photons from their telescope’s 200” mirror by a horizontal distance of 38,000 km. They still might be able to see photons from the sun but the background stars would appear as a homogeneous grey fog.

2. A Photo of the Andromeda Galaxy

In this observation, we will observe and photograph photons from the Andromeda galaxy with the 200 inch Hale telescope. In this measurement, we will consider only photons emitted by Andromeda stars that have passed within at least one light year of another star. These photons will all be deflected in one direction or another by a horizontal distance of at least 1,004,216 km by the time they reach Earth after their 2.5 million light year journey. The deflection of photons by Einstein’s maximum of 1.75 arc seconds for a sun sized star would be displaced by 12.2 light years from their original trajectories by the time they reached the Milky Way. For photons to be able to record the position of their emitting star within Andromeda, they could not be deflected by even as
much as a millimeter. If photons were to undergo any gravitational deflection as they traveled through Andromeda, the above photo would appear as a dim grey blob and not as a galaxy with billions of individual stars. While the same number of Andromeda photons will reach our telescope’s reflector, none will be on their original momentum vectors and all will appear as a grey blob of light. No photons would be lined up in the direction of their emitting stars.

3. Actual Measurement of Einstein’s Apparent Bending of Starlight
This explanation of the apparent deflection of photons as they pass the sun is calculated entirely from the values of three complimentary principles of measurement:

*Earth’s escape/surface velocity, its deceleration of gravity, and its radius.*

\[ V_{es} = \sqrt{2gR} = 11,200 \text{ m/s} \quad \& \quad g = \frac{V^2}{2R} = 9.807 \text{ m/s}^2 \]
Gravitational Constant \( G_p = \frac{\sqrt{2gR}}{V_{es}} = 1.414 \text{ kg m/sec} \)

A body’s escape/surface velocity \( V_{es} \) is measured as the square root of 2 times its deceleration of gravity \( g \) at its radius \( R \). A body’s deceleration of gravity \( g \) is measured as its escape/surface velocity squared \( V^2 \) divided by two times its radius \( R \).

The gravitational constant equation \( (G_p = \frac{\sqrt{2gR}}{V_{es}}) \) is a unit of momentum and not a quantity of force or a curvature of spacetime as it is in Newton’s gravitation or Einstein’s relativity.

This gravitational constant is used to calculate the physical gravitational parameters for all bodies. With this constant, each of a body’s three gravitational parameters can be determined from the measurement of the other two, \( (V_{es} = \sqrt{2gR}), (g = \frac{V^2}{2R}), \) and \( (R = \frac{V^2}{2g}) \). For the purposes of this explanation, these equations are used to measure Earth’s gravity as \( g = 9.807 \text{ m/s}^2 \) to determine the apparent Einstein bending of starlight. It is then used to calculate the sun’s surface gravity of \( 274.2 \text{ m/s}^2 \) to measure the apparent Shapiro’s time delay of photons passing the sun.

These values are measured with accelerometers, clocks, and measuring rods here on Earth and are all that is needed to calculate the angle at which starlight appears to curve as it passes the sun and the apparent measured time delay of radar photons that are reflected off Mercury and return to Earth. Only the Euclidian geometry of the Newtonian laws of force and momentum are used to arrive at a value of 1.74 arc-second for the apparent deflection of starlight and .000190 second for the apparent round trip photon time delay between Earth and Mercury. These measured Euclidian geometry values are basically exactly the same as General Relativity’s calculated values using non-
Euclidian geometry and the equivalent momentum vectors of photons. In these measurements, photons undergo no actual deflection within Euclidian inertial space and time. It is the changing geometry of gravitational momentum within the Earth and sun that only gives the appearance of starlight curving and time delay.

General Relativity theorists could explain these results by simply assuming correctly that their idea of curved spacetime did not curve the paths of photons. However, this assumption would allow them no way to validate their original assumption of curved space for the equivalent momentum of atoms. **Photons are not effected in any way by gravity except when they are emitted, reflected, or absorbed. They only appear to curve or slow when they are viewed relative to the changing gravitational momentum of the Earth and sun. The actual extent of a body’s changing gravitational momentum extends only to its physical surface and it can have no effect on passing photons.**

**Einstein’s Gravity is Upside Down, Backwards, and Inside Out**

The whole counter-intuitive theory of General Relativity is based on the imaginary metaphysical assumption that downward radial gravitational force and motion are equivalent and not equal to the real gravitational inertial upward force and momentum that is measured at Earth’s surface.

Einstein assumed with his unmeasurable equivalence theory that his imagined downward pointing equivalent force and momentum produced by an infinite gravitational field was real and that the upward force and momentum measured at Earth’s surface was just an imaginary idea used by his subconscious mind to constantly maintain his body’s balance against gravity’s “perceived” upward force. **Apparently, even Einstein wasn’t smart enough to even consider and believe in his own subconscious mind’s interpretation of gravity developed from monitoring his body’s five senses since birth. How was it possible that Einstein could lie in bed next to a Newtonian accelerometer and not imagine and then calculate that his bed was accelerating upward with decelerating time to maintain a constant upward velocity of 11,200 m/s.**

**The Astrophysical Disaster of General Relativity**

The Einstein apparent bending of starlight is caused by the changing geometry of gravitational momentum. In the theory General Relativity, it is perceived as unmeasurable changes in the geometry of a universal spacetime continuum. In the principle of the Expansion of Gravitational Momentum, photons undergo no changes in trajectory or momentum as they pass the sun or other mass bodies. The apparent measured deflection comes from the perspective of relativity theorists trying to calculate their imagined effects of equivalent force and momentum using non-Euclidian geometry.
If the inertial momentum vectors of photons were actually changed by gravity fields or curving space, as relativity theorists have always imagined, it would be a disaster for astronomical observations. Consider the photons that Eddington failed to capture on his photographic plates in 1919. They are now a hundred light years away moving through the Milky Way on the trajectories of Eddington’s measured angle of 1.75 arc-seconds. These photons are all believed to move at slightly different angles depending on their distance to the sun when they passed. A simple calculation shows that these photons are now at a horizontal distance of 128,000,000,000 km away from their original momentum vectors before they passed the sun. This is just for the photons that pass the sun near its surface. Virtually every photon passing the sun at other radii out to infinity will have its own unique deflection angle and altered momentum vector.

*In General Relativity, the gravitational field of every atom in the cosmos is constantly changing the momentum vectors of every photon in the cosmos. In the principle of absolute gravitational momentum the linear and angular momentum of photons is absolute and unchanging.*

The only change that has ever been measured in a photon’s momentum vector occurs at absorption where its momentum is conserved or by reflection where its momentum is conserved by the Compton effect and changes are measured as Doppler effects.

If according to General Relativity, the presence of gravitational mass was able to change a photon’s straight line path by even the slightest amount, the photons from distant stars and galaxies would be far removed from their original Euclidian vectors and would appear as a diffuse cloud of random photons everywhere we looked. Each photon would slightly change its path many times as it passed through and around galaxies. With all this random light pollution, the whole cosmos would appear as a dim gray fog and it is doubtful if the Hubble telescope could even see beyond the solar system. Even the random light pollution from streetlights here on Earth makes certain astronomical observations impossible near cities.

**The Lorentz Transformation of Mass, Space, and Time**

Besides the Einstein bending of starlight, General Relativity’s only other calculated measurement is the gravitational red shift. This is caused by the Lorentz transformation of mass, space, and time and has nothing to do with General Relativity’s fundamental assumption of equivalent or relative momentum. In fact, the Lorentz transformation is actually a disproof of equivalent momentum. Lorentz transformations are a measure of changes in a body’s absolute momentum. The equivalent momentum at Earth’s surface would not cause a gravitational red shift. See Pound-Rebka Experiment.
The Lorentz transformation is not a theory. It is the calculation of physical measurements used to measure the conservation of momentum \( P = ms/t \). It consists of three equations for calculating the measured values of mass in kilograms \( m = M/\sqrt{1-v^2/c^2} \), space in meters \( s = S\sqrt{1-v^2/c^2} \), and time intervals in seconds \( t = T/\sqrt{1-v^2/c^2} \). \( M, S, \) and \( T \) represent the measured values of Mass, Space, and Time at the position of Zero Momentum Rest for the entire cosmos.

**General Relativity’s Cosmological Paradox**

Ever since Einstein first proposed the theory, the great unexplained paradox for General Relativity theorists has always been their complete inability to confirm the validity of the experimental physicist’s measurements of photons appearing to curve their paths as they pass the sun. Although the measurements appeared to be real, their validity could not be confirmed by measurements of photons in general. While the measured photons appeared to curve away from their emitting stars, the rest of the photons in the cosmos did not curve away from their original emission vectors.

The paradox is this. If each photon’s path is slightly changed when it passes a body of mass, how is it possible the Hubble telescope is able to view each photon in the exact direction of the star that emitted it? Except for the cosmic blackbody radiation, the cosmos contains almost no spectral photons that cannot be potentially identified with their source.

In General Relativity theory, photons are calculated to slow to less than \( c \) as they approach the sun and then speed back up to \( c \) after they pass it. This is thought to be the cause of the observed Shapiro time delay of photons passing near the sun. The electrodynamics of Special Relativity has no explanation of how these photons are able to slow and then speed back up or how if ever they are able to get back to their original Euclidean momentum vectors.

According to electrodynamics, photons are potentially blue shifted as they approach the sun and potentially red shifted as they move away. This is a transverse gravitational Doppler shift (Lorentz transformation) relative to the sun’s gravitational momentum but it has no actual effect on the inertial motion or the wavelengths of the photons themselves. This blue shift would only be real when the photons are absorbed on the sun by atoms with slowed time dilation caused by the upward gravitational momentum at the sun’s surface. The photons themselves are not changed in any way but are perceived by the atoms as blue due to the atoms’ slowed clocks. These photons would be reflected or emitted as red for the same reason. Transverse shifted photons have the same red shifts in all directions when emitted and the same blue shifts when absorbed.
The quandary here among relativity theorists is that because of the Shapiro time delay, a postulate of Special Relativity (the constant speed of light) must be abandoned to account for a General Relativity calculation that is only based on an equivalent calculation rather than a physical measurement.

*General Relativity “physicists” all seem to imagine that the above effects are perfectly explained by the equivalence principle. While all experimental physicists are able to accurately measure absolute force and momentum, no one has ever been able to measure “equivalent” or “potential” force and momentum.*

**Einstein’s Bogus Bending of Starlight**

To understand the mechanics of apparent bending of starlight, we must look at it purely from the perspective of the experimental physicist’s physical measurements rather than the imagined metaphysical calculations of theoretical physicists. If the effects are explained in terms of actual measured changes in the Earth’s and sun’s gravitational momentum, it is plain to see that no changes in individual photon momentum vectors are required to account for the bogus observation of General Relativity’s curving spacetime continuum.

No theory at all is required to account for Einstein’s imagined deflection of photons by curved space because no such phenomenon can be measured to occur within the measurements and calculations of Euclidian geometry.

*There can be no “theory” of gravity beyond the simple description and extrapolation of the measurements of Earth’s force, momentum, and radius.*

The angle of the Einstein non-deflection of light can be calculated from just accelerometer measurements of force and momentum at Earth’s surface. The acceleration of gravitational momentum and the deceleration of gravitational time is not a new “theory of gravity” because it is just a principle of measurement. The only other measurements needed to calculate the apparent deflections are the radius of Earth and radius of its orbit around the sun. None of General Relativity’s metaphysical non-Euclidian complex mathematical baggage is needed to produce precise calculations for the measurements of apparent photon bending.
What the observer on Earth actually sees is a star that according to the Euclidean geometry of the empty inertial space, should be hidden just behind the solar disk. What has actually happened is that in the 8 minutes it takes for the photons to reach Earth from the sun, Earth’s gravitational momentum has carried its surface upward a distance 1221 km so that the observer can now see the star just outside the solar disk. This effect has nothing to do with solar gravity deflecting photons and is caused completely by the measured upward gravitational momentum of Earth’s surface. It is the same basic effect with the Shapiro Time Delay except that it is the changing geometry of the sun’s gravitational momentum that causes the measured illusion of deflections and time delays of photons passing between Earth and Mercury.

Gravitational Expansion’s actual measured values of mass, space, time, and gravity of are identical to the metaphysical calculations of General Relativity. Both begin with the same physical measurements of the force, velocity, and radius of Earth’s gravity. The difference is that General Relativity calculates radial gravitational momentum to be equivalent but not equal to absolute linear and angular momentum. To do this, Einstein had to imagine a virtually infinite gravitational continuum field that physically connected the force of every atom in the cosmos with the force of every other atom. With gravitational expansion, the force of each atom’s gravity extends no farther than its surface.

Both Gravitational Expansion and General Relativity, describe gravity as the changing geometry of space. In General Relativity it is the infinity of external gravitational space surrounding atoms and photons that changes and curves with non-Euclidian time and geometry. In Gravitational Expansion, it is the internal gravitational space within atoms that expands and curves. The force and momentum of gravity points up and not down as in General Relativity.
The Shapiro Time Delay

The Shapiro Time Delay of .000190 second is determined by calculating the hypotenuses of four right triangles formed by the orbital radii of Earth and Mercury and the upward gravitational fall of the sun’s surface. General Relativity’s prediction of this value is between .000199 s and .000180 s depending on how various physical parameters are tweaked in the calculations. My calculations do not allow for the tweaking of parameters or the bending of space.

Shapiro Time Delay from Earth to Mercury

Shapiro Time Delay Values & Calculations

Sun’s Surface Gravity------------------------------------------ .2742 km/s²
Sun’s upward excape/surface velocity -- \( V_{es} = \sqrt{2gR} = 617,800 \text{ km/s} \)
Radius of Earth orbit ------------------------------------- \( R_E = 149,600,000 \text{ km} \)
Radius of Mercury orbit ------------------------------ \( R_M = 58,000,000 \text{ km} \)
Geometric Distance @ \( T_0 \) ----------------- \( R_E + R_M = 207,600,000 \text{ km} \)
Calculated Time of travel Earth to Sun \( R_E/c \) ------- \( T_0 = 498.67 \text{ sec} \)
Calculated Time of travel Mercury to Sun \( R_M/c \) ---- \( T_0 = 193.33 \text{ sec} \)
Calculated Time of travel Earth to Mercury ------- \( T_0 = 692 \text{ sec} \)
Calculated round trip travel Earth to Mercury ------ \( T_0 = 1384 \text{ sec} \)
Upward Fall of Sun’s Radius \( F_1 = gT^2/2 \) during --- \( T_0 = 34,092.44 \text{ km} \)
Upward Fall of Sun’s Radius \( F_2 = gT^2/2 \) during---- \( T_2 = 5,124.49 \text{ km} \)
Upward Fall of Sun’s Radius \( F_3 = gT^2/2 \) during --- \( T_3 = 5,124.49 \text{ km} \)
Upward Fall of Sun’s Radius \( F_4 = gT^2/2 \) during --- \( T_4 = 34,092.44 \text{ km} \)
Photon distance Earth to Sun ----------- \( T_1 = 149,600,003.9 \text{ km} = 498.66668 \text{ s} \)
Photon distance Sun to Mercury ---------- \( T_2 = 58,000,013.3 \text{ km} = 193.33338 \text{ s} \)
Photon distance Mercury to Sun -------- \( T_3 = 58,000,017 \text{ km} = 193.33339 \text{ s} \)
Photon distance Sun Earth ------------- \( T_4 = 149,600,020.6 \text{ km} = 498.66674 \text{ s} \)
Total measured round trip time ------- \( T_{1+} + T_2 + T_3 + T_4 = 1384.000190 \text{ sec} \)
Calculated round trip travel Earth to Mercury ----- \( T_0 = 1384.000000 \text{ sec} \)

Shapiro Time Delay to Mercury and Back = .000190 second

General Relativity calculations for the delay are between .000180 & .000199
Philosophical Considerations

The theory of General Relativity and the principle of absolute gravitational force and momentum are based on opposite geometries of space and time. Both begin with the same “non-existent” universal three-dimensional Euclidian void of inertial zero momentum empty space. General Relativity superimposes its four-dimensional spacetime continuum on this void and allows it to continually curve in four dimensions around the centers of both moving and stationary bodies of mass. This proposed spacetime continuum serves as the “aether” through which photon and gravitational waves travel. The paths of photons are predicted to bend with the non-Euclidian curvature of this potentially infinite continuum.

In the principle of absolute gravitational force and momentum it is not the external void of space that curves but rather the internal inertial gravitational space within atoms that appears to expand and curve with time. The upward force of gravity is an acceleration in space and a deceleration in time that maintains a constant upward escape/surface velocity of $V_{es} = \sqrt{2gr} = 11,200$ m/s at Earth’s surface.

In the concept of General Relativity, the gravitational force exerted by each atom extends continuously and unalterably to every other atom in the universe. Compare this to absolute gravitational momentum where the gravity of each atom and mass body in the cosmos is measured to extends no further than its outer surface. The measured gravitational expansion of Earth is caused by the individual expansion of each atom and does not cause the whole of the universe to expand as a unit like it does with Einstein’s expanding space. **All electrons, protons, and photons expand with near perfect synchronicity throughout the whole universe. The only difference is that electrons expand slightly faster than protons and this is a yin/yang dichotomy that causes the continuing evolution of matter, energy, and gravity and gives life to the Cosmos as a growing entity. (see the Living Cosmos)**

Peculiar Gravitational Psychologies

In the fifty years or so that I have been trying to promote the principle of the Gravitational Expansion of Mass, Space, and, Time, I have had to contend with the peculiar phenomenon I call Adverse Gravitational Psychology, in which everyone absolutely refuses to believe in or even consider my empirical measurements of gravitational expansion. Even though everyone can feel or measure the surface of Earth constantly pushing them upward, no one but small children and experimental physicists seem capable of believing that it is true. Even otherwise very intelligent people prefer to believe in magical ideas like infinite gravitational attractions or a universal but undetectable curving spacetime continuum. The actual measurement and bodily feeling of gravity is much simpler and far easier to understand and calculate than the bazaar theo-
ries of infinite attractions and curving spacetime. General Relativity’s metaphysical gravity of universal reach is infinitely more complex and counter-intuitive than a physical gravity that is measured to extend no further than the edge of each proton and electron. It is the individual local expansion of each atom that is the true quantum of gravity and not waves of gravitons or local distortions in the infinite gravitational fields of each atom.

**Gravitational Philosophy and Scientific Logic**

I hate to think what William of Oakham would say to all these people who believe in complex General Relativity calculations instead of actual gravitational measurements.

Even Isaac Newton couldn’t figure it out, even though he said; “*We are to admit no more causes of natural things than such are both true and sufficient to explain their measurements.*”

Newton invented the concept of the accelerometer as a principle of measurement but for some unknown psychological, emotional, or politically correct reasons, he could not bring himself to believe that his accelerometer readings always measured the true direction of force and momentum vectors.

I have been told by several people that it would be impossible for matter to keep slowly expanding forever. However, these same people have a firm belief that the Guth inflation once caused the whole cosmos to expand from the point of a singularity to nearly its present size in a tiny fraction of a second.

Actually, gravitational expansion is really a very slow process. Let’s assume that you could transform yourself into one of Maxwell’s demons and shrink down in space and time to the size of a proton, where you could watch the circlon structure of its Compton wavelength (1.321 x 10\(^{-15}\) m) spinning at the speed of light. You assume that this reciprocal motion has something to do with the proton’s gravitational expansion, so you sit back and start counting revolutions to determine how long it takes for the size of the proton to double in size. You find it takes 8,000 quadrillion revolutions before the proton has doubled its size.

Compare that to Big Bang’s proposal of the Guth inflation where the cosmic singularity began at a diameter of less than one millimeter and then expanded in size by 130,000,000,000,000,000,000,000 times in a tiny fraction of a second.

Now, compare these ideas to the very popular many worlds interpretation of Quantum Mechanics where the whole cosmos, space and all, bifurcates instantly every time an atom emits a photon. These examples show quite conclusively that an experimental physicist’s measurements of gravitational expansion are simple indeed when compared to the cherished beliefs of all those turkeys who call themselves theoretical physicists. Philosophically, belief in the simple measurements of gravity is nearly insignificant when compared to the many adverse unmeasured metaphysical assumptions of the Standard Model Theories of Physics and the Big Bang.

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The Gravity Cannon Test
The gravity cannon is a definitive experimental test that can easily differentiate between the four possible general theories of gravity. This test is so simple and basic that once it has been performed, the results can be put on You Tube to make it possible for the true nature of gravity to be understood by everyone. Even the small child will be able to clearly see and understand just how gravity really works.

The Gravity Cannon Experiment
The Gravity Cannon experimental is the ultimate test to either validate the Gravitational Expansion of Mass, Space, and Time or falsify General Relativity’s metaphysical assumption of a curving spacetime continuum. The test will show conclusively whether the force of gravity is internal to matter of external to the cosmos.

The gravity cannon is an extremely simple and inexpensive mechanical device with only two moving parts. It has the absolute ability to differentiate between the equivalent downward inertial momentum calculated and predicted by General Relativity and the absolute upward gravitational momentum measured with accelerometers.

The only thing difficult or expensive about the Gravity Cannon experiment is that it has to be performed in outer space. The cannon itself is a large clear glass sphere with a round shaft drilled through it at its center. A round cannonball of some heavy material such as Gold is machined to loosely fit inside the shaft. To begin the test, the cannonball is held briefly at one end of the barrel and then released.

If General Relativity’s idea is correct, equivalent momentum will be added to the ball and it will accelerate down the barrel, reach maximum velocity at the cannon’s center an then decelerate to a stop at the other end of the shaft. The process will then repeat itself in reverse with the ball accelerating back down the barrel and then slowing to a stop at the opposite surface of the glass sphere. If the absolute momentum of measured gravitational expansion is correct, the Gold ball will move toward the center with decreasing acceleration until it eventually appears to stop just short of center.

The results of this test will be completely unambiguous and will decisively separate the measurements of absolute gravitational momentum from all equivalent momentum and attraction theories of gravity.
In conclusion, there are basically only four metaphysical assumptions in the Standard Model Theories of Physics and the Big Bang and I have found them all to be totally bogus and unverified by the measurements of any experimental physicist. If these four unmeasured ideas are rejected as bogus, all of physics and cosmology can be explained in terms of physical measurements and no theories based on metaphysical assumptions are necessary to describe any basic physical phenomena.

1. The Massless Photon
The momentum, angular momentum, and energy are measures of photon mass.

2. The Equivalence Principle
Gravitational force and momentum are measured to point up and not down.

3. The Intrinsically Uncertain Location and Momentum of Point Particles
The Circlon Shape of electrons and protons is the same size as their uncertain locations h/2π.

4. The Universal Eternally Constant Electron/Proton Mass Ratio of 1/1836
Cosmologist’s unquestioned belief in a constant and eternal electron/proton mass ratio has completely prevented them from developing a reasonable theory for the creation and evolution of the cosmos.

In the Living Cosmos, the rotational $E/M = C^2$ of the electron has been gradually decreasing from an e/p mass ratio of 1/1 at the beginning to today’s value of e/p = 1/1836. In this process, the electron’s decreasing rotational $E/M = C^2$ is converted to the linear $E/M = c^2$ of atoms and photons. The total Energy/Mass of the cosmos as well as total momentum has remained constant and conserved from the beginning of creation to today.

This slow evolution of the electron’s mass presents a precise step by step creation and evolution for the cosmos that explains all of its major features without resorting to Big Bang theory’s metaphysical assumptions like a singularity, Guth inflation, or expanding spacetime.

Electron evolution is a long and slow process that begins with the gradual creation of galaxies, then the slow conversion to stars within galaxies and finally the sudden creation of electrons and protons from the neutrons within stars. At e/p ratio of 1/146.5, electron and protons coupled into atoms and emitted a sudden burst of 2.7 K cosmic blackbody photons throughout the cosmos at the same time. As the electron’s mass continues to decrease, spectral photons decrease in wavelength and increase in momentum. This is the cause of the Hubble red shift. Billions of years ago, atoms with more massive electrons than today emitted photons with much longer wavelengths than they have today. Dark energy is also explained by electron evolution. Millions of years ago thermal photons from supernovae had less energy than they do today and are observed to be less intense than local supernovae.
Gravitational Expansion of Mass, Space, and Time

Accelerometers that measure force to calculate momentum, energy and velocity are the only instruments available to modern experimental physicists. All measured values eventually break down into individual changes in momentum. When we watch TV our eyes measure the individual variations in momentum of the photons emitted by the screen. When we measure gravity with accelerometers and clocks, we can only conclude that it is a three-dimensional upward pushing force that produces three-dimensional outward momentum. There are no accelerometer measurements that show gravity to be a two-dimensional downward pulling force.

Accelerometer Measurements of Force and Change in Momentum

There are four basic quantities in the Newtonian experimental measurement process: Mass, Space, Time, and Gravity. All conceivable experimental measurements are made with Newtonian accelerometers to quantify individual values for Mass, Space, Time, and Gravity. These values are combined together in the calculations of momentum, angular momentum and measurements of centrifugal and centripetal force, and linear and rotational kinetic energy. Energy is the idea used to divide the equal momenta produced by of a single force into multiple values. Gravity is the measure of force used to calculate radial gravitational momentum. Linear momentum and force exist on individual one-dimensional vectors, angular momentum and centripetal force exist on two-dimensional planes and the force and momentum of gravity are measured and calculated at the surface of three-dimensional spheres.

Einstein’s imaginary ideas about equivalent force and momentum causing inertial space to curve have only been measured with null results.
Mass, Space, Time, and Gravity

Force  \( F = ma \). Force equals mass times an unknown combination of absolute acceleration and absolute deceleration. Momentum \( p = mv \). Angular Momentum \( I \omega = mvr \).

Mass, existing in Space and moving in gravitational Time is the fundamental metaphysical assumption of all physical measurements. The assumption is that mass is eternal and when located at a position of Zero Momentum Rest, it has an absolute quantity of one and a momentum of \( p = 0 \). At this position, Mass = 1, Space = 1, Time = 1 and Gravity = \( 1^2 \). On any momentum vectors relative to ZMR, mass increases to \( M = 1 + \) and time intervals increase to \( T = 1 + \) proportionally to increases in absolute momentum \( p = 0 + \). Deceleration on a momentum vector decreases mass and shortens clock time intervals. The linear dimensions of inertial Euclidian Space have a negative reality and are always calculated to remain constant. The radial dimensions of three dimensional gravitational space have a positive reality that is measured by force to calculate increasing gravitational dimensions and the subsequent curving of time.

Centrifugal, Centripetal, and Gravitational Force and Motion

The use of accelerometers to measure the motion produced by inertial force, centrifugal force, centripetal force, and gravitational force is at the basic foundation of all experimental physics. The paradox is that these simple measurements are more or less completely misunderstood by both scientists and laypersons alike. It seems that almost no one is capable of fully understanding what these forces really are or the important role they play in our everyday realities. Everyone seems to generally imagine forces and motions as upside down and backwards and in particular, almost no one has a proper understanding of the true nature and measurement of both centrifugal force and gravitational force. Both scientists and engineers frequently use the term centrifugal force when they are really describing centripetal force and almost everyone believes that gravitational force points down even though it is measured to point up.

Momentum and angular momentum are the fundamental parameters of our physical reality and are measured by force and centripetal force. Linear kinetic energy \( e = \frac{mv^2}{2} \) is a calculation to give a relative quantity to momentum and rotational kinetic energy is a calculation to give an absolute quantity to angular momentum. Momentum defines absolute motion, and energy is a measure of absolute change in momentum. Momentum is a principle of measurement and energy is a calculation used to quantify both relative linear momentum and absolute angular momentum.

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James Carter
Because they are metaphysical assumptions, mass, space, and time cannot be measured independently. The only two physical measurements that can be made of the physical interactions of mass, space, and time are relative changes in momentum and absolute changes in angular momentum.

Every moving body has an unknown absolute momentum vector that is a combined unit of mass, space, and time (Energy/Mass = c^2). When we change and measure a body’s momentum, it is done with a force that changes its absolute momentum to a new unknown vector and value. This new measured momentum vector is produced by an unknown combination of acceleration and deceleration. When we change and measure a body’s angular momentum, it is done with a centrifugal force that either produces acceleration or deceleration in the rotating body that increases or decreases the body’s centripetal forces. Changes in momentum are measured with accelerometers on a single vector as Force and changes in angular momentum are measured at an infinite number of centripetal force points on a rotating plane.

**e = mc^2 is Wrong and E/M = cC & E/M = CC are Right**

Energy and Mass are two sides of the same coin and are always equal and cannot be physically separated in any experimental way. E/M = cC is the formula for photons, E/M = CC is the formula for protons, electrons, and stationary atoms, and E/M = c^2 is the absolute linear Energy/Mass of a moving atom’s momentum.

The force produced by an energy always produces two equal and opposite quantities of momentum \(\mathbf{p}_1 = \mathbf{p}_2 = mV = Mv\) and two unequal quantities of energy. \(e = mV^2/2\) has more energy than \(e = Mv^2/2\). Kinetic energy is quantified by dividing \(e = mv^2\) into two unequal parts. The total energy of a force is measured with two accelerometers that divide the force into two equal values of momentum and two unequal quantities of energy.

Energy/Mass is a conserved eternal quantity. The quantity of mass \(m = e/c^2\) contained in the cosmos is always equal to its total energy \(e = mc^2\) and neither quantity ever changes separately. This is because they are two parts of a whole and cannot be separated from one another in any meaningful way. When a body is accelerated to increase its energy, its mass is also increased by an equal amount. Mass has energy \(m = e/CC\) and energy has mass. \(m = e/c^2/2\).

All photons have a momentum of \(p = mc\) and an angular momentum of \(h/2\pi = m\lambda C/2\pi = mCr\). A photon is a matter/antimatter duality composed of a length positive magnetic cosmic string from a proton combined with an equal length of negative electric cosmic string from an electron. The angular momentum of a photon’s back and forth wave-like motion is a universal constant of nature. The two pieces of cosmic string are also spinning at C in opposite directions, with equal quantities of angular momentum \(h/2\pi = mCr\). When these two opposite spins are added together, the total angular momentum from the
spinning strings is zero. However, total energy of a photon’s spinning strings \( e = \frac{mC^2}{2} \) can be measured and combined with the energy of its linear motion \( e = mc^2/2 \) for a total photon energy of \( e = mc^2/2 + mC^2/2 = mcC \). The photon’s momentum \( p = mc \) provides 1/2 of its measured energy and the angular momentum of its rotating mass provides the other half \( e = I\omega^2/2 \). The energy of its momentum is relative to an observer’s motion and the energy of its angular momentum remains constant for all observers.

Momentum produced by a force can only be measured relative to the rest frame of an accelerometer and total energy produced by a force can only be measured relative to the rest frame of the two accelerometers measuring equal and opposite momenta. The kinetic energy inherent in angular momentum \( e = mr^2\omega^2/2 \) is an absolute and constant quantity that is measured to have the same value in the moving frames of any observers. When the values of mass, rotational velocity, and radius are changed to maintain constant angular momentum, the rotational energy is also changed. As with momentum, angular momentum contains a body’s kinetic energy but it is not a measure of it. Different spinning bodies can have the same values of angular momentum but greatly different rotational kinetic energies.

**Absolute Accelerometer Measurements**

Accelerometers measure the force producing the acceleration or deceleration of mass. They are the only possible measuring devices for quantifying changes in a body’s momentum or angular momentum. Modern experimental physicists have thousands of different measuring devices for determining all of the many different quantities in physics. However, at their most fundamental level, each of these instruments measures and calculates changes in momentum and angular momentum through the measurement of accelerations and decelerations produced by force. As an example, consider the radar gun used by police to measure the speed of cars. This device determines traffic speeds by measuring changes in the momentum of photons reflected from moving vehicles. The Hubble red shifts are measured as changes in the momentum of spectral photons. All of an experimental physicist’s many measured and calculated values are based on accelerometer readings of either a linear force or centrifugal force that changes momentum or angular momentum.

**Momentum, Force and Energy of Cannons and Cannonballs**

In the following thought experiment with a cannon and cannonball, their individual momentum is easy to calculate because they are always equal. However, the recoil energy from the force of the gunpowder is much greater for the ball than the cannon. Momentum is measured from the acceleration produced by of a single quantity of force and energy is calculated from the opposite ac-
Cannon ball has the same momentum as the cannon but has 100 times more kinetic energy.

A Force always produces two equal momenta but it almost never produces two equal quantities of kinetic energy.

celerations produced by force. In this sense, momentum is absolute and energy is relative even though they are both always equal. Momentum is measured as motion in a single absolute frame and energy divides the motion between two relative frames.

Since we are unable to measure the cannonball’s momentum without changing it, we can calculate its exact velocity and energy by measuring the cannon’s equal momentum. If the cannon is rifled, and causes the cannonball to spin, then calculating the total energy of the ball, when it hits the target, becomes more complicated. The cannonball’s linear energy $e = \frac{mv^2}{2}$ is strictly relative to its motion with the target. However, its rotational energy $e = mr^2\omega^2/2$ is absolute and has the same value relative to all moving targets.

### Measuring of Positive and Negative Centrifugal Forces

**Centrifugal Force is a Momentary Transverse Push.** Centrifugal forces are measured as momentary transverse accelerations or decelerations. Whereas, a linear force that changes momentum is on a vector relative to the accelerometer’s position of rest, centrifugal forces that change angular momentum are perpendicular measurements relative to the center of a two-dimensional plane.

**Centripetal Force is a Constant Two-Dimensional Radial Pull.** Centripetal force is a constant and equal balance of radial acceleration and deceleration. Centripetal force can be measured at anyplace on the table with two accelerometers set at 90° apart and aligned with the center. One measures a constant one-half transverse acceleration and the other measures the equal one-half of a transverse deceleration.
Both centrifugal force and centripetal force are measured with accelerometers attached to a rotating body. Centripetal force is a measure of the total positive centrifugal forces that have created the rotation. A free-wheeling rotating turntable produces a constant centripetal force at any location on the table. Transverse centrifugal forces produce either positive or negative changes in the turntable’s angular momentum and rotational energy. Momentary centrifugal forces are equally added to or subtracted from the table’s constant centripetal force.

The turntable measurements of force and momentum are done with two accelerometers. Centrifugal force accelerometers are aligned at 180° and centripetal force accelerometers are aligned at 90°. Centrifugal forces are measured as positive and negative one-dimensional pushes that are equal and opposite to the two-dimensional centripetal pulling force. These two forces are really just the same force aligned at 90° from one another. The momentum and linear energy produced by centrifugal force are stored in the angular momentum and rotational energy of centripetal force.

**Change in Momentum Produces Force that is Measured as Energy**

It is a common misconception of both scientists and laymen alike when they say, “To increase the rotation of the turntable we must add energy to it.” This statement is true only in a relative sense. When we measure and change the rate of the turntable’s rotation it is done by adding equal, consecutive units of centrifugal force. Each unit of force increases or decreases the table’s centripetal force, angular momentum, and rotational energy. Changing Momentum is the cause of Force and energy is its measurement. It should be clear from this, that when we accelerate the table by using centrifugal force to equally increase its angular momentum and centripetal force, we are using linear kinetic energy to add rotational kinetic energy in the table.

This rotating turntable experiment begins at Position 1 with the balls resting in a radial groove. Ball #1 is just leaving the table at \( v = 4 \) and the table is spinning at \( v = 4 \). The total angular momentum and energy of the table and the balls is \( I\omega = 1 \). The table’s centripetal force is \( F = 1 \) and its centrifugal force is \( F = 0 \).

When the balls are all released from centripetal pulling force, centrifugal pushing forces becomes active and begin pushing the balls out the groove. As the balls move out toward the edge of the table, their velocity and energy are increased by the centrifugal push from the back edge of the groove in the table. Accelerometers on the balls measure a positive centrifugal pushing force from the turntable and accelerometers mounted to the table measure an equal and opposite negative centrifugal pushing force that decreases table’s rotational velocity. The centrifugal force converts rotational energy from the table to the
linear energy of the accelerating ball. In this process, the table is slowed but its energy and angular momentum remain constant until the next ball is released.

As the balls roll out to Position #2, angular momentum is being transferred to the accelerating balls from the decelerating table. As the balls’ velocity speeds up, their energy increases, and as the turntable’s velocity slows its energy decreases by an equal amount. Total combined angular momentum and energy of the table and the balls remain constant.

In this experiment, accelerometers are used to measure the positive and negative centrifugal forces that change the angular momentum and energy of both the table and the balls. This is a passive measurement that involves no change in total angular momentum or kinetic energy. What is measured are the centrifugal forces required to transfer angular momentum and energy from the table to the balls.

This experiment consists of measurements at eight positions on a single...
rotation of the table and balls. Four positions measure the table’s decreasing centripetal force as the balls move along the grooves and the other four positions measure proportional decreases in positive and negative centrifugal forces. The arrows represent accelerometer readings with their length indicating their equal force and their size indicating the amount of acceleration or deceleration produced. Red arrows represent accelerations and black arrows are decelerations. All arrows are measurements of the forces that change the balance of angular momentum between the table and the balls. As the Balls leave their grooves, their angular momentum is converted into linear energy of momentum. However, even after the balls leave the groove in the table and are far away, the total angular momentum and energy of the balls and table remains conserved.
Laws of Motion and Einstein’s Postulates and Assumptions

1. Law of Momentum and Angular Momentum, \( p = ms/t \) & \( I\omega = mvr \)
   A body at rest has zero momentum. A body in linear motion maintains constant momentum unless acted on by a force. A rotating body maintains constant angular momentum regardless of complementary changes in mass, velocity, and radius.

2. Law of Acceleration/Deceleration of Force, \( F = ma \)
   Force equals mass times an unknown combination of absolute acceleration and deceleration.

3. Law of reciprocal acceleration and deceleration in the conservation of momentum and energy.
   Every acceleration of mass (momentum) is produced by an equal deceleration of momentum.
   
   $$ E \quad p \quad F < E > \quad F \quad p \quad E $$
   
   $$ 1/2mv^2 < m\nu \quad < ms/t^2 \quad E = mv^2 \quad ms/t^2 > m\nu > 1/2mv^2 $$

   A force equally divided between two unequal mass bodies produces two equal and opposite momenta and two unequal separately conserved kinetic energies. Whereas momentum is a dual physical quantity of absolute motion, energy is a single calculation of relative individual momenta. Energy is not a real physical quantity like momentum. Energy is just the conceptual way that changes in momentum are measured. Force divides momentum equally and separates energy into unequal quantities.

4. The Lorentz Transformation of Momentum \( m' = M/\sqrt{1-v^2}/c^2 \)
   This law combines and quantifies the relative and absolute motions of the first three laws into the absolute momentum of matter and photons relative to zero momentum photon rest.

5. The Conservation of Energy/Mass
   The Energy/Mass of matter \( E/M = CC \), the Energy/Mass of photons \( E/M = cC \), and the Energy/Mass of moving bodies \( E/M = c^2 \) remain constant and conserved.
   When two equal and opposite momenta \( mv + mv = mv^2 \) are formed by a force of total energy \( E = mv^2 \), it is divided unequally into kinetic energies \( e_k = 1/2mv^2 \) & \( 1/2mv^2 \).

   Newton’s three laws deal with the conservation of momentum relative to any arbitrary position of rest. They are really just a single law that addresses
the Lorentz transformation from three different absolute perspectives. The transformation calculates the conservation of momentum and angular momentum relative to the speed of light and the speed of gravity. These “laws of physics” are basically a single experimental principle of mass, space, time, and gravity for the measurement of inertial force, momentum, Energy/Mass, and the force and motion of gravity as they all relate to the speed of light.

Einstein postulated that the laws of physics remain the same when atoms are accelerated or decelerated to different inertial reference frames. This was a very general statement and he did not identify specific laws of nature nor how they would be measured to remain unchanged. In fact at the time, he did not even know about some of the laws listed below. Contrary to his first postulate, the experimental method easily shows that some of these laws remain constant while others are changed by motion both physically and in the way they are measured.

These basic laws of experimental physics were established long before Einstein developed his relativity theories. He simply incorporated each of these laws into the metaphysical assumptions of the theories and attempted to make both subtle and revolutionary changes in each of these laws.

**Einstein’s Third Unknown Metaphysical Assumption**

*Einstein based his relativity theories on three fundamental assumptions that have never been verified by any experimental measurement. The first two are prominent in any discussions of atomic physics, astronomy, and cosmology but the third has always been regarded as an eternal law of chemistry rather than an evolving electrodynamic principle.*

1. **The rest Energy/Mass** $E/M = C^2$ **of matter can be converted into the pure momentum** $p = mc$ **and pure energy** $e = mc^2$ **of massless photons. It is assumed that massless photons are composed of and travel at** $c$ **through a physical aether-like medium called a spacetime continuum or an electromagnetic field.**

2. **Earth’s gravitational force** $g = ms/t^2 = 9.8 \text{ m/sec}^2$ **and motion** $V_{es} = \sqrt{2gR_E} = 11.2 \text{ km/sec}$ **are directed toward Earth’s center.**

3. **The electron/proton mass ratio** $e/p = 1/1836$ **has been an eternal and universal constant since the “beginning” of time.**

These three unmeasured metaphysical assumptions are the foundation of Einstein’s special and general relativity theories of physics and cosmology. They are also used in the standard model theories of quantum mechanics, electrodynamics, evolutionary cosmology and various string theories.
Einstein’s Postulates
To frame these three assumptions, Einstein felt it necessary to include two somewhat ambiguous and contradictory “postulates”.

First postulate:
The laws of physics are the same in all inertial frames of reference.
or more precise: The laws of motion are measured to be the same regardless of the observer’s moving frame.

The basic philosophical flaw with this first postulate is that it makes the very unlikely assumption that the matter of the cosmos could exist in more than one inertial reference frame. We know from measurements of photon momentum that all photons move at c in the same inertial frame. How could we prove or why would we want to believe that atoms did not move and have momentum relative to the same universal inertial frame as photons? If each atom had a different zero momentum reference frame, we would measure Hydrogen atoms to all have different masses.

Experiments show that Lorentz transformations occur within a single inertial frame of reference that is equivalent but not equal to each of Einstein’s imaginary frames of reference. The first postulate is totally unnecessary because the cosmos can logically have only one natural inertial frame of reference where:

Values of Absolute Zero Momentum Frame
Momentum = zero, Mass = one, Inertial time = one, Gravitational time = one, Photons move at c, Photons and atoms spin at C, Linear Energy/Mass of atoms is zero E/M = 0, Rotational Energy/Mass is E/M = CC, and the Energy/Mass of photons is E/M = cC.

All of these values are transformed within each of Einstein’s many imaginary “frames of reference” but there is still only one zero momentum frame that is common to the cosmos. The Lorentz transformation calculates the correct values for total two-way momentum in all of Einstein’s moving frames. However, correct one-way transformations cannot be calculated in any of Einstein’s imaginary first postulate frames. (see Triplet Paradox)

Second Postulate
Without the first postulate’s absolute relative motion between multiple frames, the second postulate’s constant speed of photons becomes redundant. The second postulate becomes the same as the first. “All photons travel at exactly c within one-dimensional voids common to the same zero momentum inertial void of all atoms.” The two-way speed of light is always measured at c and the one-way speed of light can only be estimated at c +/-v by Doppler shifts in photon momentum.
Einstein’s postulates were not meant to be new physics laws but rather to be constraints on existing physics laws so they would conform to his new metaphysical assumptions. The first postulate is negative and unnecessary because no one believes that the laws of physics cannot be correctly measured by moving observers.

The main problem with the first postulate is that it is not based in cosmic time. It seems to imply that the “laws of physics” have been the same since the beginning of time. The first postulate is presented as a negative principle of measurement even though there is no experimental evidence offered to support its negative claims.

What Did Einstein Mean by “Laws of Physics” Anyway?

The main problem with Einstein’s postulates is that he never really identified or defined what laws of physics remain the same and what laws would change when bodies are accelerated or decelerated to different inertial frames. Obviously, the only laws that remain unchanged by absolute motion are the laws of motions represented by the Lorentz transformations of mass, space, time, and gravity. Beyond these, there are many other physical relationships and constants listed below that could be called “laws of physics”. Measurements clearly show that some of these “laws” are changed by acceleration and deceleration and some are not. For example, the speed of light c is usually identified as a “law of nature” but it has a different measured value in every inertial reference frame. This is an apparent change caused by the slowing of clocks used to measure it.

Measured Speed of light in Earth’s frame $c = 299,792,458$ m/s
True Speed of light at zero momentum rest frame $c = 299,417,717.4$ m/s
The Bohr Radius
The Fine Structure Constant
Planck’s Constant
The Mass of the Electron
The Mass of the Proton
The Hydrogen Spectrum
The Energy/Mass of Photons $E/M = cC$
The electron/proton Mass Ratio of $e/p = 1/1836$
The Gravitational Force & Momentum Constant
The One Kilogram Platinum Bar in Paris
The One Meter Rod in Paris
The frequency of Cesium-133 atoms $= f = 9.192 631 77$ GHz $= 1$ second
In Conclusion

Einstein’s two contradictory postulates and three unmeasured metaphysical assumptions can make very accurate calculations to explain many physical events. However, none of these arbitrary relationships are needed to determine the parameters of any actual experiments. While Einstein’s relativity theories may work beautifully, they describe an imaginary reality that is upside down, backwards, and inside out from our true measured physical reality.

The first postulate’s virtual relative motion cannot be reconciled with the individual legs of Twin Paradox experiments or by the fact that photons always have the same intrinsic velocity in empty space but are measured to have different values in every moving reference frame.

The idea of a massless photon contained within the momentum and energy of an imaginary electromagnetic field cannot be reconciled with experiments that measure photons moving with the inertia of their linear momentum \( p = mc \) and containing the energy of that momentum \( p = mc \) plus the rotational energy of their angular momentum \( I \omega = m\lambda C/2\pi \).

**Photon Energy** \( = mc^2/2 + mC^2/2 = mcC \)

Newton and Einstein’s imaginary assumption that the force and momentum vector of gravity pointed towards Earth’s center cannot be reconciled with experiments performed with accelerometers and atomic clocks that positively verify the upward pushing force of gravity that we all feel. The upward deceleration of escape/surface velocity \( V_{es} \) that we measure with satellite clocks and Mossbauer effects positively confirms that the direction of Earth’s gravitational momentum vector is up and not down.

Where Einstein’s metaphysical relative and massless assumptions really begin to fall apart is when they are used in the various cosmologies derived from his relativity theories. The common assumption of all Big Bang theorists that the 1/1836 electron/proton mass ratio is an eternal constant has never been verified by any experiment. The major cosmological parameters such as the Guth inflation, the formation of matter and photons, the accumulation of galaxies and stars, the Hubble constant, the 2.7 K temperature of the cosmic blackbody radiation, and Dark Energy can only be properly understood in terms of an electron/proton mass ratio that has been evolving in value over the course of cosmic history.

Believing in length contraction comes from not realizing the clock’s mass and intervals have increased. **The false but accurate measurement of length contraction is the only way an observer’s absolute motion can be indirectly determined.**
The Variable Speed of Light versus the Absolute Motion of Clocks

The following series of thought experiments are devised to show what natural laws and constants remain the same through changes in momentum and which laws are altered by acceleration or deceleration. For ease in calculation, the velocity of .867 c is chosen for these experiments but Lorentz transformations are valid for any absolute velocity relative to the universal position of zero momentum photon rest. At this velocity, the linear Energy/Mass = $c^2$ (relativistic mass) of the ship and crew is equal to the rotational Energy/Mass = $C^2$ (rest mass) of their atoms. This doubling of the ship and crew’s Energy/Mass has slowed the rates of onboard inertial clocks to one-half and speeded the rate of pendulum gravity clocks to $1.414$

The experiment begins when the atoms contained in a group of experimental physicists and their spaceship are accelerated from rest to a velocity of 86.7% the speed of light. They use an onboard Inertial Navigation System to determine when they have reached this velocity. The technicians then assemble a number of experiments to measure the “laws of physics”. These tests were performed when the ship was at rest and then again at speed in order to detect any changes in locally measured values.

Conservation of Linear and Angular Momentum
The first three laws of nature to be calculated and measured are Newton’s four laws of momentum. $p = mv$, $I\omega = mvr$, $F = ma?d$, and $m = M\sqrt{1-v^2/c^2}$.

Momentum is mass times velocity and angular momentum is mass times rotational velocity times radius. These are the ultimate conserved components of all atoms and photons in the cosmos. Momentum a passive quantity that can only be detected by a linear Force that is measured on a single vector as mass times an unknown combination of absolute acceleration and deceleration. An accelerometer measures changes in momentum relative to itself but it can never separate its single reading into absolute acceleration from absolute deceleration. Angular momentum is an active absolute quantity that is the same in all reference frames that is measured by radial centripetal force. West bound automobiles must accelerate and increase their momentum to begin their journey but East bound drivers must decelerate to reduce the absolute momentum of their cars in order to move Eastward against Earth’s constant angular momentum.

The Lorentz transformation is simply a combination of the laws of momentum and Force and is the mechanism used for calculating and measuring the conservation of linear momentum. The Lorentz transformation is a measure of momentum that is calculated as an increase in the Energy/Mass = $c^2$ of moving bodies. Increasing mass causes inertial clocks to slow and slowed
clocks make distances to appear contracted that in turn causes velocities to appear to speed up.

The technicians use three different clocks to measure time. A Cesium clock and a gyroscope to measure inertial time and a pendulum clock to measure gravitational time. The gyroscope rotor is spinning at 3600 rpm and ticks off one second after each 60 revolutions. As they accelerate faster and faster they note that their Cesium clock and gyroscope clock remain synchronized even though they know that they must both be slowing down. What causes the gyroscope clock to slow is that as the Lorentz transformation increases the its rotor’s mass, its rotational velocity must slow in order to conserve angular momentum $I \omega = mvr$. It is also the conservation of angular momentum that causes the Cesium clock to slow by the same rate as its atoms increase in mass.

The Astronauts use accelerometers to quantify the laws of momentum at their extreme velocity. They first measure the mass of a one kilogram bar by measuring the force needed to accelerate it to a given velocity. The then use the velocity and a clock to measure the length of a meter rod and finally they use the meter rod and velocity to determine the interval lengths of the accelerometer’s clock.

All of their measurements come out exactly the same as they had back at rest on Earth. The bar still weighted one kilogram, the measuring rod was still one meter in length and the accelerometer’s clock still verified both values. All measurements of mass, space, and time, appear to be the same, even though the technicians knew their intrinsic values have been changed by their absolute linear momentum.

These unchanged measured values of mass, space and time would seem to verify Einstein’s 1st postulate that stated the laws of physics are the same in all inertial frames. This all depends on what he considered to be “laws of physics”. The technicians knew from their inertial navigation system that they were traveling at .867 c and also calculated that at this velocity the Lorentz transformation would double their mass, slow their inertial clocks to one/half, speed up their gravity clocks by 1.414 times, and cause their meter rods to be measured at 500 mm.

Einstein’s second postulate was a new law of nature that stated that photons always moved through empty space at $c = 299,792,458$ m/s. When the scientists use their clocks and meter rods to test this law and measure the speed of light, they find to their surprise that the two-way speed has increased to nearly 600,000,000 m/s. There are two possible explanations for this doubling of c. Either their clocks have slowed to one-half or their meter rods have contracted to one-half but not both. Either way the actual intrinsic speed of light has not changed. Only the parameters of the astronaut’s measuring instruments have changed.
The True Speed of Light is **299,417,717.4 m/s**

We measure the speed of light \( c \) here on Earth to be exactly 299,792,458 m/s. This value is exact because it is used to define the length of the meter and the duration of a second. This is not the true value of \( c \) because it is measured to have a different value in every other inertial reference frame.

We can determine from the 2.7 K cosmic blackbody photons that Earth’s inertial frame is moving towards Leo at about 375 km/s. This momentum has increased the mass of Earth and the duration of its rotation as well as its other clocks by .00125 (Mass = 1.00125 kg, clock seconds = 1.00125 s and the length of the day has increased to 1.00125 day due to the conservation of Earth’s angular momentum \( I = mvr \)). The time interval of the second for pendulum gravity clocks has increased to .707 second.

When \( c \) is measured at the zero momentum rest frame of all photons where mass = 1.0 and the second = 1.0, it is measured to be 299,417,717.4 m/s. This is the true velocity at which all photons move through empty space. When experimental physicists attempt to measure this intrinsic velocity in any other moving reference frames they find that its velocity increases in direct proportion to the momentum of their frame. The actual speed of photons does not change but just appears to increase due to the observer’s slowed inertial clocks and appears to slow down when measured with a gravity clock.

**Earth’s daily rotation is an inertial clock and the moon’s monthly orbit is a gravity clock.**

However, these increases in the measured speed of light do contradict a conclusion of Einstein’s first postulate that states it is impossible for observers to locally determine their motion through empty space. By measuring that the two-way speed of light has doubled in all directions inside their spaceship, the researchers are able to determine their ship’s velocity through absolute space to be .867 \( c \). However, there is still no way to determine the direction of their momentum vector without looking at the stars or the 2.7 K cosmic blackbody radiation.

In another test, a spectrometer is used is used to measure individual photons of the Hydrogen spectrum. They know that the mass of the electron has been doubled by their momentum and that this will double the length of the Bohr radius which in turn doubles the wavelengths and halves the momentum of Hydrogen spectral photons. This is the so called transverse Doppler effect. While this double red shift in the Hydrogen spectrum can be measured by observers at rest, it cannot be measured in the spaceship because the spectrometer has undergone the same transverse shifts in its atoms. Even though the wavelengths of Hydrogen spectrum photons have actually doubled, the slowed clocks will measure them at their original momentum, energy and wavelengths.
Inertial Time versus Gravitational Time

Lorentz transformations caused by increased linear momentum cause all inertial clocks to slow and pendulum gravity clocks to speed up. This divergence between inertial time and gravitational time indicates that they flow in opposite directions and meet in the middle as metaphysical time.

An additional test is performed to measure the gravitational force constant with accelerometers and pendulum clocks attached at the bow and stern of the ship. The astronauts first performed this test in a high Earth orbit to measure the amount of gravitational acceleration produced by the ship’s Energy/Mass = c² at rest m = 1. The pendulum clocks are then synchronized with the craft’s Cesium clocks.

The same measurements are made again when the ship reaches its final momentum. Because of the craft’s doubled mass, the doubled gravitational acceleration on the clock’s pendulum would increase its rate by 1.414 times its Earth rate and 2.828 times the slowed local Cesium clock’s rate (t = 2π √L/g = 1 t’ = 2π √L/2g = .707). The doubled mass of the clock’s pendulum would not effect its rate of ticking but it is found that if the length of its pendulum is doubled, it will run at the same rate as the local Cesium clock. This is another example of an apparent Fitzgerald contraction.

The Fitzgerald Length “Contraction”

In their measurements of light speed, the scientists detect a .5 contraction in the length of their meter rods when using their local clock. This is also true when they change the length of a gravity clock’s pendulum to adjust its time intervals. This is the so-called Fitzgerald contraction but as we can see here, it is a non-physical length effect that is an artifact of the measurement process using slowed or speeded up clocks.
At absolute rest, atoms have only rotational Energy/Mass = C\(^2\) (angular momentum) and zero momentum. When they are accelerated, they acquire linear Energy/Mass = c\(^2\) (momentum). At .867 c, their E/M = C\(^2\) is equal to their E/M = c\(^2\).

The only thing that really changes in a Lorentz transformation is an increase or decrease in the clocks’ linear Energy/Mass = c\(^2\) (momentum) while their rotational Energy/Mass = C\(^2\) (angular momentum) remains constant. The faster the observers go, the more divergence they measure between the speed of light and their clocks. Observers can then use these measured changes in light speed or rod length to calculate their true velocity relative to the zero momentum photon rest frame of the cosmos.

The three parameters of mass, space and time involved in the Lorentz transformation are just the components of changing linear momentum. Linear Energy/Mass = c\(^2\) is the only changing reality and space and time are merely metaphysical ideas used to quantify linear momentum as the absolute motion of Energy/Mass. Of the three Lorentz transformation calculations of mass, space and time, mass is the only parameter that actually changes. Changes in the mass of any clock’s moving parts changes the lengths of its recorded intervals and changes in clock intervals will change length measurements when the two-way speed of light is used as a constant for space and time in the measured values.

The following thought experiment demonstrates why length contraction is not a physical effect and how the idea arises from the experimenter’s choice of constants and physical parameters in the measurement process.

In the experiment, a 300,000 km ruler with a mirror at the end is attached to a space ship. Photons are blue shifted to double their momentum when emitted toward the mirror and then red shifted to half their original momentum when they are reflected back to the ship. The clock timing of the photons’ return is used to determine the length of the ruler. The intrinsic velocity of both the blue and red photons is exactly c relative to the empty space of zero momentum rest.

Before the ship takes off, it is measured that it takes two seconds for the photons to return to the ship. However, when the ship and ruler are moving at 87% c, it only takes one second for the photon to travel to the mirror and back. This is because the observer’s inertial clocks have slowed to one half their Earth rate due to the doubling of its mass. If the observers don’t realize their clocks have slowed and assume the speed of light to be constant, they will incorrectly assume that the ruler has contracted to one half its Earth length.

If the aether people try to use a Michaelson Interferometer to measure their absolute motion they will get a zero fringe shift. The small fringe shifts measured by interferometers back on Earth result from the Sagnac effect detecting Earth’s daily rotation.
In drawing #1, green un-shifted photons travel in opposite directions on a circular path around the interferometer. They meet at the point where they started.

In drawing #2, the circular path is rotating to the right. The photons emitted in the direction of the motion are blue shifted and take momentum from the apparatus and the photons emitted against the motion are red shifted and add to its momentum. Both sets of photons move at exactly c in opposite directions. Because their paths are rotating, they do not meet until the blue photons have made more than one revolution and the red photons have made less than a revolution. The exact rotation of the interferometer can be measured as red and blue fringe shifts. They both move at exactly c and travel the same distance in the same time but the blue photons are perceived to move faster than the red photons relative to the Sagnac apparatus.

The Sagnac effect is somewhat unique among scientific experiments because it has been claimed at one time or another to both verify and falsify Special Relativity, General Relativity, and aether theories. These theories offer different and somewhat contradictory explanations of this effect. However, none of these metaphysical assumptions are necessary because the Sagnac effect is based on a simple principle of measurement that requires no theory to explain. The constant speed of light is a measurement and not a theory.

All photons are measured to move at exactly c through the same zero momentum rest frame of empty space. Their velocity relative to an observer is always plus or minus c and is precisely measured as red and blue Doppler shifts in photon momentum.

In linear measurements, Doppler shifts cannot be physically separated from a photon’s actual dimensions but with the circular motion of the Sagnac interferometer, the complementary absolute red and blue shifts are equal and can be precisely measured as fringe shifts to quantify rotary motion and conserve angular momentum.
The Lorentz Transformations of Mass, Space, Time, and Gravity

\[ m' = \frac{M}{\sqrt{1-v^2/c^2}} \]

*A Lorentz Transformation Thought Experiment*

**GPS Clock Calculations**

**Pound-Rebka Experiment**

**Triplet Paradox Experiment**

A moving body’s kinetic mass \( m' \) is equal to its zero momentum rest mass \( M \) divided by the square root of one minus its velocity squared \( v^2 \) divided by the speed of light squared \( c^2 \).

The Lorentz transformation of mass equation is a principle of measurement that must be classed as one of the laws of physics like force and acceleration \((F = ma)\) and the energy and mass \((e/m = c^2)\) of momentum \((p = mc)\). It comes into play whenever a body of mass undergoes measurable acceleration or deceleration. This equation calculates the changes in a body’s mass that occur with measured changes in its momentum. When a body is accelerated, its mass increases and when it is decelerated, its mass decreases to a minimum at rest.

This Lorentz equation combines the principles of force \( F = ma \), momentum \( p = mv \), and energy \( e = mc^2 \) to combine zero momentum rest with the speed of light. In the photon version of this equation \( e/m = c \) energy and mass are always equal. (One unit of energy divided by an equal unit of mass is equal to the linear speed of light \( c \) times the rotational speed if light \( C \).) As the momentum of a body is increased, its energy/mass are increased by equal amounts. As the body approaches the speed of light, the value of its energy/mass increases requiring more and more energy/mass to accelerate it faster. At the speed of light, a body’s energy/mass would become infinite and its clock would stop.

At 86.7% \( c \) the energy/mass of a rocket’s linear momentum would be equal to the total angular momentum \( I_\omega = mCr \) of the rocket’s atoms. At this point the rocket’s linear energy/mass \( e/m = c^2 \) would be equal in measured value to the rotational energy/mass \( e/m = C^2 \) of all its atoms. This doubling in mass of the craft and the components of its clocks causes the length of recorded clock intervals to double as their rate slows to one-half. Clocks must slow when their linear momentum is increased while their angular momentum remains constant.

The Lorentz transformation of time \( (t' = \frac{T}{\sqrt{1-v^2/c^2}}) \) calculates the length of a clock’s time intervals as it slows down or speeds up in direct proportion to increases or decreases of the energy/mass of the clock’s momentum vector relative to the Zero Momentum Frame of rest. When a 1 kg clock is accelerated,
its mass increases to 1+ kg and its time intervals grow longer. When a clock is decelerated, its mass decreases back to \( m = 1 \) kg at rest and its time intervals grow shorter to a maximum rate and minimum interval of \( t' = 1.0 \) where the clock is at absolute rest and has no linear momentum to dilate its intervals.

This change in the duration of clock intervals has nothing to do with the imaginary concept of “time itself”. Motion induced changes in clock rates are simply the mechanical effects if increasing mass in the clock’s internal mechanism. As a clock’s linear energy/mass (momentum \( p = mv \)) increases with increasing velocity, the rotational energy/mass (angular momentum \( Iw = mvr \)) of its rotating and vibrating components remains constant. It is the conservation of angular momentum that causes the components clocks and atoms to slow their motion and increase the intervals of time that they record. This process is reversed when clock is decelerated and the lengths of its recorded intervals are decreased.

The Lorentz transformation is a principle of measurement and not a theory. It is simply the equation for calculating the measured values of mass, space, time, and gravity. To obtain correct values, the equation must be used whenever acceleration and deceleration are measured. At low velocities, changes in mass are insignificant but real. They are easily measured with GPS clocks and in the photon Doppler shifts of the Pound-Rebka experiment.

While Einstein incorporated the Lorentz transformation into both of his relativity theories as a principle of measurement, it is not a component of the metaphysical assumptions made in either the special or general theories of relativity. He borrowed the Lorentz equation for calculations of his own metaphysical assumptions about the force and motion of atoms, photons, and gravity. All physical theories must use the equation to get accurate measurements.

The Lorentz transformation of mass, space, and time does not produce a physical change in the length of rulers but rather a change in the parameters of the measurement process. If moving observers use lasers to measure the length of an extended body, their slowed clocks would cause them to measure either a contraction in the body’s length or an increase in the speed of light.

**Einstein’s 1st Postulate Falsified**

Contrary to Einstein’s 1st postulate, the slowing of clocks due to increased momentum provides an experimental method for astronauts inside their ship to measure the vector of their velocity but not its forward or backward direction. If they were moving at \( 1/2 \) c, they would measure the forward or backward speed of light to be \( 1.15 \) c. Whereas measurements at right angles to their momentum vector would measure the speed of light unchanged. For right angle measurements, the light clock effect would slow the measured speed of the photons back to c. The speed of light does not change but the astronaut’s slowed clocks makes it appear to speed up.
Complementary Measurements of Relative Motion

Both \( m' = M/\sqrt{1-v^2/c^2} \) and \( t' = T/\sqrt{1-v^2/c^2} \) determine the inertial frame for each body of mass such as an atomic clock. There are an infinite number of inertial frames with different values for their momentum vectors \( p = mv \), but the cosmos contains only a single Zero Momentum Rest frame where \( p = 0, \, v = 0, \, m' = 1, \, M = 1, \, t' = 1 \) and \( T = 1 \).

All clocks with the same ZMR velocity (\( v \)) have the same mass increase and increased clock intervals regardless of the direction of their motion. It is the absolute velocity of a clock’s momentum vector that determines its mass value and time intervals and not the relative velocity between any two bodies. Two clocks can be moving side by side at \( v = x \) and have no relative velocity between them or they can be moving in opposite directions with a relative velocity of \( v = 2x \). In both cases the values for their mass and time intervals will be the same.

Even though the relative motion between bodies in two moving frames has no effect on their mass and time, it is the only component of each body’s absolute momentum vector that can be measured. The experimental process is unable to separate a single measured acceleration vector into the separate components of its absolute acceleration and deceleration vectors that produce changes in a clock’s mass and time intervals.

Lorentz Transformation Thought Experiment

The following experiment allows observers to separate absolute motion from relative motion. It demonstrates that Lorentz transformations always establish absolute motion and never relative motion.

Imagine two pairs of spacecraft containing Cesuim-133 clocks and technicians. Each pair of craft is separated by some distance and moving toward one another at a measured relative velocity of 1 km/s. One craft is at zero momentum rest with a velocity of \( v = 0 \) while the other is moving toward it at \( v = 1 \) km/s. The second pair of craft are moving nearly side by side at \( v = 150,000 \) km/s (1/2 c) and \( v = 150,001 \) km/s respectively. From their relative motion, we must conclude that each pair of clocks is moving along separate momentum vectors that are nearly identical. In each case, the technicians measure them to be moving toward one another with an average relative velocity of \( v = 1 \) km/s.

In the course of the experiment, the two crafts move close together, pass, and then move farther apart. The purpose of the experiment is to acquire information about the true absolute motion of each clock. The technicians use Doppler shifted photons to monitor their changing relative motion as they pass. This relative velocity measured with Doppler shifts is only valid for individual points in time. Photons are blue-shifted as the clocks approach and then are red shifted as they recede from one another. At the time interval when the two...
ships pass, there are no Doppler shifts between them (except for minor transverse shifts) indicating they have no relative motion. However, when all of the Doppler measurements are calculated together, it is determined that the two ships’s average relative velocity is \( v = 1 \text{ km/s} \).

At the point where the spaceships pass, it is easy for the technicians to compare the difference in their clocks’ intervals and determine their true absolute velocities. If one clock is actually at rest with a mass value and time interval of 1.0 and the other has an absolute velocity of \( v = 1 \text{ km/s} \), then the mass and time interval of the moving clock would be \( m’ = 1.0000000000056 \) kg and \( t’ = 1.0000000000056 \). However, with one clock moving at 150,000 km/s and the other moving at 150,001 km/s, then the first clock would record time intervals of 1.15470054 and the second clock’s intervals would be 1.15470310. The difference in clock rates between a \( v = 1 \text{ km/s} \) relative velocity at rest and a \( v = 1 \text{ km/s} \) relative velocity at \( 1/2 \text{ c} \) is enormous. The clock interval increase for 1 km/s at rest is more than 5 orders of magnitude smaller than the difference in intervals for \( v = 1 \text{ km/s} \) of relative motion between clocks moving at \( v = 1/2 \text{ c} \).

**Lorentz Transformation Mass and Time Values for 1/2 c**

- Mass of Clock at 1 km/s: \( m’ = \frac{M}{\sqrt{1-v^2/c^2}} = 1.0000000000056 \text{ kg} \)
- Clock interval for 1 km/s: \( t’ = \frac{T}{\sqrt{1-(1 \text{ km/s})^2/c^2}} = 1.0000000000056 \)
- Mass of Clock at 150,000 km/s: \( m’ = \frac{M}{\sqrt{1-v^2/c^2}} = 1.15470054 \text{ kg} \)
- Mass of Clock at 150,001 km/s: \( m’ = \frac{M}{\sqrt{1-v^2/c^2}} = 1.15470310 \text{ kg} \)
- Clock interval for 150,001 km/s: \( t’ = \frac{T}{\sqrt{1-(150,001 \text{ km/s})^2/c^2}} = 1.15470310 \)
- Clock interval for 150,000 km/s: \( t’ = \frac{T}{\sqrt{1-(150,000 \text{ km/s})^2/c^2}} = 1.15470054 \)
- Difference in clock intervals of 150,001 km/s & 150,000 km/s: 0.000000256
- Difference in mass increase for \( v = 1 \text{ km/s} \) when \( v = 1 \text{ km/s} \) at rest: 457,142

A 1 km/s velocity increase at 1/2 c produces 457,142 times more kinetic mass than a 1 km/s velocity increase from rest.

**The Zero Momentum Rest Frame of Atoms and Photons**

The idea of a zero momentum rest frame \( m' = M/\sqrt{1-0^2/c^2} \) is a metaphysical principle for the mass and clock intervals of \( m' \), \( M \), \( t' \), & \( T \), all = 1.0. This imaginary zero velocity metaphysical frame is just a featureless void of empty three-dimensional space that can never be measured because it has no physical parameters. There are an infinite possible number of other moving frames that can be measured with clocks and accelerometers. Each frame has a different value for its momentum vector \( (p = mv) \) and a different time interval \( (t'/T) \) for its clock. These frames all share relative motion with the single zero momentum frame. In all moving frames, mass and time intervals have equal values of \( (m' = 1+) \) & \( (t' = 1+) \). Increasing the velocity of a clock increases its mass and mo-
mentum and the conservation of angular momentum in turn increases the length of its time intervals.

Two actual experiments that use the Lorentz transformation principle to calculate the mass and time differences between two Lorentz transformation frames are the GPS clock measurements and the Pound-Rebka measurements of gamma photon momentum.

**Global Positioning System Clock Calculations**

In the GPS measurements, clock intervals between two different moving frames are calculated and measured. The first frame is the combined velocity vector of the rotational (orbital) velocity ($v_o = 448$ m/s at equator) at Earth’s surface and the measured perpendicular upward gravitational escape/surface velocity of Earth’s surface $v_s = \sqrt{2gR_E} = 11,189$ m/s. The Lorentz transformation velocity $v = \sqrt{v_s^2 + v_o^2}$ at Earth’s equator is 11,198 m/s. The second frame is the combined vector of the GPS satellite’s orbital velocity $v_o = 3868$ m/s and the vertical upward gravitational escape velocity $v_s = \sqrt{2gR_E} = 5471$ m/s at its orbit. The Lorentz transformation velocity $v = \sqrt{v_s^2 + v_o^2}$ of each of the 24 GPS satellites is 6700 m/s and all of their clocks run at the same rate. The constantly changing relative velocities between them has no effect on their constant clock rate.

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**Orbiting Atomic Clock Rate Equations**

Orbital time dilation results not from a combination of gravitational potential and orbital motion. Rather, it is caused by the combined velocity vector ($v_oV$) of two velocities at right angles to one another. The Lorentz mass transformation at the combined vector of orbital velocity ($v_oV$) and escape velocity ($v_sV$) causes the time dilation of orbiting clocks.

The time dilation velocity ($v$) of an orbit is equal to the square root of the sum of the escape velocity squared ($v_s^2$) and the orbital velocity squared ($v_o^2$).

The orbital time dilation ($t_dV$) of an orbit is equal to its rest time interval ($T_0$) divided by the square root of one minus the escape velocity squared ($v_s^2$) plus the orbital velocity squared ($v_o^2$) divided by the speed of light squared ($c^2$).

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**Earth Clock and GPS Clock Experimental Values**

Mass of 1kg clock at relative motion- $m' = \frac{M}{\sqrt{1-v^2/c^2}} = 1.000000000113$ kg

Relative velocity interval---------------- $t' = \frac{T}{\sqrt{1-v^2/c^2}} = 1.000000000113$

Mass of Earth clock at 11.2 km/s-------$m' = \frac{M}{\sqrt{1-v^2/c^2}} = 1.000000000697$ kg

Mass of 1 kg GPS clock at 6.7 km/s----$m' = \frac{M}{\sqrt{1-v^2/c^2}} = 1.000000000249$ kg

Earth Clock’s velocity interval ---- $t' = \frac{T}{\sqrt{1-(11.2)^2/c^2}} = 1.000000000697$

GPS Clock’s velocity interval ------- $t' = \frac{T}{\sqrt{1-(6.7)^2/c^2}} = 1.000000000249$

Interval slowing needed to synchronize GPS clocks ------- .000000000448
These calculations are not made with the equations of General Relativity theory’s metaphysical assumptions of undetectable gravitational potentials and relative and equivalent gravitational force and motion. These potentials are derived from measured inertial gravitational accelerations and escape/surface velocities and they cannot be measured independently. It matters not whether you use calculated gravitational potentials or measured escape/surface velocities in your calculations. The results will come out the same either way because the calculated potentials are derived from measured velocities and accelerations. The metaphysical assumption of imaginary gravitational field potentials is not needed to calculate the correct GPS clock rates.

**Pound-Rebka Calculations**

In the Pound-Rebka measurements, the gravitational momentum and clock time intervals at the top of the 22.5 m high Jefferson tower are compared with the greater momentum and longer time intervals at the bottom of the tower. The gravitational escape/surface velocity at the top tower is \( V = 0.01974 \text{ m/s} \) less than the escape/surface velocity at the bottom. The Lorentz transformation between top and bottom escape/surface velocities is used to measure the decreased time intervals of the top clock and the increased wavelengths of absorbed photons. Einstein called the difference in clock intervals and photon wavelengths between the top and bottom gravitational red shifts.

**Pound-Rebka Experimental Values**

Gravitational velocity at the top of tower -------------- 11,189 m/s
Gravitational velocity at the bottom of tower -------------- 11,189.01974 m/s
Difference in velocity during photon travel time---------- 0.00000736 m/s
Mass of clock for relative velocity = 1.00000000000000000000000003
Relative velocity interval--------- \( t' = 1.00000000000000000000000003 \)
Mass of top clock ------------------ \( m' = \frac{M}{\sqrt{1-v^2/c^2}} = 1.0000000006959459 \text{ kg} \)
Mass of bottom clock -------------- \( m' = \frac{M}{\sqrt{1-v^2/c^2}} = 1.0000000006959484 \text{ kg} \)
Bottom clock interval interval- \( t' = \frac{T}{\sqrt{1-v^2/c^2}} = 1.0000000006959484 \)
Top clock interval \( t' = \frac{T}{\sqrt{1-v^2/c^2}} = 1.0000000006959459 \)
Difference in time intervals between the top and bottom--0.0000000000000025
Pound-Rebka measured momentum, wavelength & interval shifts--- 2.5 x 10^{-15}

If we use a zero velocity frame to calculate the momentum and time shifts in the gamma photons and clocks used in the experiment, we get a result that is 17 orders of magnitude smaller than the measured effect. In order to duplicate the measured values of 2.5 x 10^{-15} for photon momentum and time dilation, we must calculate the time dilation of the two escape/surface velocity frames at the tower’s top and bottom. The relative velocity of 7.36 x 10^{-7} m/s can be used to
calculate the Doppler shifts but the actual cause of the shifts is the difference on gravitational momentum and clock intervals between top and bottom.

Again, these calculations are not based on either Special Relativity or General Relativity. These results are derived completely from the measured parameters of gravitational force and motion. They have nothing to do with metaphysical assumptions about the relative motion between the undetectable potentials of gravitational fields. *(there is a more detailed explanation of the Pound-Rebka experiment elsewhere in this book.)*

**The Triplet Paradox Experiment**

*There is a third type of Lorentz transformation experimental measurement that makes a comparison between not two but four or more Lorentz velocity frames.*

One example of this is the so called Twin Paradox experiment where one twin stays home in an assumed zero velocity Lorentz frame and the other goes on a long, high velocity, journey into space and back. When the astronaut twin returns home, he is younger than his brother due to the difference between the unchanging clock intervals of Earth’s Lorentz rest frame and the increased length in clock intervals of the outbound or inbound Lorentz velocities. If both legs of the journey are at the same measured velocity, then the dilated clock time intervals will be the same for the back and forth portions of the trip.

The glaring problem with calculating the results of a twin paradox experiment is that the actual zero momentum Lorentz frame cannot be easily located and Earth’s true Lorentz velocity frame cannot be located beyond comparing Earth’s location with the motion of bodies in the universe in general and the Doppler shifts of 2.7˚K Cosmic Blackbody Radiation photons in particular.

The thought experiment illustrated is performed by identical triplets. Adam, Bob & Chad. Adam stays on Earth for two years and watches his clock. Bob uses his accelerometer to measure an acceleration to 375 km/s in the direction of the constellation Leo, maintains that velocity for one year and then records the time on his clock, turns around and accelerates to 750 km/s back towards Earth. This gives him a relative velocity with Earth of \( V = 375 \text{ km/s} \).

Chad accelerates to 375 km/s in the direction of Aquarius and then after one year he records the elapsed time on his clock, turns around and accelerates to 750 km/s back towards Earth. This also gives him a relative velocity with Earth of \( V = 375 \text{ km/s} \). Both triplets spend two years traveling at a velocity of \( V = 375 \text{ km/s} \) relative to Earth.

If we use relativity’s time dilation formula \( t' = t/\sqrt{1-v^2/c^2} \) to calculate the clock rates for 375 km/s, we find the intervals of Bob’s and Chad’s clocks are \( t' = 1.000000781 \) versus Adam’s zero velocity intervals of \( t' = 1.0 \). These measured values are only valid for the special situation where Earth is at rest in the zero momentum rest frame. Common sense tells us that Earth cannot possibly
be in the zero momentum frame. If nothing else, we can see Earth moving relative to the sun. Earth’s true Lorentz velocity must remain unknown until the triplet paradox experiment has been completed. By measuring the difference in intervals between each leg of an astronaut’s journey, it is possible to measure the magnitude of Earth’s velocity along the vector of the twin’s journey. Only if the two intervals are the same can we determine that Earth is at rest along that vector.

Now, if we use the formula to calculate Earth’s values within a 375 km/s Lorentz frame with its vector between Leo and Aquarius, we get different intervals for all three clocks. Adam’s Earth clock with an assumed interval of $T = 1.0$ is now calculated to have a Lorentz interval of $t' = 1.000000781$.

On Bob’s trip toward Leo, he is actually traveling at 750 km/sec relative to the zero momentum rest frame. This increases the momentum of his atomic clock and increases its interval to $t' = 1.000003125$. This is four times slower than Adam’s slowed Earth clock. After one year, Bob turns around, marks his clock, and accelerates to 750 km/s toward Earth to obtain a relative velocity of 375 km/s. In actuality, this is all deceleration that brings Bob to the position of zero momentum rest. On Bob’s “trip” back to Earth, he is actually sitting still while it is Earth that is traveling at 375 km/s to meet him. With no momentum to slow his clock, Bob’s clock is running faster than Adam’s clock with a time interval of $t' = T / \sqrt{1 - 0^2/c^2} = 1.0$. Bob can determine he is actually at $v = 0$ Lorentz rest by observing no dipole anisotropy in the temperature and momentum of the 2.7°K CBR photons.

When Chad accelerates to 375 km/s in the opposite direction towards Aquarius, he is actually decelerating to a stop. This decreases his clock’s momentum to zero and causes it to run at its maximum rate of $t' = T / \sqrt{1 - 0^2/c^2} = 1.0$. He also will not be able to measure any dipole anisotropy in the momenta of 2.7°K CBR photons. He sits at rest for one year while Earth moves away from him at $v = 375$ km/s. He then marks the time on his clock and accelerates to a momentum vector of $v = 750$ km/s towards Earth, giving him a relative velocity of $V = 375$ km/s. His clock will now have an interval of $t' = 1.000003125$ for his true Lorentz velocity of $v = 750$ km/s.

In these calculations, Bob and Chad spent half their journeys sitting at rest with clock intervals of $t' = 1.0$ and the other half moving at $v = 750$ km/s with clock intervals of $t' = 1.000003125$. The average momentum frame time dilation interval of the traveling triplets is $t' = 1.000001562$. Relative to Adam’s unmeasured Earth clock’s rate of $t' = 1.000000781$, the traveling triplets will measure their average time dilations for both their trips to be $t' = 1.000000781$. By recording the elapsed time on their clocks when they turn around, Bob and Chad will be able to determine the correct clock time intervals for each leg of their journeys. This will allow the triplets to determine that the true motion of Earth is 375 km/s towards Leo without using the CBR dipole anisotropy as a reference.
While it is true that special relativity’s twin paradox calculations for a zero velocity frame and the calculations for an arbitrarily moving Earth rest frame yield identical results for the total time dilation of Bob’s and Chad’s round trip journeys, they give greatly different results for the time intervals of individual legs of the triplet’s journeys. When the triplets record the time intervals for each leg of their journeys, they find that they are not equal even though they were careful to maintain a precise relative velocity of \( V = 375 \text{ km/s} \) with

**Triplet’s Journey in 2.7°K Cosmic Blackbody Radiation Time**

**Triplet Paradox Experimental Values**

- Clock interval of Zero Momentum Frame - \( t' = T / \sqrt{1 - 0^2/c^2} = 1.0 \)
- Lorentz mass of relative velocity -------- \( m' = \frac{M}{\sqrt{1 - 375^2/c^2}} = 1.000000781 \text{ kg} \)
- Clock interval of relative velocity -------- \( t' = T / \sqrt{1 - 375^2/c^2} = 1.000000781 \)
- Lorentz mass of fastest legs -------------- \( m' = \frac{M}{\sqrt{1 - 750^2/c^2}} = 1.000003124 \text{ kg} \)
- Clock interval of fastest legs -------------- \( t' = T / \sqrt{1 - 750^2/c^2} = 1.000003124 \)
- Clock interval of stationary “legs” -------- \( t' = T / \sqrt{1 - 0^2/c^2} = 1.0 \)
- Average clock interval of to and fro legs ----------------------- \( = 1.000000156 \)
- Increased mass of Earth at 375 km/s -------------------------- \( = 1.000000781 \)
- Clock interval of Earth’s 375 km/s Lorentz velocity frame -- \( = 1.000000781 \)
- Measured interval between Earth clock & Triplet’s clock ---- \( = 1.000000781 \)
- Measured mass and time interval of Earth clock------- \( m \) & \( t' = 1.0 \)
Earth. This relative velocity can be measured and verified with both inertial navigation accelerometers and photon Doppler shifts between Earth and the spacecraft. The triplets can then use the measured differences in these two clock intervals to calculate the true value for Earth’s velocity and momentum vector.

These results clearly show that the Zero Momentum Rest frame is the only possible preferred frame and all of special relativity’s arbitrary “rest” frames can be measured to be moving frames with unique momentum vectors. While special relativity’s relative motion theory is able to calculate the correct average time interval for the triplet’s two-way trips, it fails completely to give correct time intervals for individual one-way legs of the trips without incorporating Earth’s true momentum vector $p = mv$ relative to the absolute frame.

The Zero Momentum Preferred Rest Frame

The absolute negative existence of the Zero Momentum Rest frame calculates and measures the position and magnitude of Earth’s momentum and establishes the true values for its mass, space, time, and gravitational force and motion.

The measured time interval of 1.000000781 second, hour, year etc. tells us that Earth is moving at 375 km/s along the same x vector of the triplet’s trips. The difference in time intervals between each leg of the triplet’s trips determines the direction and magnitude of Earth’s Lorentz velocity. There are three vectors of motion and this measurement only identifies. Earth’s true momentum vector xyz velocity is $v = 375$ km/s along the x axis and zero velocity along the y and z vectors. This value is obtained from the measurement cosmic blackbody photons.

In a triplet paradox experiment where Adam, Bob and Chad travel along the x, y, and z vectors, it would be possible to compare Earth’s momentum vector with the momentum vectors of photons relative to the same Zero Momentum Frame where a one kilogram clock is $m' = M/\sqrt{1-0^2/c^2} = 1$ kg.

The ZMF is the measured preferred absolute rest frame of the Living Cosmos. Special Relativity calculations are only correct when the idea of relative motion is abandoned the equations are based on the ZMF. In any other relativity frame, Lorentz calculations will yield incorrect values for experimental measurements of the time intervals in individual legs in Twin Paradox experiments.

Not even the most dedicated relativity enthusiast can deny that the location of the Living Cosmos’s Zero Momentum Frame represents the preferred rest frame for all accelerometer readings, Lorentz transformations, and photon Doppler shifts. All photons move at exactly c within this frame and it is the only frame in which it is possible to make correct calculations for one-directional time dilations. It is also the only frame in which there are zero Doppler
shifts in emitted and absorbed photons. While the very existence of the Doppler effect demands a common rest frame for photons, Doppler shifts, by their very nature, can only be used to measure relative motion. Doppler shifts are two way measurements of one way motion.

Even true believers in aether frames will usually choose the ZMF as the location for their aether since it appears to be the common frame for the speed of light. They propose that all photons are measured to move at c relative to their idea of a zero velocity Lorentz aether. Most aether people try to put their aether’s rest frame at the common frame of their idea of cosmic blackbody light waves.

Special relativity does not attempt to locate a position of rest for its metaphysical assumption of a 4-dimensional spacetime continuum field. It is a postulate of the theory that the parameter of absolute space can’t be measured because the laws of nature are the measured to be the same in all moving frames. Einstein didn’t say that an absolute frame did not exist. He simply couldn’t figure out a way to physically locate it. Had he lived long enough to see the Pound-Rebka experiment, GPS clock measurements, and the cosmic blackbody radiation, he would have certainly abandoned his idea of intrinsic relative motion.

The Lorentz Transformation of Personal Mass and Energy

What this transformation of mass and energy means is that, when we accelerate an automobile East on the highway, both the car and our body increase in mass in proportion to the kinetic energy from the acceleration. In this case, the change in mass is very small, but by comparison, the mass inherent in our kinetic energy begins to become significant when we consider the absolute velocity of 375 km/s that our bodies have relative to the zero momentum rest frame identified by the 2.7˚K Cosmic Blackbody Radiation dipole anisotropy. This velocity gives a 100 kg person a kinetic energy of 1.8 x 10^{13} Joules and a kinetic mass increase of about 200 milligrams. This absolute velocity relative to zero momentum rest gives us each real linear kinetic energies that are about equal to the first atomic bomb that was exploded in New Mexico (10^{13} Joules) (see *Joules of the Universe*). This energy is completely hidden from us and could only be realized by the negative kinetic energy needed to slow us down to a stop. While this velocity might at first seem to be very fast, it is only about 1/1000\(^{th}\) the speed of light. For our bodies to double in mass, we would have to travel in a spaceship at 87\% the speed of light. At this velocity, our rest mass and kinetic mass would be equal and we would each have personal kinetic energies equal to about one million atomic bombs (10^{19} Joules).
Photon Physics without Metaphysics

The corpuscular view of light cannot explain the celerity of light. This was Newton’s theory of light, renewed by the photon of the relativistic theory. The celerity of the photon is regarded as a law of Nature. Relativists think it is perfectly futile to seek an explanation.

Jean de Climont

Photon Structure and Dynamics

Circlon Synchronicity is an experimental principle of the mass, space, time, and gravity of atoms and photons. It is based on the circlon shaped physical mass structures of electrons, protons and photons. Circlon synchronicity means that all electrons, protons, and photons in the Living Universe have identical parameters and are in perfect synchronicity with one another in time and space. All atoms have an individual relative momentum vector of $p = mv$ and all photons have an absolute momentum vector of $p = mc$ relative to the zero momentum photon rest frame.

Aether Theories

Einstein’s postulate for the constant speed of light has led many theorists to believe that some form of universal medium such as an aether or field must be required for all photons to move at the same speed of light $c$ within the same universal reference frame. This is the way sound waves move in air and water with their speed depending on the temperature and density of the medium.

Just because a photon has wave characteristics, does not mean it has to have a medium to travel through. The physical linear structure of the photon itself is its own moving mass medium. It travels through empty space at $c$ and $C$ on its own inertial momentum and angular momentum $p = mc$ and $I \omega = m\lambda C/2\pi$. Photons are made out of the same coil shaped mass structures as atoms.

Although Einstein claimed not to believe in aether as a carrier of photon waves, he invented a similar aether-like field substance called a spacetime continuum for his massless photons and gravitational waves to travel through. Since then, Einstein’s critics have invented many different unmeasured metaphysical types of aether and fields to transmit massless photon and gravity wave units through space in a process analogous to the way that sound waves are transmitted through air or solid matter. None of these theories is ever physically complete because there is never any experimental verification of the aether itself. We can measure many things about atoms, photons, and gravity but no one has ever been able to measure anything about spacetime, aether, or fields that are not connected to electrons and protons.

Some dissident theorists propose separate aethers for photons and gravity, while others, like Einstein, try to invent a single spacetime aether that does everything. The most commonly proposed aethers are either rigid or elastic solids.
Others propose massless continuous fluids, while still others imagine their aether to be composed of countless, either stationary or rapidly moving unmeasured particles to which each theorist gives his own peculiar pet names. Some theorists even propose their aether to be composed of a stationary lattice of electron/positron dipoles that are packed into space, back to back, wall to wall, and treetop tall. Some claim their aether to have an overall universal density similar to a neutron star. Ordinary matter has the miraculous ability to pass through this dense material lattice without any resistance. Still others claim that these “positron/electron” dipoles are massless because they imagine that while electrons have mass, antimatter positrons must have “anti-mass” and when they combine together into a neutral dipole they are massless. One theorist even claims that the universe is filled with otherwise indefinable and undetectable “black boxes” that are filled with “fibers” that vibrate as photon waves pass through them. The one thing that all of these imaginary aether, field and particle mediums have in common is that none has ever been detected by an experimental measurement.

Electric and magnetic fields have been measured, but always in connection with electrons and protons and never in connection with the empty void of space itself. Electric and magnetic fields are structural stationary photon-like extensions of electrons and protons and have nothing to do with aether.

Surprisingly, few of Einstein’s critics have ever questioned his initial metaphysical assumption that the photon is a massless wave/particle duality that moves as a wave disturbance through the spacetime medium. The photon is considered by convention to be massless even though photons are measured to carry momentum, angular momentum, and energy as they travel through space. The only thing that we can ever measure about a massless photon is its momentum $p = mc$. *How do you quantify momentum without mass?*

In contrast, if photons are allowed to have their measured mass, they can travel and spin from one end of the universe to the other under the power of their own inertia. Photon dynamics can be understood from the simple results of experimental measurements and there is no need to invent elaborate metaphysical theories to understand how photons move through the void of empty space. Photons are just like rifle bullets that contain the two separate energies of their moving ($c$) and spinning ($C$) mass. A rifle bullet’s kinetic energy is $e = mv^2/2 + mVr^2/2$. A photon’s kinetic energy is $e = mc^2/2 + mCr^2/2 = mcC$.

**Photon Doppler Shift Measurements**

All photon measurements show that when atoms moving with different relative velocities emit photons, their motions have no effect on the velocity $c$ that the photons travel through space. The atom’s individual motion produces Doppler shifts in the emitted photon’s momentum and wavelength but has no
effect on its angular momentum or its constant velocity $c$ that all photons move relative to the empty void of zero momentum space.

Since all photons are Doppler shifted by the absolute motion of the atoms that emit or reflect them and Doppler shifted again by the absolute motion of the device that measures them, there is no experimental way to determine the separate absolute motions of either source or observer. However, the sum of these Doppler shifts can always be used to measure the precise relative velocity between them. Also, even though the photon’s relative velocity between source and observer will always be less than or greater than $c$, the average two way velocity between them will always be measured at exactly $c$.

Each photon measurement contains a pair of unknown Doppler shifts that can only be resolved as a single relative motion. While one way measurements of photon velocity $v$ are always Doppler shifted at $c +/ - v$, two way measurements of photon velocity cancel all Doppler effects and always show $v$ at exactly $c = (c + v) + (c - v)$. One way measurements of photons show their relative motion with matter and two-way measurements show their absolute motion with other photons.

**Charge Coil Dynamics and Photon Emission**

What theorists call electric and magnetic fields are actually structural parts of the electron and proton that extend outward from their edges and are not “fields” existing as separate entities within space. Electric and magnetic fields are large etherial particles extending out into space from each electron and proton respectively.

When the expanding negative electric charge coil of an electron (A) comes in contact with a proton’s positive magnetic charge coil (B), they intertwine with one another and pull the two particles together until they reach equilibrium at the Bohr radius (C).

As these two charge coils pull together (C), they align and adjust to form a stationary photon that reaches synchronicity when they become the same size.
and occupy the same space while spinning in opposite directions (D). The sta-
tionary photon’s secondary coils spin in opposite directions while maintaining
their centers on a single two-dimensional plane and the 11.7 times smaller pri-
mary coils spin in opposite directions with their centers on an infinite number
of different two-dimensional planes.

These two equal and opposite charge coils combine to become a stationary
photon (E). It is the stationary photon link at the Bohr radius that holds the
proton (F) and electron (G) together within the hydrogen atom.

When this alignment process reaches synchronicity, the negative electric
coil structure of the electron and the positive magnetic coil structure of the
proton combine to form a stationary electric/magnetic photon. This photon has
a mass = 2, a wavelength = 1/2 and an angular momentum of \( \hbar/\pi = m\lambda c/\pi \).
It has an energy of \( e = mc^2 = 2 \). Half of this is the rotational kinetic energy
\( = mC^2/2 = 1 \) from the primary coils spinning at C on all planes and the other
half is from the rotational kinetic energy \( = mC^2/2 = 1 \) of the secondary coils
spinning in opposite directions at the speed at C with their centers on a single
plane. The tertiary coils move in one dimension, the secondary coils move in
two dimensions and the primary coils move in n dimensions.

The circumference of the Bohr link stationary photon is \( 2\pi a_0 \) and when it
splits into a pair photon they each have a wavelength of \( 4\pi a_0/\alpha \). This is \( 2/\alpha \)
times longer than the Bohr link’s circumference.

When a stationary photon bifurcates, the oppositely spinning magnetic and
electric secondary coils break in two and separate their two spins at C into two opposite directions at c. As the two new photons unravel from the Bohr link’s secondary coils, they stretch out to twice the secondary coils original length. The emitted photons are the stretched out lengths of oppositely spinning primary coils.

**Internal Coil Structure of the Hydrogen Atom**

It is quite difficult make realistic drawings depicting the mechanics of the hydrogen atom because of the vast size differences between the different links in its radiation chain. Of the 7 links shown here, the photon link is the largest link in the chain and is over $\sqrt{\alpha^2} = 32,000,000$ times larger than the electron’s smallest classical electron radius link.
Each consecutive link is $\sqrt{\alpha} = 11.7$ times larger than the previous link.

The above drawings show two different ways of depicting the Hydrogen atom’s circlon shaped structural links. From the outside, the whole chain appears as just its largest link because the progressively smaller links are hidden inside of the atom’s seven coils.

**Photon Energy & Momentum**

$$E = mc^2/2 + mC^2/2 = mcC$$

and

$$p = mc$$

**Photon Angular Momentum**

$$M = \frac{mcC}{2\pi}$$

The photon’s angular momentum is contained in the wave-like motion of the two oppositely spinning bodies of positive magnetic matter and negative electric matter. The opposite spins at C of this positive and negative hollow string contain the photon’s absolute rotational energy and the kinetic energy contained in the photon’s linear momentum is relative to an observer’s absolute motion.

**Photon Dynamics**

When synchronicity is reached within the stationary photon structure (E), it splits into two photons that have equal wavelengths, equal and opposite momenta and equal and opposite angular momenta on opposing planes. Each photon has $m = 1$, $\lambda = 1$, $I\omega = h/2\pi = m\lambda c/2\pi$ and $e = 1$. This energy is one half the kinetic energy $e = mc^2/2$ of the photon’s momentum at c and the other half is from the angular momentum of its primary coils spinning at C on all planes and in opposite directions. $e = mc^2/2 + mC^2/2 = mcC$. When an atom emits a photon, there is no transformation between mass and energy. What happens is the transformation of two opposite rotational motions of mass at C into two opposite linear motions of mass at c. A quantity of angular momentum becomes two equal quantities of linear momentum.

The random relative motions (heat) of the electron and proton prior to the coupling of their charge coils produce the atom’s initial quantity of angular momentum $I\omega = mvr$ (A,B and C arrows). The number of $I\omega = h/2\pi$ units determines the number of photons that the atom can emit until its angular momentum becomes less than $2h/2\pi = h/\pi$ and it does not have enough $I\omega$ to emit a pair of photons. The atom reaches its ground state when it can no longer emit any photons until it receives one or more units of angular momentum from another photon or from random mechanical motion (heat).
The Cosmic Evolution of Matter

James Carter

The Mechanics of Photon Motion $c^+ \& c^-$

All photons are emitted as identical pairs from the common position of photon zero momentum rest. The stationary photon has zero net energy because the opposite angular momenta of its coils cancel and there is no relative energy between them. Individually, the coils have energy but together their energies cancel.

Within the stationary photon, the magnetic coils of the proton and the electric coils of the electron are spinning at $C$ and in opposite directions while adjusting and aligning with one another. When they reach reverse synchronicity, both coils bifurcate and combine into two identical photons that move apart on a single vector at 2 $c$.

When the coils divide, the secondary magnetic coils from the proton combine with the opposite secondary electric coils from the electron. They stretch out into the electric/magnetic primary coil wavelength. Photons are $2/\alpha = 274$ times larger than the stationary photon that emitted them. This is because when the secondary coils of a circlon shape are stretched out into a primary coil wavelength $\lambda$, they are $2/\alpha$ times longer than the circumference of the stationary photon’s tertiary coil. Opposite halves of the electric/magnetic coils combine to form a pair of identical photons moving in opposite directions.
When photons are emitted from a moving atom they share momentum with it but not velocity. During the time $t$ the stationary photon is being transformed into a pair of photons, their wavelengths and momenta are being Doppler shifted by the atom’s momentum.

Even though these photons are identical at the point of the photon break, they become red and blue shifted during the time of emission by sharing momentum with the atom. In the time $\lambda/c$ between photon break and emission, momentum is added to one photon and removed from the other by the atom’s absolute motion. Photons share momentum with the moving atom but not its velocity relative to zero momentum rest. Photons get all of their velocity c from the opposite spins of the electric/magnetic secondary coils of the stationary photon. Photons get no velocity from the emitting atom’s linear motion. All of a photon’s velocity comes from the primary coil spin velocities of the stationary photon $C$. The velocity $c$ of photons is always constant because they get all of their velocity from the coils of matter spinning at $C$ and none from the inertial motions $v$ of matter. The absorption of a photon by an atom is virtually the same process in reverse.

**The 2.7° CBR Dipole Anisotropy**

This drawing shows the unseen Doppler shifts caused by Earth’s absolute motion toward Leo relative to the Zero Momentum Rest Frame of the Cosmic Blackbody Radiation as measured by the CBR dipole anisotropy. A moving light bulb emits red and blue Doppler shifted photons on opposite sides of the bulb along the vector of motion.
For an example of how the change in a body’s kinetic energy must also change its mass, consider a thought experiment in which a flywheel has evenly spaced mirrors attached to its outer surface like the fins of a paddle-wheel. The wheel is made of an exceedingly strong imaginary material and is spun so fast that the mirrors are moving at a velocity of 1/3 c.

Two lasers, A and B, shoot photons at the mirrors on opposite sides of the wheel so that the mirrors are moving at 1/3 c toward the photons from laser A and at 1/3 c away from laser B photons. These photons are all emitted from the lasers with a wavelength, and momentum of exactly one, and all move at exactly c relative the same inertial CBR rest frame common to all photons. These photons reflect from the mirrors at the same velocity c that they had before striking the mirror. The velocity of the mirrors has no effect on the photons’ velocity but does change their momentum and wavelength.

The $\lambda = 1$ photons from laser A are blue-shifted to a wavelength of $\lambda = 0.707$ as they reflect from the approaching mirror, and their energy and mass are increased to 1.414. In this process, the velocity of the spinning wheel is slowed as mass and energy are transferred to the reflecting photons.

The photons from laser B are red-shifted as they reflect from the receding mirror to a wavelength of $\lambda = 1.414$ and a momentum of 0.707. In this case, the velocity of the wheel increases as energy/mass is transferred from the photons to the wheel. In both of these examples, momentum is conserved and both mass and energy remain separate and constant. Mass and energy are two sides of the same coin and always remain constant, conserved and equal.

If we attempt to explain this experiment in terms of massless photons then the conservation of mass and energy is lost. The photons from laser A take energy away from the wheel and decrease its mass. Laser B photons transfer energy to the wheel and increase its mass. In both cases, energy remains constant but mass either vanishes into or appears from nowhere. How can mass and energy be equivalent if energy remains constant but mass does not? If the energy of moving mass produces extra mass how can the energy of moving photons not have mass?
This is a scale model of photons being Doppler shifted in ten different situations by one third of the speed of light. Photons emitted with the motion of the plane have half the wavelengths and twice the energy of the photons emitted against its motion. The above drawings all reproduce experimental measurements of photon force and do not involve any "theories" of photons proposing aethers, fields, dimensions and any other unmeasured parameters or metaphysical media.
Binary Pulsar Observations

The photons from this pulsar have traveled for two hundred thousand years before being observed and measured on earth, yet to the limit of measurement they remain in perfect order of the time they were emitted. They form a line of photons with wavelengths that smoothly change back and forth from between ($\lambda = 1.001$) and ($\lambda = .999$) as the pulsar revolves around its companion.

When the observer uses the 1000 pulses per second of the pulsar as a measure of time to measure the velocity of the photons relative to his moving observation point on Earth, he finds that the measured velocity of light is not always c in his rest frame. In spring, when the earth’s orbital motion is transverse to the pulsar’s position, the green photons from pulsar positions (A) and (B) are measured at 1000 pulses/sec. In summer, when he is traveling at .0001c away from the pulsar, he receives the green photons at 999.9 pulses/sec and thus measures the velocity of the photons to be .9999c in his rest frame. In winter, when he is traveling at .0001c toward the pulsar he receives 1.001 pulses/sec and thus measures the velocity of the photons to be 1.001c.

Binary Pulsars

The observation of binary pulsars offers very convincing experimental evidence that all photons move at exactly c within the common reference frame of Zero Momentum photon rest. A binary pulsar emits rapid bursts of X-ray photons at very regular intervals as it revolves around a companion star. When photons from a pulsar are carefully measured, it is found that they are blue shifted when the revolving pulsar is moving toward the earth and red shifted when the pulsar is moving away. Even though the pulsar may be two hundred thousand light years from earth, the photons remain perfectly lined up in their order of emission. They are observed as repeating sequences of first red shifted photons and then blue shifted photons. If the changing motion of the revolving pulsar had any effect on the photons’ velocity of c, then the photons could never have remained in their sequence of emission for two hundred thousand years. If any of these photons moved even slightly faster or slower than c, they would be observed as a jumbled up mixture of red and blue shifted photons.
The True Meaning of $E = MC^2$

The energies of the electron and proton are divided into two opposite rotational energies. The rotational kinetic energy of the primary coils and the opposite rotational kinetic energy of the secondary coils. The energy of the photon is divided into four separate kinetic energies.

1. The linear energy of its magnetic coil mass.
2. The linear energy of the electric coil mass.
3. The rotational energy of the magnetic coil mass.
4. The rotational energies of the electric a mass body.

The two linear coil energies are Doppler shifted by the relative motion of the observer but the two opposite rotational energies of the electric and magnetic coils are absolute and are measured to be the same in all moving frames.

The two separate but equal rotational energies of the primary and secondary coils of the electron and proton are absolute and measured to be the same by all moving observers. When electrons and protons are accelerated, their linear energy/mass is measured to increase but their rotational energy/mass remains constant.
Experimental Measurement of Photon Mass

Doppler shifts in photon momentum and energy could be detected with lasers aligned to the 375 km/s velocity vector of the CBR. Such an experiment could easily be performed in a small underground laboratory. Four lasers would be aligned with, against, and at right angles to the CBR dipole anisotropy. Sensitive detectors would measure changes in the photon’s momentum and energy as Earth’s rotation moved the lasers into and out of alignment with the vector of CBR motion.

This experimental measurement could easily be performed in a small laboratory. All that would be required is four lasers and sensors capable of accurately measuring photon wavelength and energy.

The Definitive Measurement of the Absolute Motion of Both Inertial Mass and Photon Mass

This motion can be detected independently of the CBR by measuring the difference in Doppler shifts between a photon’s energy and its wavelength and momentum. This measurement can also be used to show the photon has a mass structure and that it is not just “pure energy”.

This experiment measures a photon’s Doppler shifted momentum, energy, and wavelength. It will show a different value between Einstein’s idea of the “pure energy” massless photon and the physical parameters of mass, space, and time in the measurements of photon momentum, wavelength, and energy. These experiments identify photon mass but are unable to separate its value from the unknown Doppler shift in a photon’s absolute momentum. Einstein’s massless photon would have the same proportional photon Doppler shifts for momentum and energy. A photon with mass would have no Doppler shifts in momentum or wavelength a 50% less Doppler shift in its energy.
The Circlon Model of Nuclear Structure

The Circlon Shape

All particles of matter, are combinations or configurations of four basic stable particles. These are protons, electrons, photons, and neutrinos. All of these particles can be created when other particles of matter collide with one another at velocities near the speed of light. Each new particle is always created with an exact opposite antiparticle. These are the antiproton, positron, photon, and antineutrino. All eight of these particles are constructions of two basic kinds of hollow string that have mass, dimension, and shape. Particles with positive charge like protons and positrons are composed of positive magnetic string and particles with a negative charge like electrons and antiprotons are composed of negative electric string. Each photon is composed of an equal piece of both electric and magnetic string. Neutrinos are composed of a piece of magnetic string and antineutrinos are made of electric string.
To form the physical structure of each particle, this cosmic string is wound into several series of different sized coils that form a structure called a circlon shape. The circlon has the basic shape of a torus that is composed of several series of smaller structures with the circlon shape. The circlon has a tertiary coil that is composed of smaller circular-shaped secondary coils that are composed of smaller circular shaped primary coils. At this point we may assume that these coils are composed of a hollow string, which is the fundamental component of reality.

The circlon shape is fundamental to particles of matter in the universe. It exists in essentially two varieties; the proton (positive string) and the electron (negative string). These are identical except for oppositeness in internal spins (charge) and a difference in scale. The electron is 1,836 times larger than the proton and the proton is 1,836 times more massive than the electron.

The Electromagnetic Charge Chain
Protons and electrons are totally mechanical particles of matter that must touch to interact. It was long considered that each particle was attached to its own electromagnetic field that could be extended far out into the space around them. Instead of fields, the circlon shaped protons and electrons have potential sizes that are unlimited in scope. Once formed, protons and electrons immediately extend their size by creating a single chain of progressively larger links with the proton or electron at one end and the direction of infinity at the other. These chains never get close to infinite length because they soon interact with the single chain of another proton or electron. As soon as a proton and electron connect, their chains switch from expansion to contraction and they are pulled together. As the links in the chain get progressively smaller, the last links at the end of each chain combine to emit a pair of photons as the next smaller links in the chain connect. As the atom gets smaller and smaller it emits photons of shorter and shorter wavelengths. Each time an atom emits a photon it gives up a unit of angular momentum ($I\omega = \hbar/2\pi = m\lambda c/2\pi$). An atom stops emitting photons when the angular momentum between the proton and electron is less than the one unit needed to produce a photon. At this ground state, the charge chains are at equilibrium and the proton and electron maintain a constant distance. If angular momentum is added to a ground state atom the largest links in its chain will combine to produce photons. The charge chain of the proton has been called the “magnetic field” and the electron’s charge chain is referred to as the “electric field”.

The proton link is the first link in the proton’s chain and contains most of its mass and maintains a position at the far edge of the circlon shaped particle. The meson link is the second link of the proton’s chain and within an atom, its size and mass are $(1/\sqrt{\alpha})$ 11.7 times larger and 11.7 times less massive. The mass of a proton is 938 meV and the mass of a free pi-meson is 139.57 meV (938/139.57= 6.721)
A meson link forms spontaneously from within the circlon structure of a bare proton. As soon as the meson link is formed, a third muon link is formed from within the structure of the meson link. An unlimited number of ever larger links will continue to form until the charge chain comes in contact with the charge chain of another particle.

The Meson Link

When protons are bombarded with high energy particles, the meson link can be broken free to become a pi-meson. The pi-meson is more massive than a meson link because it acquired mass from the large amount of energy that it took to break it loose from the proton link. The pi-meson is a well known particle with a relativility long lifetime. It decays when this bare meson link spontaneously forms a second link that transforms it into a muon. A meson is simply a physical part of the proton. Its structure grew from within one of the bare proton’s secondary coils. It grows into the next fractal layer of the positive mass string that makes up the circlon shaped mass structure of a proton.

The Neutron

A neutron is basically a Hydrogen atom that is turned inside out. When the bond between a proton and electron are subjected to enough energy, their mutual charge chains collapse to the point where the bare electron becomes trapped inside of the bare proton link. Where the circlon shape of the proton was spinning like a wheel the neutron is now spinning end over end more like a ball. In this condition, neither particle can extend a charge chain out to other particles. The neutron’s extra mass comes from the energy that it took to force the electron inside of the proton’s structure. This extra mass makes the neutron smaller than a proton. Without a meson link, the neutron is just the right size to fit inside of the secondary coils of another proton’s meson link. This forms a deuterium nucleus. A free neutron will decay within about nineteen minutes. When this happens, a proton and electron are not “created”. They are simply released from the bond that they shared within the neutron. The extra mass of the neutron is released as the decay energy of the particles.

The meson link is a hollow torus shaped physical structure. It holds the neutron simply because it is rolling around inside of the meson’s secondary coils and can’t get out. The proton is actually a part of the meson link’s secondary coil structure. A proton and meson can be broken apart but they are not separate entities. Cut off a piece of rope and both pieces are still the same rope.

Neutrons are actually formed inside of a meson link during the process of electron capture. When a nuclear isotope has fewer neutrons than it needs to be stable it will use some of its structural energy to collapse one of its electrons into a proton and form a neutron. I do not believe that a neutron can form
in any way except through electron capture within a nucleus. A neutron can also be forced inside of a meson during neutron capture and in the process of nuclear fusion.

The neutrons are like rolling balls within an atom’s meson. They remain unchanged within the meson until they undergo beta decay. When this happens, the electron is ejected and the proton remains within the nucleus and generates a new magnetic charge chain that eventually couples to the electric charge chain of an external electron. This process is called beta decay.

The alpha particle (He-4 nucleus) is the most stable and has the highest binding energy of any nuclear particle. Its formation takes preference over the formation of any other nuclei. An extreme example of this is the almost instant decay of Beryllium-8. When the structure of a nuclei is disrupted through a decay or a collision, an alpha particle can form spontaneously and become ejected. An alpha particle exists at the center of every nucleus but a nucleus can contain only one alpha particle. Whenever an alpha particle is formed spontaneously from other weak bonds within a nucleus it is immediately ejected.

Fusion is the process by which an alpha particle is formed or a proton is added to a nucleus. Fission is when the bonds between a proton and a neutron come apart. Beta decay results from the splitting of a neutron back into a proton and electron. In the process of beta decay, there is sometimes enough extra energy for the formation of a positron/electron pair. When this happens, the positron soon couples to an electron to form a Positronium atom. Positronium atoms are very well studied low energy combinations of an electron and positron that exist for a short period of time before they annihilate into a number of photons. Positronium exists in the two spin states. Para-positronium has anti-parallel spins and has a lifetime of \((1.25 \times 10^{-10}\text{ sec})\). It decays through the emission of an even number of photons. Ortho-positronium has parallel spins and has a lifetime of \((1.42 \times 10^{-7}\text{ sec})\). It decays through an odd number of photons.

It is through radiation chains that protons and electrons interact with one another and are able to produce photons by combining the last links in both chains. However, for the purpose of understanding the Circlon Model of Nuclear Structure, it is only necessary to consider the first two links in the proton’s radiation chain. These are the proton link and the meson link, which together form the promestone. The proton link is identical in size to the meson’s secondary coils. These three particles are assembled to form the approximately 2,000 nuclear isotopes of all the elements. These isotopes are constructed according to the Rules Circlon Nuclear Structure.
The Rules of Circlon Nuclear Structure

The following Nuclear Structure Rules describe how Promestones are added, one at a time, to form the nuclear structures of successive elements from Hydrogen (#1) through Circlonium (#118).

To form a stable nucleus, one or more neutrons must be added with each Promestone. As the nucleus grows, one element at a time, its structure must obey the Hydrogen and Alpha Center Rules, and, as structural complexity increases, one or more of the ten other rules.

Hydrogen Rule

Each meson has four Nucleon Receptors equally spaced along its circumference. One of the meson’s four Nucleon Receptors must always be occupied by a proton. The other three Nucleon Receptors are spaced at 90 degree intervals from the proton. In the hydrogen nucleus, the Nucleon Receptors at 90 degrees from the proton must remain vacant.

Nucleon Receptors are not physical structures in that they “look” no different from the rest of the meson’s circumference; they merely represent the four places where nucleons (protons and neutrons) and other mesons can attach to a meson within a nucleus.
The Alpha Center Rule

The center of each nucleus heavier than Hydrogen is formed by an Alpha Center. The structure of the Alpha Center, which is essentially an alpha particle, consists of two mesons crossed at right angles to one another, with a proton and neutron at each intersection.

The two remaining Nucleon Receptors of each meson are vacant so that the He-4 nucleus has four vacant Nucleon Receptors. These four Receptors all contain neutrons in He-8, which is the heaviest unstable isotope of Helium.

Meson Rules

Four simple rules govern the configuration of protons and neutrons within the mesons that form the completed inner structure of all nuclei large enough for the rules to apply.

**Rule of Four**  The two mesons that form the Alpha Center of a nucleus will each contain four neutrons and four protons when their structure is complete. These two mesons will have one neutron and one proton at each joint where they connect. (This rule applies to all elements from Carbon on.)

**Rule of Three**  All mesons outside of the Alpha Center will contain three neutrons when their structure is complete. (This rule applies to all elements from Sodium on.)

**Rule of Two**  Whenever two mesons are joined together at one point they will contain two nucleons (one neutron and one proton) at this joint when their structure is complete. (This rule applies to all elements from Lithium on.)

**Rule of One**  Whenever two mesons outside of the alpha center are crossed so that they are joined in two places, they will have one proton at one joint and one neutron at the other joint when their structure is complete. (This rule applies to all elements from Nitrogen on.)
Lithium

Lithium forms when a Promestone attaches to one of the Alpha Center’s vacant nucleon receptors. This structure is called a Lithium Leg, and all elements except palladium and the noble gases have at least one. This process is repeated in successive elements, until the Alpha Center’s three other vacant receptors are filled with Lithium Legs, forming Carbon.

Nitrogen

Nitrogen forms when a Promestone is attached in a cross formation with one of carbon’s four Lithium Legs to form a Nitrogen Cross. Lithium Legs and Nitrogen Crosses hold the electrons of an atom’s outermost electron shell.

In a Nitrogen Cross, the proton occupies one pair of crossed nucleon receptors, and the neutron occupies the other pair. The Nitrogen Cross is similar in structure to the Alpha Center, except that its structure is complete when it has one proton at one of the junctions of its crossed mesons, and one neutron at the other junction. This process is repeated with successive elements, until the three remaining Lithium Legs are converted to Nitrogen Crosses to form Neon.

At this point, a second Lithium Process begins with Sodium and ends at Argon to form another outer layer of nuclear structure. This step-by-step building of outer layers of nuclear structure is called the Lithium Process. There are five Lithium Processes, ending with Neon, Argon, Krypton, Xenon, and Radon respectively.

A sixth Lithium Process begins with francium and radium, but is interrupted by the third Scandium Process, and cannot be expected to resume formation until Copernicium #112 and then complete that process at element #118 (Circlonium).
The Dual Event Transformation

When a fourth Scandium Ear is added to a Vanadium nucleus, it causes a Promestone from one of its Lithium Legs to immediately move from the third Lithium Layer down into the first Scandium Layer, where it combines with a Scandium Ear to form a Chromium Cross. This is a Dual Event Transformation, and it occurs in the formation of twelve other elements, namely Copper, Niobium, Ruthenium, Palladium, Cerium, Terbium, Gold, Protactinium, Uranium, Neptunium, Plutonium, and Berkelium.

The need for a Dual Event Transformation is indicated in the electron configuration for these elements (see the vertical row of numbers at the lower left of each isotope). These numbers indicate the number of electrons in each of the atom’s electron shells. Since each Promestone holds an electron, it shows up in the electron configuration when a Promestone moves from an upper position in the nucleus to a lower one, as the electron held by that Promestone is likewise pulled down into an inner shell.

Dual Event Transformation Rules

Chromium Rule Twenty-five percent of any layer of Chromium Crosses must form in one step and be the result of a Dual Event Transformation. Thus, one Chromium Cross is formed in Chromium and two Chromium Crosses are formed in Cerium and Protactinium.

Niobium Rule When a layer of first four, then three, and finally six Scandium Ears are formed, it immediately initiates a Dual Event Transformation, in which a Promestone moves down into the internal structure of the nucleus from a Lithium Leg.
This forms a Chromium Cross in the case of chromium, a fourth Scandium Ear in the case of Niobium, and a seventh Scandium Ear in the case of Ruthenium. This rule is not obeyed by elements heavier than Ruthenium.

This is a copy of the Copper block from the *Periodic Table of the Circlon Model of Nuclear Structure*

**Copper Balls**

Like Chromium, Copper is formed in a Dual Event Transformation, when a Promestone is added to one of Nickel’s Chromium Crosses to form a Copper Ball. This creates a dynamical imbalance that causes a Promestone to move down from the Lithium Layer to the Scandium Layer, and form a second Copper Ball opposite the first. In a Copper Ball, the third meson is attached to where the two mesons of the Chromium Cross cross and attach to each other. One of these two junctions contains three mesons and a proton, while the other contains three mesons and a neutron. These two Copper Balls both begin and complete the first layer of two Copper Balls. At this point the third Lithium Process resumes with the addition of a Lithium Leg to form Zinc. Copper’s two remaining Chromium Crosses do not become Copper Balls until the formation of Palladium.

**Copper Rule**

Whenever the last ball in a layer of two, four, or eight Copper Balls is formed, it does so as the result of a Dual Event Transformation, initiated by the formation of either the first, the third, or the seventh ball in the layer. This rule applies to Copper, Palladium, Gold, and Roentgenium.
**Palladium Rule**
The last two balls in a layer of four or eight Copper Balls cannot form until the layer of Scandium Ears of the next Scandium Process has completed its formation. This rule applies to Palladium, Gold, and Roentgenium.

**Terbium Rule**
Whenever the first ball in a layer of eight Copper Balls is formed, it does so as a result of a Dual Event Transformation, as in the case of Terbium and Berkelium.
Lanthanum Rule
A Lanthanum Spear will always occur in the element prior to the beginning, and completion, of a layer of eight Chromium Crosses. This rule applies to Lanthanum, Gadolinium, Actinium, and Curium.

A Lanthanum Spear, which is essentially a false start at the third Scandium Process, is always a temporary nuclear structure that eventually moves down into the internal nuclear structure in a Dual Event Transformation. Lanthanum is formed when a Promestone is attached to one of barium’s Nitrogen Legs to form a Lanthanum Spear.

Thorium Rule
In order for the first five Chromium Crosses in the Actinide Group to form, the “pressure” of one Lanthanum Spear must be maintained in the external structure of the nucleus.

When a Promestone is added to a Thorium nucleus, it forms a third Lanthanum Spear. As soon as this resulting pre-Protactinium nucleus is formed, the two other Lanthanum Spears move down into the third Scandium Layer to form two Chromium Crosses opposite each other. The resulting protactinium nucleus is transformed into Uranium by the addition of another Promestone, which first momentarily forms a second Lanthanum Spear and then either it or the Lanthanum Spear opposite falls down into the third Scandium Layer to form a third Chromium Cross.

When a Promestone is added to a neptunium nucleus to form a fifth Chromium Cross, the Lanthanum Spear then moves down to form the sixth Chromium Cross of Plutonium.

This rule applies to Thorium, Protactinium, Uranium, Neptunium, and Plutonium.
NUCLEAR GLOSSARY

Archetope Symmetry Principle
All elements have at least 3 known isotopes and some have as many as twenty-nine. The 112 named elements contain nearly two thousand known isotopes. Of these about 280 are stable or have very long lifetimes. Each element has a particular isotope that is most representative of that element. This archetypal isotope is called the element’s Archetope. The primary consideration in determining an element’s Archetope is symmetry. An Archetope’s balance neutrons must maintain an internal symmetry that matches the Archetopes surrounding it on the periodic table. Most Archetopes obey all three Archetope Rules. In almost all cases, an element’s Archetope is its most abundant isotope.

Chromium Cross
The nuclear structure that is formed by the crossing and linking together of two adjacent Scandium Ears.

Copper Ball
The nuclear structure that is formed when a Promestone is attached to a Chromium Cross, at a 45 degree angle to that Cross’s two component Promestones.

Dual Event Transformation
Dual Event Transformations occur as interruptions in the natural flow of the Scandium Process. When a Dual Event Transformation occurs, the Lithium Process moves one step backwards, enabling the Scandium Process to move two steps forward. They occur at the beginnings and endings of layers and sub-layers in the internal nuclear structure. One explanation of why this occurs, is that the weight of the external nuclear structure is too great for the resistance of the internal nuclear structure, and a Promestone from the external structure “falls” into the internal structure.

Lanthanum Spear
The nuclear structure formed when a Promestone is attached to the side of one of the legs of a nucleus. A Lanthanum Spear is just like a Scandium Ear, except that it attaches farther out on the nuclear leg while it “waits” to migrate down into the internal nuclear structure, to join with a Scandium Ear, to form a Chromium Cross. Lanthanum, Gadolinium, Actinium, Protactinium, Uranium, Neptunium, and Curium each have one Lanthanum Spear, and Thorium is the only element with two.

Lithium Leg
The nuclear structure formed by the attachment of a Promestone to one of helium’s vacant nucleon receptors. This process transforms an alpha particle to a lithium nucleus. All elements except the noble gases and Palladium have at least one Lithium Leg in their outer nuclear structure.

Lithium Process
The sequence by which an outer layer of nuclear structure is formed. This is a two-step process, in which first a layer of four Lithium Legs is formed, and then each is transformed into a Nitrogen Cross with the addition of a Promestone.

Meson
The meson is the fourth link in a proton’s radiation chain. In the nucleus of the atom, the neutrons fit within the secondary coils of the mesons, and lock the nucleus together.

Nitrogen Cross
The nuclear structure that is formed by the attachment of a Promestone at right angles to
the Promestone that forms a Lithium Leg. From Nitrogen on, all elements contain at least one Nitrogen Cross in their outer structure, except Silicon, Germanium, Tin, and Lead.

**Nucleon Receptors**
The four places on the meson where it can attach to protons, neutrons, and other mesons. A proton is always located at one of a meson’s Nucleon Receptors and the others are located at 90 degree intervals from the proton.

**Promestone**
The first two links in the proton’s radiation chain. The Promestone is the nucleus of the Hydrogen-1 atom, and as such, along with the neutron, is the basic building block of all the elements. A Promestone with a neutron trapped within the secondary coils of its Meson link is a Deuteron, or Hydrogen-2 nucleus. A Promestone with two neutrons is a Triton, or Hydrogen-3 nucleus.

**Scandium Ear**
The nuclear structure that is formed when a Promestone is attached to the side of one of the legs of a nucleus and becomes part of its internal nuclear structure.

**Scandium Process**
The sequence by which an internal layer of nuclear structure is formed. This is a three-step process, in which first a layer of Scandium Ears is formed, which is then converted into a layer of Chromium Crosses, which is then converted into a layer of Copper Balls.

**Nuclear Stability Number**
The idea of the Nuclear Stability Number is a new concept for the classification of the structure of atomic nuclei. It is a very simple system that matches nuclear structures with a superior degree of accuracy. This system fits the whole range of elements very well. Elements that fall outside of these rules have what are called Stability Anomalies, and provide a means of testing the idea of circlon nuclear structure. These anomalies must be explained in terms of the unique nuclear structure of the elements exhibiting them.

The Stability Number for each element is the increase in mass that its Archetope has over the Archetope of the previous element. This difference in mass is measured in whole units of proton or neutron mass.

For most elements, the Archetope is quite unambiguous, since almost half of the elements have either only one stable isotope or no stable isotopes, and thus only one longest-lived isotope. For most of the other elements with more than one stable isotope, the choice of Archetope is quite straightforward, since the relative natural abundance of the various isotopes of a particular element will usually, quite overwhelmingly, point to a single isotope. These most abundant isotopes almost invariably match the neutron patterns of the Archetopes closely associated with their particular element on the periodic table.
Archetope Rules
1. The Atomic Weight of Archetopes will be even for even numbered elements and odd for the odd numbered elements.

2. The Archetope of an element is that isotope which is most abundant in nature, or in the case of elements which have no stable isotopes, it is the longest lived isotope.

Number Rules
1. The Stability Number of odd numbered elements to Arsenic is +3, and the Stability Number of odd numbered elements from Arsenic on is +1.

2. The Stability Number of even numbered elements up to Zinc is +1, and the Stability Number of even numbered elements from Zinc on is either +3 or +5.

Stability Anomalies
Any element that violates either the Stability Number Rules or the Archetope Rules has a Stability Anomaly which must be explained in terms of that element’s unique nuclear structure, and also in terms of that element’s place in the sequential process of nuclear structure.
This 39” x 27” full color Circlon Model of Nuclear Structure wall chart contains nuclear models of the most common isotope of each element. My new book “Physics without Metaphysics” also contains these models as well much additional information about the absolute motion of mass, space, time, and gravity and a complete description of Big Bang physics. Both the chart and book can be purchased at www.living-universe.com
The Cosmic Evolution of Matter
Nuclear Stability Model

The Nuclear Stability Model shown on the back cover is a composite, sequential model of all known elements, up to Copernicium-272. Each is labeled with the element symbol and atomic weight of the nucleus formed with the addition of that particular nucleon. Each proton is represented by a pink circle and each neutron by a yellow box. The meson attached to each proton is colored to match its element group on the periodic table below.

Up to the isotope of Bismuth-209, which is the heaviest known stable isotope, all nucleons in this model form stable isotopes when they are added to a nucleus, except for atomic weights 5 and 8, and the Protons that form Technetium and Promethium. The Protons and neutrons added after Bismuth-209 follow a line through the longest lived isotopes of those elements.

The periodic table presented here is different from a “standard” periodic table in that Lutetium and Lawrencium are moved from the last places in the Lanthanides and Actinides up into the main body of the table. This is because these two elements are each formed with the addition of a Scandium Ear and not with a Chromium Cross or Copper Ball as are the other Lanthanides and Actinide elements.

The periodic table is divided into 13 groups, each with its own color. Each vertical row of the Lithium Process elements is given a separate color, while the elements of each of the four Scandium Processes have different colors.

Silver and Cadmium are shown to be the last two elements of the first Scandium Process even though the last two Copper Balls of this process were formed with palladium. This is to maintain symmetry in both the structure of the model and the coloring system. The Lithium Legs that form Silver and Cadmium first became part of the nuclear structure with the formation of Rubidium and Strontium and then moved down into the internal nuclear structure during the formation of Ruthenium and Palladium. Rather than label these two Lithium Legs twice, it makes more sense to label the last two protons of palladium’s Copper Balls as Silver and Cadmium. These elements are thus considered to be the last two members of the first Scandium Process rather than members of the fourth Lithium Process even though they are each formed by the addition of a Lithium Leg. The above explanation is also applicable to Gold and Mercury, and to elements #111 and #112.
How the Pound-Rebka Experiment Invalidates the Equivalence Principle

When Einstein first calculated the transverse gravitational red and blue shifts of Earth’s gravitational potential field, the effect was so small that many thought it would be impossible to measure.

It was not until 1959, four years after Einstein’s death, that Robert Pound and Glen Rebka made very accurate measurements of both direct Doppler and transverse shifts in the momentum of emitted and absorbed photons. At the time, theorists realized they had discovered and measured Einstein’s long predicted gravitational red and blue shifts caused by Lorentz transformations in the intervals of clocks. Einstein believed gravitational transformations were produced by unmeasured equivalent motion whereas the Lorentz transformations in special relativity are a measure of absolute inertial motion of mass. Einstein was a fool to believe in equivalent motion because transformations in mass and time are caused by measured and not imagined gravitational inertial motion.

Pound-Rebka measures transverse and direct Doppler shifts in the relative momentum of photons and the absolute momentum of gravity. Transverse photon shifts result from Lorentz transformations in the intervals of emitting and absorbing clocks. Direct Doppler shifts are produced by relative motion such as the movement of actuators.

Careful examination of the experimental results shows the measured shifts to be simple transverse and direct Doppler shifts caused by changes in momentum and not by the effect of Einstein’s imagined gravitational potential field or his equally implausible electromagnetic field. Photons are shifted by absolute motion but only measured by relative motion. Photon shifts can be calculated in Einstein’s imaginary spacetime continuum but only measured in inertial space. Einstein’s calculations are correct but they are based on the metaphysical assumptions of two otherwise unmeasurable quantities. Although Einstein’s followers were able to correctly calculate the measured values of the Pound-Rebka shifts, they only did so by ignoring the Newtonian laws of measured force and motion.

While Einstein accepted the quantum mechanical and electrodynamic measurements of atoms and photon motion to be true, he declared the mechanical measurements of gravitational force and momentum to be not equal to but only just equivalent to the inertial force and momentum of atoms and photons. Einstein’s equivalent anti-principle of force and motion says that gravitational force and momentum can never be measured because it is not real. They are not equal to but only just equivalent to the force and momentum of atoms and photons that can always be measured. The Pound-Rebka experiment clearly shows that the force and motion of gravity is equal to the force and motion of photons and not just their equivalent.
Pound-Rebka Physical Values

This drawing depicts the actual values for photon momentum and wavelength measured by the Pound-Rebka experiment.

Observers at the bottom and on the top of the tower observe the photons from green light bulbs located at the tower’s top and bottom. The bottom observer measures the bottom green light photons as green and the top observer sees these green photons as red but sees the photons from the top green light as green even though they are measured as blue by the bottom observer.

These are the indisputable measurements of the experiment and everyone believes them to be true. Where the disputes arise is in the many ideas that theorists have to explain the physical mechanisms underlying these measured shifts in photon momentum.

Several mainstream Harvard type theoretical physicists have strikingly different explanations of these red and blue shifts and numerous crackpot theorists also have several different metaphysical theories of gravity and photon momentum.

The absolute motion explanation of the experiment presented in this book is not a “theory” of gravity or photons. It just presents physical measurements of mass, space, time, and gravity that require no theories.

Metaphysical theories are only needed when theorists like Einstein and other crackpots want to change the interpretation of the measurements in ways that cannot be detected.
The Pound-Rebka Experiment

The Pound-Rebka experiment is a quantum mechanical and electrodynamic measurement of the gravitational expansion of mass, space, and time. It determines precise values for the force and motion of gravity and their interactions with the momentum of photons. The conclusion reached by the experiment is that the measured slowing of atomic clocks by escape/surface velocity $V_e$ show that the force and motion of gravity point up. This model is not a theory of gravity because it is just compares the electrodynamic measurement of photons with inertial measurements of gravitational force and motion. This is a principle of measurement and does suggest or require any theories for aethers, fields, or a spacetime continuum.

There is no equivalence between gravitational motion and inertial motion because Pound/Rebka measures them to be exactly the same and concludes that gravity is an upward push. Everyone’s idea of gravity is pure fantasy. The idea of a universal gravitational pull of mass, space, and time requires an incomprehensible general structure filling the whole universe that has an intimate connection with each atom in the cosmos. A local upward gravitational push does not produce any elaborate universal fantasies because each atom’s gravitational force and motion do not extend beyond its atomic structure.

This experiment combines the mechanical measurement of gravity with the electrodynamic measurement of photons. It provides separate measurements for both direct and transverse photon Doppler effects. The interactions between gravity and photons are the physical measurements of mass, space, and time that define the force and motion of gravity. The red and blue shifts measured in Pound-Rebka are both direct and transverse Doppler effects caused by differences in the gravitational and inertial velocities between emitters and receivers.

The Pound Rebka Photon

The generic electrodynamic photons measured by Pound and Rebka have the following basic parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photon energy/mass</td>
<td>$\frac{e}{m} = cC$</td>
</tr>
<tr>
<td>Photon energy</td>
<td>$e = mcC$</td>
</tr>
<tr>
<td>Photon mass</td>
<td>$m = \frac{\lambda c}{h}$</td>
</tr>
<tr>
<td>Photon wavelength</td>
<td>$\lambda = \frac{h}{mc}$</td>
</tr>
<tr>
<td>Photon momentum</td>
<td>$p = mc$</td>
</tr>
<tr>
<td>Planck’s Generic Photon Energy</td>
<td>$h = m\lambda c = 6.6 \times 10^{-34}$ Joules</td>
</tr>
<tr>
<td>Planck Photon momentum</td>
<td>$p = m\lambda c = 6.6 \times 10^{-34}$</td>
</tr>
<tr>
<td>Planck Photon Mass</td>
<td>$m = \frac{\lambda c}{h} = 6.6 \times 10^{-34}$ kg</td>
</tr>
<tr>
<td>Planck Photon Wavelength</td>
<td>$\lambda = \frac{h}{mc} = 1$ meter</td>
</tr>
<tr>
<td>Angular Momentum of All Photons</td>
<td>$I\omega = \frac{m\lambda C}{2\pi} = 1.055 \times 10^{-34}$ kg m</td>
</tr>
</tbody>
</table>
It is not necessary to have an “aether theory of the photon” to understand these calculations because they are just generic measurements. Every theory of photon structure and motion must use these same calculations or their predicted measurements won’t work.

**Four Photon Doppler Effects**

In the process by which an atom emits and absorbs photons, the photon undergoes four separate Doppler effects depending on the quantity and direction of the absolute motion between the atom and photon.

**First**, the emitted photon has a Direct Doppler Effect from the atom’s momentum vector relative to its position of zero momentum photon rest \( p = 0 \). Direct Doppler shifts are different for each direction.

**Second**, the emitted photon has a Transverse Doppler red shift from the absolute quantity of the atom’s motion relative to the speed of light. Transverse emission shifts are always red and are the same in all directions.

**Third**, a direct shift occurs in an absorbed photon from the observer’s momentum relative to the photon’s vector.

**Fourth**, absorbed photons have a non-directional transverse blue shift resulting from the observer’s absolute momentum relative to zero momentum photon rest. Transverse absorption shifts are always blue.

In most cases, these four separate Doppler effects cannot be separated from within a single measured shift. However, because gravitational velocity is measured to be in the same direction as inertial velocity, Pound-Rebka is one example where transverse and direct Doppler shifts can be experimentally separated.

**The Pound Rebka Gravitational Parameters**

The absolute gravitational force and motion measured by Pound and Rebka that produce Doppler effects in photons is measured with accelerometers.

- Acceleration of Gravity at Earth’s Surface \( g = m/t^2 = \text{about } 9.8 \text{ m/sec}^2 \)
- Upward Escape/Surface Velocity \( V_{es} = \text{about } 11.2 \text{ km/sec} \)

Again, it is not necessary to have a “field theory of gravity” to understand these calculations because they are just generic measurements of physical values. General Relativity uses these same calculated values in its theories but it turns them upside down, backwards and inside out.

**The Mossbauer Effect**

The Mossbauer effect is the atomic phenomenon that Pound and Rebka used to make their very accurate measurements of transverse and direct Doppler effects of photons caused by measured absolute gravitational velocity.
Atoms emit photons that travel an unlimited distance at c to other atoms that either absorb or reflect them. Atoms reflect most photons and can only absorb a limited number spectral wavelengths. This number decreases as the momentum and energy of the photons increase. The greater the photon’s momentum and energy, the less likely it can be absorbed and not reflected by an atom. In the longer wavelengths, like visible and radio photons, a very wide range of photons can be absorbed and emitted. In the shorter wavelengths like X-rays and gamma photons only a very limited number of wavelengths can be emitted and absorbed by a particular atom.

As the momentum and energy of photons increase, atoms can absorb fewer and fewer photons until finally they can only emit and absorb a single photon of a precise wavelength. In the case of the Pound-Rebka measurements, the atom used is Fe-57 and the photon is a gamma ray photon that has a momentum, energy and wavelength of exactly one $\lambda = 1$. An Fe-57 atom at rest on Earth’s surface can only emit or absorb this exact gamma photon. The Fe-57 atom reflects all similar sized photons. When this photon travels from the bottom of the tower to the top, it maintains its exact wavelength of $\lambda = 1$.

When two of the Fe-57 crystals used in the Pound-Rebka experiment are placed apart horizontally on level ground, they are each able to readily absorb the $\lambda = 1$ photons emitted by each other. However, if either crystal is put into even a slight amount linear motion, all absorption of $\lambda = 1$ photons stops. It doesn’t matter which crystal is moving. Even the tiniest amount of relative motion between the crystals produces direct Doppler effects either at emission or absorption that prevent the photons from being absorbed.

When Pound and Rebka placed two Fe-57 crystals apart vertically in the Jefferson Tower, there was no photon absorption at either the top or bottom crystal even though they appeared to be at rest and maintained an exact vertical distance of 22.5 meters.

There are only three possible ways to explain this effect. Either the photons acquired Doppler shifts instantly at emission or absorption or they acquired their shifts gradually as they traveled from emitter to receiver. The only other explanation is that the top and bottom of the tower are moving with the same absolute relative motion measured by accelerometers.

The receiving and emitting clocks at the top of the tower are moving at a lower escape/surface velocity $V_{es}$ than the clocks at the bottom. This difference in absolute gravitational momentum causes clocks at the top of the tower to have less energy/mass = $cc$ and record shorter intervals than the heavier clocks at the bottom. The slower upward gravitational velocity at the top has transverse shifted the receiver to a wavelength of $\lambda = 1.0000000000000025$. The $\lambda = 1$ green photon from the bottom can no longer be absorbed by an Fe-57 atom at the top that can only see it as red.
Linear Actuator Measurements

In order to measure the different gravitational escape/surface velocities between the top and bottom of the tower, Pound and Rebka installed the bottom Fe-57 crystals on linear actuators to produce direct Doppler effects in the emitted and absorbed photons to counteract the transverse Doppler effects of their different gravitational velocities.

A simple measurement with an accelerometer reveals the true value of the motion producing the shift. Both crystals are found to be decelerating upward with the force of gravity but with less gravitational force, the crystal at the top of the tower has decelerated to a slower $V_{es}$ than the bottom crystal.

In order to make the transverse blue shifted Fe-57 atoms at the top of the tower absorb the photons from un-shifted green atoms at the bottom, it is necessary to put the bottom emitter on a very slow linear actuator that can move upward at the precise velocity of $V = 1$. As the actuator speeds up to this velocity, it direct Doppler blue shifts the photons by the same amount as the receiver’s transverse blue-shift. When the actuator blue shifted photons are absorbed by the blue shifted receiver they are measured as green due to the observer’s faster clock. The slower $V_{es}$ and faster clock at the top of the tower cause the top Fe-57 crystal to emit blue photons even though the top observer sees them as green.

To measure the blue photons moving from the top emitter to the bottom receiver, the linear actuator is set to move downward at $V = 1$. The blue transverse shifted photons from the top emitter are measured as green by the direct Doppler red shift of the bottom receiver moving downward at $V = 1$.

In the first case, direct Doppler blue shifted photons are measured as green by a transverse blue shifted receiver and in the second case, transverse blue shifted photons are measured as green by a direct Doppler red shifted receiver. Both of these shifts are produced by the measured velocity of the linear actuator. The direct Doppler effects are caused by the actuator’s relative velocity of $V = 1$ and the transverse Doppler effects are caused by the absolute differences in escape/surface velocity between the top and bottom of the tower.

Transverse shifts are absolute and have the same value in all directions. They are always a red shifts for emitted photons and blue shifts for absorbed photons. Transverse Doppler effects change with each momentum increase or decrease in an atom’s absolute motion. Only atoms at absolute zero momentum rest emit and absorb photons with no intrinsic Doppler shifts. Even these photons can have slight measurable direct shifts from the atom’s recoil.

See the back cover of this book for an illustration of these shift measurements.
Pound-Rebka Theories

The Pound-Rebka experiment is a simple and elegant definitive scientific measurement of the relationship between the momentum produced by the acceleration of gravity and the inertial momentum of photons.

The experiment clearly separates the relative and equivalent motion proposed by both Newton’s and Einstein’s gravitational force field theories from the calculated momentum of photons and the measured velocity of gravity. The only theories that have been credibly used to explain the Pound-Rebka results are the various interpretations of General Relativity. These ideas use the metaphysical equivalence principle to assume that inertial velocity and gravitational velocities are in opposite directions and that the actual directions of gravitational force and motion point down even though everyone has always felt and measured the force of gravity pushing them up.

Transverse Doppler effects are absolute and have the same value in all directions. They are always a red shifts for emitted photons and blue shifts for absorbed photons. Transverse Doppler effects changes with each momentum increase or decrease in an atom’s absolute motion. Direct Doppler effects are different for each photon’s direction. Only atoms at absolute zero momentum rest emit and absorb photons with no intrinsic Doppler shifts. Even these photons can have slight measurable direct shift from the atom’s recoil.

One interpretation of General Relativity assumes that the photons acquire their shifts as they travel through a gravitational continuum field. Some theorists even claim that actual wavelengths change while others say that the photons “fall” in the gravitational field and the shift is caused by changes in their relative velocity. Another interpretation makes the claim that the weaker gravitational field potential at the top of the tower makes its clock run faster than the clock at the bottom. None of these metaphysical assumptions are needed to explain the Pound-Rebka values. The results of the experiment transformed gravity is from a general metaphysical pulling theory to a local physical principle of gravitational push.

General Relativity theorists have proposed different and contradictory theories for the Pound-Rebka shifts that all calculate the same results using different parameters. Even though only one of these alternative descriptions could possibly be correct, some theorists declare them all to be “equivalent” and thus feel justified to use them interchangeably. The actual mechanical motion and force of gravity measured by accelerometers do not require any of the relativity theorists’ metaphysical assumptions to explain the shifts.

How the Measurements Were Made

The experiment uses accelerometers and linear actuators to clearly demonstrate that the gravitational motion and force of matter is in the opposite di-
rection from the force and motion in General Relativity’s imaginary gravitational field theories. Motion and force are measured to be equal and opposite to the equivalent unmeasured force and motion assumed by the equivalence principle. Inertial force produces relative acceleration and deceleration and gravitational force produces absolute acceleration of mass and absolute deceleration of time.

The Basic Measured Values of the Pound-Rebka Experiment

Earth radius at bottom of tower  
\[ R_B = 6,371,000 \text{ m} \]

Earth radius at top of tower  
\[ R_T = 6,371,022.5 \text{ m} \]

Gravity at bottom of tower  
\[ g_B = \frac{V_B^2}{2R_B} = 9.807 \text{ m/s}^2 \]

Gravity at top of tower  
\[ g_T = \frac{V_T^2}{2R_T} = 9.8069308 \text{ m/s}^2 \]

Acceleration of gravity at Bohr radius  
\[ g_{ao} = 8.018 \times 10^{-17} \text{ m/s}^2 \]

Escape/surface velocity at Bohr radius  
\[ v_B = \frac{G V_B}{2R_B} = 9.2116 \times 10^{-14} \text{ m/s} \]

Escape/surface velocity at top of tower  
\[ v_T = \sqrt{2gR_T} = 11,178.5667 \text{ m/s} \]

Difference in velocity \( V \) between top and bottom  
\[ \Delta V = v_B - v_T = 0.0197 \text{ m/s} \]

Transverse Doppler shift of velocity \( \lambda = \sqrt{1 - \frac{v^2}{c^2}} \)  
\[ \lambda = 2.5 \times 10^{-15} \]

Photon transit time between emitter and receiver  
\[ 22.5 \text{ m/c} = 0.000000736 \text{ s} \]

Direct Doppler shift of transit velocity  
\[ \frac{gd}{c^2} = 2.5 \times 10^{-15} \lambda \]

Difference in transverse shift between top and bottom  
\[ \lambda_T - \lambda_B = 0.000000000000736 \lambda \]

Clock time interval at top of tower  
\[ T_T = 1 \text{ s} \]

Clock time interval at bottom of tower  
\[ T_B = 1.000000000000025 \text{ s} \]

Deceleration of gravity during photon travel time  
\[ V = 0.000000736 \text{ m/s} \]

The mechanical details of Pound-Rebka are quite simple. Fe-57 crystals were used as high-energy gamma photon emitters and receivers. They were placed at the top and bottom of Harvard’s Jefferson Tower to emit and absorb photons of a single and very precise momentum and wavelength. As these photons moved back and forth between the top and bottom of the tower, they were carefully measured. It was found that photons received at the top were measured as red shifted and those received at the bottom were measured as blue shifted. These red and blue shifts were extremely small but precisely measured with the Mossbauer effect to be equal.

Ever since the Pound-Rebka experiment was first performed in 1959, no one has ever disputed the extreme accuracy of the results. However, a number of gravitational theorists have tried to use their own various preferred pet theories of gravity to explain the measurements in terms of gravitational fields, potential energies and other unmeasured metaphysical entities like aethers, or a spacetime continuum.
As soon as the results of the experiment were in, many theorists claimed that it had proven both Einstein’s equivalence principle and the general theory of relativity. The problem was that there were two opposing camps within general relativity proponents and both calculated the same measured values for the shifts but offered different equations and two completely different metaphysical mechanisms to explain them.

One camp imagined that higher gravitational potentials at the top of the tower caused recorded clock intervals to decrease causing a measured red shift in the photons. The Fe-57 atom’s faster clock caused un-shifted green photons from the bottom to be measured as taking a longer time to be absorbed and thus saw them as red. Gravity does not shift photon momentum and wavelength but changes the conditions under which they are measured. A transverse shifted clock emits red photons and absorbs green photons as blue. Upward gravitational velocity $V_{es}$ at the top of the tower is less than the $V_{es}$ at the bottom. The clock at the top has less transverse mass and runs faster from the conservation of angular momentum. The faster top clock emits blue-shifted photons with greater energy and shorter wavelengths and absorbs green photons as red shifted.

While General Relativity’s calculations for these shifts were verified by the Pound-Rebka experiment to fifteen orders of magnitude, the actual direction of the measured force and motion of gravity was completely ignored when they tried to explain the physical dynamics of the measured parameters. They imagined and believed that gravity and inertia were equivalent but the experiment measured transverse gravitational shifts to be equal to inertial Doppler shifts and no opposite equivalence was found.

Other relativity theorists also ignored gravity measurements and claimed that as photons move through the varying potentials of their imagined gravitational field, they either gained or lost momentum and energy to Earth’s field and thus changed their wavelengths while in flight. Most believed that this effect was accomplished without any change in the photon’s velocity at c.

A few theorists even believe that photons slow down or speed up as they pass through their own peculiar gravitational field. Most believe photons fall in Earth’s gravitational field exactly like any other material bodies. All of these theorists make calculations with their ideas that match Pound-Rebka values. Some theorists believe in the Lorentz transformation of a photon’s momentum and some don’t. Most believe in the time dilation of clocks but some don’t.

Many general relativists even believe that all photons throughout the universe are constantly being red-shifted as they pass through expanding and curving gravitational spacetime potentials. Cosmologists use this assumption of a curving and expanding gravitational medium to explain the red-shifted Hubble photons from distant galaxies as peculiar non-motion induced Doppler effects in which photon momentum and energy are not conserved.
Hard core cosmologists who believe in the eternal 1/1836 e/p ratio, imagine the assumption of curving and expanding space justified their metaphysical belief that the 2.7 K Cosmic Blackbody Radiation can cool even though this idea violates the laws of thermodynamics. They believe that these photons were emitted when their blackbody distribution curve had a temperature of about 3000 K. They believe that CBR photons had a thousand times more momentum and their wavelengths were a thousand times shorter than they are today but that their numbers have not changed significantly. Relativity theorists believe that more than 99% of the photon momentum and energy ever produced by the cosmos has simply disappeared down their imagined cosmic rat hole of an expanding spacetime continuum.

Relativistic cosmologists imagine the enormous amount of momentum and energy lost from this cooling process was not transferred to the rest of the cosmos and was thus not conserved. They imagined that it just disappeared into their imagined expanding spacetime continuum as if it never existed. This idea for a massless expanding dimension of space is in complete violation of the conservation laws for momentum and energy/mass. It is opposite the Doppler effect because these shifts in momentum and energy do not involve any change in the relative velocity between photon and observer. One major problem with relativity theorists is that they go off in theoretical tangents and are then unable to make up their minds. They seem satisfied that since all of their different ideas are equivalent they must somehow all be correct.

Either gravity shifts a photon’s direction and momentum in flight or it does not. Quantum electrodynamics has long established that Doppler shifts only occur at the emission and absorption of photons yet there is a substantial group of relativists who believe photons can be Doppler shifted as they travel through expanding spacetime fields or a gravitational spacetime continuum.

**Einstein Believed in Gravitational Waves**

Einstein imagined the universe to be filled with graviton particles/waves that caused the gravitational interactions of matter. Some theorists believe that gravitons can interact with photons to change their momentum and energy. Others believe that gravitons only effect the momentum of matter and not photons. There is no direct evidence for either of these metaphysical assumptions. All experiments clearly show that all photon shifts originate at either emission or absorption and not in the medium in between, be it aether, glass or empty space.

**The Location of Gravitational Force and Motion**

Either the force and motion of gravity originates inside of atoms as measured or it exists as imagined and calculated varying potentials far outside the physical boundaries of atoms. It cannot be both ways. Either photons are Doppler shifted by moving atoms or they are non-Doppler shifted as they move.
through a stationary continuum field. Again, it cannot be both ways. Relativists have to make up their minds.

The principle of equivalence must be a great philosophical paradox to the logical and common sense minds of children who can’t sense equivalence and are not yet able to comprehend its paradoxical nature. Since infancy, children have constantly felt the force of gravity pushing them upward. No sensual being would conclude anything else be it elephant, or microbe. Certainly the subconscious mind that controls a child’s sense of balance would never be fooled into believing in equivalent force. How do you maintain your balance against an equivalent unmeasured force?

Einstein however, was able to completely ignore his own sense of balance, at least on a conscious level, and fool himself into imagining and then believing that gravity pointed down. By using clever mathematics, he was able to fool other theoretical physicists into believing that the force of an atom’s gravity of pointed down toward Earth’s center from deep in the cosmos. He completely ignored the experimental physicists who were only able to measure gravity as an outward push from within Earth and who could measure no gravitational force beyond its surface.

Imagining an undetectable universal gravitational attraction caused by curving space seems to present no problems for the typical general relativity theorist. It is a standard opinion among relativists. Because the parameters can be calculated in opposite ways, they are believed to be equivalent and relative and just represent different aspects of a single gravitational continuum. What this double speak means is that because gravity can be calculated in the two opposite directions of up gravity and down gravity, the calculations are “equivalent” and thus both are thought to be intrinsically true.

**Up Gravity versus Down Gravity**

Einstein used Galileo’s measurements and calculations for up gravity to fantasize about Newton’s equivalent unmeasured down gravity. Einstein was able to fool his conscious mind into believing that down gravity was true. However, he was never able to convince his subconscious mind that down gravity was real because it kept compensating for and reacting to up gravity in order to maintain Einstein’s balance while he drew equations on the blackboard. Just because the calculations for up gravity and down gravity are equivalent, does not mean they can both be true. Everyone believes in up gravity because they can feel it and see it happening all around them. If they didn’t believe and react to it they would fall flat on their faces. To all but theoretical physicists, the four-dimensional nature of down gravity always remains an elusive idea that cannot quite be contemplated by a three-dimensional mind. Even all theoretical physicists rely completely on up gravity when they get out of bed in the morning.
To believe that *up gravity* is true, you merely need to observe and measure bodies of matter undergoing the very slow mechanical process of the gravitational expansion of mass, space, and time. By contrast, if you want to imagine and then believe in *down gravity* you must open a whole can of wormholes and metaphysical assumptions. With *down gravity*, an atom’s gravity does not extend from just from its center to its surface, as in *up gravity*. In *down gravity* each atom has an eternal unbroken connection with every other atom in the universe. It might be easy for gullible theoretical physicists to believe in and calculate *down gravity* interactions but none have ever come up with a reasonable explanation of how it all really works. They say the ultimate “truth” is buried deep in their four-dimensional mathematics and cannot be visualized with an ordinary three-dimensional mind.

The experimental truth of *up gravity* is far easier to visualize than the virtual truth of *down gravity*’s n-dimensional math. While Einstein’s calculations may perfectly match measurements, his equations contain non-physical parameters like waves in potential fields that only exist in the predictions of his metaphysical ideas. Einstein was a fool to think he could take the *up gravity* measurements of experimental physicists and then turn them upside down and inside out to create a *down gravity* theory that is perfectly equivalent with *up gravity* values. Certainly his counter-intuitive, mathematical theory of *down gravity* works beautifully, but why would he bother. The real mystery here is why he chose to abandon the *up gravity* his body and subconscious mind had intimately experienced his whole life?

**Gravitational Expansion is a Principle and Not a Theory**

The principle of gravitational measurement calculates the values of its parameters and needs no theory to explain it. Gravitational expansion is simply what we feel gravity to be and the measurement of what gravity does. You only need a theory of gravity to explain an opposite downward gravitational force field like Newtonian’s universal gravitation or Einstein’s general relativity. General Relativity adds a fourth dimension to an imagined three-dimensional reality and the gravitational expansion of mass, space, and time adds a third dimensional of space to a measured two-dimensional reality.

The gravitational expansion of mass, space and time is not an assumption but a conclusion. It is just calculations based on physical measurements of \( F = ma*d. \) Force equals mass times a combination of absolute acceleration and deceleration. This is not a theory of gravity, but rather just the substantive values of the physical measurements of mass, space, time and gravity.

Falling bodies do not change their state of motion until they are hit by Earth’s upwardly decelerating surface. Photons do not change the state of their motion or momentum until they are reflected or absorbed by atoms. The gravi-
tational expansion of Earth is measured to be a simple local mechanical process of constant upward force producing upward momentum.

**Gravity is Child’s Play**

While Einstein’s theory of equivalent gravitational force can only be fully understood through his complex and infinite mathematical equations, the gravitational expansion of mass, space and time is a simple, local, and mechanical process that can be explained to and completely understood by the smallest child. Ask a child to repeatedly jump off a chair, watch the floor rushing up, feel it strike them and then continue pushing them upwards. The simple upward force and motion of gravity will quickly become apparent to a child because he or she have both felt it and seen it happening their whole lives. The gravity that children feel is easily measured, calculated, explained and visualized. By contrast, no child or even Einstein himself could completely understand and visualize the workings and mechanics of an opposite senseless and unmeasured universal multi-dimensional spacetime continuum field.

**Equivalent Momentum as a Cause**

*Einstein imagined that physical momentum continually flows out from the equivalent momentum of the gravitational field and into falling bodies to increase their downward velocity.*

When Galileo first made experimental measurements of gravity, he may even have understood the true upward force and motion of gravity. Certainly, his dropping of different weights from the top of the Tower of Pisa would indicate upward gravitational motion of Earth’s surface.

Then just a year after Galileo died, Newton was born and began inventing equations and calculations to turn Galileo’s measurements upside down. Many years later, Einstein imagined his version of the equivalence principle and invented equations to turn Newton’s gravity inside out and backwards with his calculations of a curving gravitational continuum field that altered the scientific method’s measurement principle by reversing the temporal direction for cause and effect. Einstein offered no mechanism of how the physical effect of momentum could just appear from apparently empty space without an initial physical cause other than an undetectable equivalent force caused by curving spacetime.

**The Nature of Photon Momentum**

*The only aspect of the photon measured in the Pound-Rebka experiment is its momentum $p = mc/\sqrt{1-v^2}$ relative to the observer. All theories of the photon use momentum as its primary parameter of measurement, as do all theories of matter consider momentum as the primary parameter in which measurements of the motion of mass are made.*
This explanation of Pound-Rebka is not meant in any way to be a new theory of photons. The photon model used in this description is strictly a generic photon made up from simple photon measurements of momentum, wavelength, velocity, and energy. Regardless of what your theory of the photon might be, you must use these same measured values of momentum to quantify your version of the photon. A photon’s wavelength, energy, and frequency are determined from measurements of its momentum. It makes no difference whether you believe the photon to be a massless wave of “pure energy” or a particle of mass with the kinetic energy of its motions. Whether or not the photon has mass is irrelevant to this experiment. Any body’s rest mass is a calculated quantity that is only implied through the measurement of its momentum. Momentum is a relative quantity and we can never measure a photon’s exact mass or energy because we cannot separate the Doppler effects of its absolute momentum of $mc$ from its relative momentum of $mv$.

The sole measurement made in the Pound-Rebka experiment is the relationship between the relative momentum of photons and the changing absolute gravitational momentum of Earth’s escape/surface velocity $V_{es}$. Photon energies and wavelengths can be calculated from these momentum values but they are secondary photon parameters and not part of this experiment that only measures momentum. The Doppler shifts of photons measured here are the separate values of relative momentum and gravitational momentum.

The photon model used in this experiment is simply a moving point of momentum $p = mc$. All photon theories begin with this measured point of momentum. How or why these points move or what kind of medium they move through has no bearing on how we measure a photon’s momentum. In my illustration of the experiment, I show the photons as masslengths of cosmic string with wave-like motion. While these illustrations may represent some aspects of truth, it is change in momentum and not changes in the energy and wavelengths of photons that is used to explain the Pound-Rebka results.

**Measuring Relative Motion in Space Travel**

If we could travel in a photon powered rocket at one-third the speed of light, the photons emitted and absorbed by atoms in the direction of our motion would have twice the momentum and half the wavelengths of the photons absorbed and emitted against the direction of the rocket’s motion.

However, within your space capsule, these photons would be measured to have the same momentum $p = 1$ and wavelengths $\lambda = 1$ as they had when the capsule was at rest on Earth’s surface. Even though the photons emitted and absorbed within the capsule are highly red and blue shifted with both transverse and direct Doppler shifts, these shifts cancel each other and cannot be detected with measurements inside the capsule. Photons emitted and absorbed within the capsule are measured to have an un-shifted wavelength of $\lambda = 1$. 

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If we could travel much faster to very near the speed of light, we would measure the forward facing 2.7˚K CBR microwave photons to have a very high temperature with the momentum of X-ray photons and gamma photons. By contrast, the backward facing 2.7˚K CBR photons would have the momentum of radio wave photons and a temperature of very near to absolute zero.

All calculations of a photon’s mass, wavelength, energy and frequency are based on the measurement of its momentum. Only at absolute photon rest (located at a velocity of about 375 km/s in the direction of Aquarius) would we be able to measure a photon’s true non-Doppler shifted momentum, wavelength, and frequency. At such a point within zero momentum frame of photon rest, all of the CBR photons from all directions would have the same blackbody distribution curve and the same overall temperature of 2.726˚K.

Transverse Doppler Shifts in Momentum and Time

All randomly moving bodies such a clocks, bullets and photons possess a single absolute momentum mv vector relative to zero momentum photon rest. As a body’s momentum is increased from zero at photon rest, it accumulates kinetic energy \( e = mv^2/2 \) and mass \( m = 2e/v^2 \). As each body’s individual momentum is increased from zero at rest, its energy/mass constantly increases with velocity \( e/m = E/M/\sqrt{1-v^2/c^2} \) in direct proportion to momentum. A body’s energy/mass increases and decreases with each acceleration and deceleration of its absolute momentum vector. At any position within photon rest, an atom’s mass is at its minimum value of one \( m = 1 \), its momentum is zero \( p = mv = 0 \) and its photon clock has the maximum rate of one \( t = \lambda/c = 1 \) and emits a \( \lambda = 1 \) photon. Any accelerated motion away from this position of zero momentum rest requires kinetic energy and increases the atom’s Energy/Mass with added momentum but does not change its angular momentum. As a result, the increased mass slows the atom’s clock interval to \( t = T/\sqrt{1-v^2/c^2} \). The Equivalence Principle is Revealed as a False Reality

Theoretical physicists claim the equivalence principle has been measured to be correct many times and to a precision of many orders of magnitude. However, all of these confirmations have been with null results. An example of such an experiment would be to place a very accurate accelerometer on a falling body within a vacuum. When it is determined that the accelerometer registers zero change in downward motion, the claim is made that the equivalence principle had been proven to the limits of the accelerometer’s accuracy. The Pound-Rebka experiment has long been claimed to be a proof of the

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equivalence principle but here again the verification is in the form of null results. The failure of the experiment to detect a downward force and motion of gravity are seen as experimental proofs of equivalence. The equivalence principle basically says that “gravity cannot be directly measured”. Whenever an experimenter fails in an attempt to measure gravitational momentum, general relativists declare it as a “proof” of Einstein’s equivalence principle.

**Principle of the Gravitational Expansion of Mass, Space, and Time**

*When we measure and calculate the physical mechanics of gravitational motion and force with Newtonian accelerometers and cesium clocks, we logically and philosophically arrive at the gravitational expansion of mass, space and time.*

Gravitational expansion is a physical principle of measurement and not a metaphysical theory of gravity because it makes no assumptions other than the accuracy of accelerometers and $F = ma*d$. Force is equal to mass times an unknown combination of deceleration and acceleration. This is the only equation necessary to explain the physical mechanics of the principle of gravitational expansion. Any “theory” of gravity must present metaphysical assumptions to explain why the physical measurements of upward gravitational force and momentum are false. Einstein’s attempt at falsifying experimental measurement was his theory of equivalence.

Gravitational expansion of mass, space, and time is a principle of measurement. Its how we feel the force of gravity with our bodies and what gravity does and looks like when we measure it with accelerometers and clocks. Skydivers in free-fall feel motionless as they watch Earth rush up to meet them. This is a simple common sense observation that employs all their senses. Skydivers have no sensory input that would lead them to believe they were being accelerated towards Earth. They can easily feel the air pushing them upward as Earth’s surface rushes toward them with increasing velocity.

For skydivers to invent a “theory” of gravity to counter the upward principle of gravity based on their own sensory observations, they must first psychologically overcome their sensual feelings of watching a rising Earth. To defeat these feelings, skydivers must try to imagine they are somehow being unfeelingly pulled toward a stationary Earth by an otherwise undetectable force field. To do this, they can imagine different ideas like gravitons, aethers, dimensions, continuum fields and spacetime. They can use one or a combination of these intangible mathematical ideas to create a mechanism for gravity that will invalidate the workings of gravity they see and feel as they float above Earth on a rising column of air.
Gravity Comes from the Inside of Atoms and Not the Outside

The motion and force of gravity come completely from within the interior of the atom’s mass, space, and time and not from the other atoms in the universe at large. The upward force of gravity extends only to the outer surface of each photon, atom, moon, planet, star, and other solid bodies of matter.

While the rates of clocks are a measure of transverse shifts, it is changes in momentum and not changes in time that is the true physical parameter of the transverse shift. Time is just an imaginary parameter to quantify momentum \( p = ms/t \) and like the idea of space has no separate physical existence. Space and time are just the imaginary handles for the measurement of mass. Photon momentum \( p = mc \) and angular momentum \( m\lambda c/2\pi \) are the two separate configurations of mass, space and time.

Protons and electrons are measured as individual bodies of circlon shaped mass. Each projects a circlon shaped charge chain “field” out into the surrounding space that pulls them together, or pushes them apart. All of their interactions are transfers of momentum. Momentum and energy are not separate things. Momentum is the primary entity and energy is the secondary interaction between force and momentum. Whereas momentum is absolute, eternal, and conserved, energy is relative and momentary. Total energy is conserved but the conservation law for energy is secondary to the conservation of momentum. Moving bodies with identical conserved momentum can have greatly different values of conserved kinetic energy. The cannonball has far more energy than the cannon but their momenta is the same. A single force measured as energy \( e = mv^2 \) is divided into two equal momenta \( mv = mv \) that produce two unequal energies \( e = mv^2/2 + e = mv^2/2 \).

Momentum is the constant motion of mass and energy is the measure of any change in momentum. Energy provides the force to create momentum and change in momentum produces the force necessary to create energy. Energy is the relative, positive or negative measure of a body’s change in momentum. Energy is absorbed when a body is accelerated and energy is produced when a body is decelerated.

The gravitational expansion of mass, space, and time might be called a “dynamic dimension” but it is not in any way a field, an aether, a spacetime continuum or anything else that would give substance to space. There is no theory required for the gravitational expansion because gravity is just a physical measurement and physical principles of measurement are the opposite of theories. There is no question as to what gravity does experimentally. Gravitational theorists try to believe in a field that cannot be measured. Relativity theorists all claim that the equivalent force and momentum of gravity point down yet the physical results of Pound-Rebka and all other accelerometer and atomic clock measurements show conclusively that gravitational force and motion point up, not down.
The Harvard Fantasy of Equivalent and Relative Motion

Harvard physicists often tout Pound-Rebka as an actual measurement of the hidden gravitational potential produced by the curvature of gravitational space Ann time that is calculated and predicted by general relativity’s equivalence principle. However, the use of actuators to produce direct Doppler shifts to cancel the transverse shifts of gravitational motion proves quite conclusively that there can be neither a gravitational potential field nor a curved gravitational spacetime continuum. No gravitational potential is required for the measured direct shifts and if such a “potential” were actually to exist, it would change the measured values.

The only space that curves is not the four-dimensional external spacetime continuum space surrounding atoms but rather the three-dimensional internal gravitational space defining the shape and intrinsic inertial expansion of atoms. The gravitational expansion of mass, space and time is the true measure of gravitational force and motion and it extends only to the three-dimensional outer surface of each atom. No measurement has ever been made of an occult gravitational attraction or pull between atoms resulting from some all-pervasive gravitational potential field or from a curvature of spacetime. All such fanciful ideas may be psychologically and emotionally pleasing fantasies for Harvard theoretical physicists but they are definitely not philosophically pleasing for Harvard’s experimental physicists. In reality, these ideas are nothing more than the purest of metaphysical speculation. The simple true nature of the cause and effect of gravity revealed by the Pound-Rebka experiment is that Earth’s surface falls up with a constant upward velocity that is accelerating in space and decelerating in time.

The Common Sense Principle of Cause and Effect

The basic physical components of atoms and photons are mass, space, time and gravity. Their measurable physical parameters are force, acceleration, momentum, wavelength, and energy. These are calculated for each event with scientific method’s common sense principle of cause and effect. The most important principle of physical measurement is the temporal direction of cause and effect. The direction in time of Newtonian force and motion runs counter to the temporal direction of cause and effect in Einstein’s equivalence principle.

The Pound-Rebka experiment establishes that change in momentum is both the cause and effect of force. Momentum’s direction in time is always measured from cause to effect. In the equivalence principle, the directions in time for cause and effect are turned upside down. Einstein’s equivalent gravitational force becomes the cause and downward equivalent gravitational motion becomes its effect. The Pound-Rebka experiment does not detect or measure either equivalent force or change in downward momentum.
Active force changes timeless momentum into energy. Change in momentum is the cause and effect of force and energy is divided between the two changed momenta. This is a simple cause and effect temporal principle of measurement and not a theory. A metaphysical theory would say that force can also be a cause when it constantly appears from within a continuum to make the momentum of falling bodies into an effect.

Einstein’s Reversal of the Cause and Effect of Time

In the Philosophy of Temporal Cause and Effect, a force can never be a cause of changing momentum because force is an effect of two changes in momentum. The One-dimensional momentum of one moving body is always the cause of force that produces the energy that becomes the change in momenta of two bodies. Each of these moving bodies is the potential cause of the energy of a new force that will produce two momenta. It is this timing of the principle of cause and effect that is the model for the gravitational expansion of mass, space, and time. The upward momentum \( mV \) of Earth’s surface is the cause of the force that produces the energy of a waterfall.

Momentum > Force > Energy > 2 Momenta

This the measured direction of time in the motions and interactions of all photons, atoms, and gravitational force and momentum.

In his general relativity theory, Einstein imagined reversing the direction of time for the principle of cause and effect in the interaction between gravitational force and momentum. He imagined that momentum appeared without measured force from the space surround each stationary falling body and then accumulated in it at an increasing rate until it combined with the momentum of a stationary Earth to produce the force and energy of impact. Einstein’s account of gravitational dynamics is purely imaginary because no experimental measurement has ever validated Einstein’s reverse timing for the cause and effect of gravitational force and momentum.

This transformation in direction from \( \text{cause} \rightarrow \text{effect} \rightarrow \text{effect} \rightarrow \text{cause} \) is nothing short of trying reverse time itself. Momentum > force > energy > is the physically measured direction of time for cause and effect. In Einstein’s backwards and upside down idea of energy > force > momentum, energy from his massless spacetime continuum causes equivalent force that produces momentum as an effect. This idea creates contrary non-experimental definitions of the concepts and calculations of momentum, force, and energy. Einstein was able to imagine and calculate his reversal of physical time but he was never able to find any experimental evidence of gravitational energy coming out of space. All measurements show gravitational force and energy to be the result of changes in momentum at Earth’s surface.
Momentum and Force are the Measurable Parameters of Reality

Momentum and force are measurable dynamic entities. They are individual quantities of mass, space, time, and gravity. Momentum and force are the primary parameters of existence and energy/mass = c^2 is the subject and substance of all measurement. Energy is the interaction between force and momentum and does not exist independently of momentum. Force and energy are always relative to momentum and absolute momentum is relative to Zero Momentum Photon Rest. All photons move at c relative to ZMPR. It is measured to be the only possible stationary frame. All other frames move relative to ZMPR and are subject to the direct Doppler shifts and Lorentz transformations caused by inertial motion. Even though the ZMPP is just an imaginary void of space, its absolute location can be accurately measured by finding a point of rest -c for the photons of the 2.726˚K Cosmic Blackbody Radiation. This point has been measured to move relative to Earth at about 375 km/s in the general direction of Aquarius.

Another way to find ZMPR would be to put an atomic clock in a space probe and then decelerate in different directions until the clock reached its fastest possible rate. At this point in the void, any acceleration would cause the energy/mass of the clock to increase and slow its rate. This increased momentum would also cause the direct and transverse Doppler effects in absorbed and emitted photons.

Theoretical Physicists Ridicule the Philosophy of Common Sense

The principle of common sense measurement was been virtually ignored by Einstein and the group of people who put together the standard model theories of physics and the Big Bang. In fact, in the academic world of Harvard theoretical physics, the idea that deep physics problems might have common sense solutions is often treated with great derision. They can only imagine physics to be a deep and magical paradoxical mystery that can only be understood in terms of metaphysical assumptions and abstract mathematical equations. Only a mental midget with an insufficient imagination or a Harvard experimental physicist would attempt to explain natural phenomena just in terms of their physical measurements.

In the case of Harvard’s Pound-Rebka experiment, the experimental physicists made the measurements of gravitational and photon momentum and then the theoretical physicists invented several different calculations to describe what was happening. Since these different counter-intuitive calculations were “equivalent” with one another, the theorists decided that they were all correct even though they contradicted the standard common sense values that the experimental physicists had measured.
A prime example of this kind of thinking is Einstein’s famous statement, \textit{“Imagination is more important than knowledge”}. Here he clearly shows his preference for using magical thinking and metaphysical ideas to try and contradict his knowledge of experimental facts. Just one example of this was his adoption of the equivalence principle so that he could imagine that the direction of gravitational force pointed downward in contrast to all experimental measurements. Einstein didn’t even try to sense or measure gravity, which he could have easily done without any scientific instruments. All he had to do was to sit in a chair and consciously feel the force of gravity pushing him upward with his sense of touch. Instead, Einstein ignored his own common sense experience and then went on to fool himself and other theorists into believing in his complex and paradoxical notion that gravity extended to the farthest reaches of the universe instead of just to the nerve endings in the seat of his pants.

Ever since Einstein was able to get away with ignoring common sense experimental principles and construct theories based on metaphysical assumptions, this method of theorizing has become the dogma of Harvard’s theoretical physicists. They begin by imagining a metaphysical principle that cannot be established by experiment. They then begin constructing their theories by arranging and compromising common sense experimental facts in such a way that they are compatible with their imagined underlying metaphysics. A successful theory is one in which a large numbers of experimental facts can be arranged around a basic metaphysical principle without internal contradiction. A theory becomes suspect when contradictory conclusions or new data require the adoption of new metaphysical principles to make the old theory work. This has happened to the attraction theories of gravity that were forced by experimental measurements to imagine and adopt new metaphysical assumptions like Dark Matter and Dark Energy existing within an imagined spacetime continuum laced with vast but separate quantities of “energy” and “mass”.

In conclusion, when the Pound-Rebka results are taken at face value, there are no experimental, philosophical or logical reasons to believe that the gravitational pulling theories of Newton or Einstein have any validity in our own personal sensory reality. The only reason that anyone would believe in any such fanciful ideas would be the purely emotional and psychological desire to feel secure in their perception of an eternally unchanging and unmoving world.
Pure Energy is the Irresistible Imaginary Fantasy of Theorists

Standard model physicists, Big Bang theorists, and virtually all crackpot theoretical physicists all use Einstein’s upside down and backwards idea of “pure energy” as both the primary component of reality and the prime mover in physical dynamics. In Special Relativity, pure energy is represented by the massless photon \( e = mc^2 \) and in General Relativity pure energy takes the form of the momentum of falling bodies and the equivalent unmeasured force that accelerates them. Dissident aether theorists that dispute Einstein also usually adopt his idea of pure massless energy and then try to adapt the concept to their own peculiar spacetime aether medium. Experimental physicists always measure energy and mass as a single unit of momentum, \( \text{energy/mass} = c^2 \) and then conceptually separate energy from mass with their calculations.

The Big Bang people all want to believe the universe began as a singularity containing only pure energy and no momentum. Nuclear physicists all seem to believe that pure massless energy can be transformed into pure energy-less particles of matter and then converted back into massless energy photons. In experimental physics, pure massless energy has never been measured and there seems to be no way that it could be detected even if it did exist. Energy/mass = \( c^2 \) is always detected as a unit, be it in atoms or photons. Energy is always a measurement of momentum but momentum is never a measurement of energy.

Einstein’s imaginary idea of pure massless energy was the opposite of Newton’s measured parameters of force and momentum. Newton never acknowledged the concept of energy as a primary component in the measurement of force and momentum. Energy is always measured as the unequal effect of a force in the equal division to two momenta. Energy is the measurement of a force producing two or more momenta. The cannon and the cannonball have exactly equal quantities of momentum but greatly differing amounts of energy.
Space Aliens and Gravity

To fully understand the principle of the gravitational expansion of mass, space, and time, it is necessary to first present a little science fiction tale. This is a story about the initial discovery of gravitational motion and force by a group of scientists far more advanced than beginners like Galileo, Newton and Einstein.

As our story begins, a group of people are traveling through the deep space between the stars in the star ship Titanic. They have been on this journey for many generations and for one reason or another have lost all knowledge from their former civilization. They are technically advanced and have a wide array of observing and measuring devices. Being far removed from any large bodies of matter for thousands of years, there is no possible reason for any of them to consider the unmeasured phenomenon of gravity. The area of the star ship containing their living quarters is a large rotating circular structure that provides an inward centripetal acceleration of 10 m/s$^2$ at its outer circular floor. This artificial gravity saves their bodies from the damaging effects of being weightless for long periods of time. These space travelers understand this constant centripetal acceleration very well and are able to increase or decrease it by changing the rate of rotation or moving up or down within the capsule. They are also familiar with the momentary linear acceleration produced by the star ship’s engines. It is just that they do not associate these accelerations with gravity because they have neither heard of nor experienced the phenomenon of gravity.

At long last, the Titanic approaches a star surrounded by a group of planets similar to our own solar system. After decelerating their spacecraft to the inertial frame of the star, the space aliens decide to stop and explore one of the inner planets that has oceans and continents. They were looking for a new planet to call home and this looked like a likely candidate.

As they maneuvered their spaceship around the planet, they unexpectedly noticed that its surface seemed to rush towards them when they were not measuring any acceleration toward it. After a number of speed adjustments and calculations they determined that they could set their ship at a velocity vector that was both away from the planet and at right angles to it and that exactly balanced the motion of the planet’s surface toward them. These maneuvers put them in a circular orbit around the planet. Eventually, they guided the ship to a stationary point above the rotating planet’s equator (geosynchronous orbit).

They didn’t quite understand the actual dynamics of this orbit, but since
the Titanic seemed to be secure as it revolved with the planet, they decided to send a smaller exploratory craft down to the planet’s surface where they could observe this strange new phenomenon from close up.

As they moved down toward the planet’s surface, they had to keep accelerating the craft upward in order to eventually make a soft landing. Once they arrived on the surface, they were able to measure that it was accelerating upward at 10m/s\(^2\) just like it had been appearing to do from orbit. Once the explorers got out of the craft and started walking around, they quickly noticed that the upward acceleration of the ground felt exactly like the inward centripetal force of their rotating circular living quarters back on the Titanic.

After thinking about this strange phenomenon for some time, they concluded that the matter within the planet must be slowly expanding. This idea would also explain how the Titanic was able to maintain its orbit around the planet. It was simply moving away from the planet at the same speed that the planet’s surface was moving toward it. While the idea of an expanding planet seemed rather strange and unexpected, that was certainly what they had measured with their accelerometers and almost no one was able to come up with an alternative explanation.

One old man with fuzzy white hair suggested the somewhat incomprehensible theory that there was some kind of a virtual attraction between the people and the planet that constantly pulled them together. This idea seemed completely out of the question to the majority of the observers because such an unmeasured effect would be completely unlike the effects of magnetic and electrical attractions that they were all accustomed to calculating and measuring. The concept of an unbounded gravitational attraction between individual atoms also seemed to be completely unreasonable because the simpler and more intuitive local measurement of gravitational expansion was so readily at hand.

These were practical people who were used to the everyday measuring of force and acceleration in a straightforward way. The idea of an infinite and inalterable attraction between all bodies of matter and photons seemed preposterous and such an unlikely and counter-intuitive concept could simply not be accepted by any of them.

They concluded that if the matter within the planet was slowly expanding, then the matter contained within the Titanic and even their physical bodies was also expending at an, until now, imperceptible rate. To test their new principle of gravitational expansion they placed sensitive accelerometers at both the Titanic’s bow and stern. They discovered that the two ends of the Titanic were accelerating and moving away from each other at a small but measurable velocity. The old man with the white hair claimed their experiment proved nothing since his mass attraction theory would produce the same results.

The technicians got together and designed an experiment in which gravitational expansion and gravitational attraction would yield different results. They
fashioned a large glass sphere with a hollow shaft through its center. They then machined a solid Gold ball that would loosely fit within the shaft. A number of accelerometers were attached to the sphere’s surface and another one was put at the center of Gold ball. They then placed the ball at rest in the hole at the outer surface of the sphere and then recorded video of the apparatus as the ball began to move down the shaft towards the center of the glass sphere.

The old man predicted the ball would be attracted toward the center of mass and accelerate to a maximum velocity at the center and then decelerate to a stop at the opposite end of the hole. He claimed this back and forth motion would repeat endlessly barring any friction between the ball and the sphere. The rest of the group predicted that gravitational expansion would leave the ball motionless while the surface of the sphere moved away from it in all directions.

As they watched, the ball appeared to decelerate to stop at the center. When they checked the accelerometers they found that all points on the sphere’s surface continued to accelerate away from its center while the ball registered no acceleration at all. They concluded that gravitation attraction could not exist because, like Einstein, they were unable to devise any experiment that could detect it.

In conclusion, no rational space alien who carefully measured gravity would ever conclude that it is some kind of occult and non-local attraction between atoms when it can be easily measured that the mass, space, and time of all atoms are slowing expanding at a constant rate that is synchronous throughout the Living Cosmos.

The Gravity Cannon Test for the Law of Gravity

The gravity cannon experiment is a very simple mechanical measurement that can provide decisive confirmation or falsification of the various gravity theories. In particular, a short video of its actual gravitational dynamics would provide the ultimate and dramatic test of Einstein’s equivalence principle of force and momentum. The unambiguous result would be easily understood by everyone from cosmology theorists to the smallest child who can run and jump.

The Gravity Cannon Test

The gravity cannon is a definitive experimental test that can easily differentiate between the four possible general theories of gravity. This test is so simple and basic that once it has been performed, the results can be put on You Tube to make it possible for the true nature of gravity to be understood by everyone. Even the small child will be able to clearly see and understand just how gravity really works.
The gravity cannon is a very simple mechanical device with only one moving part. It is simply a glass sphere with a barrel running through its center and a gold cannonball moving in the barrel. The measurement is made by a video camera recording the motion of the ball relative to the barrel. The result of the experiment will absolutely determine what actually moves. Is it the cannon or the cannonball?

Although it would have to be performed in the weightlessness of an Earth orbit, this experiment could otherwise be executed very easily and inexpensively. It would be able to decisively differentiate between the four possible general theories of gravitational force and motion that exist among gravitational theorists. The experiment would also provide the means to verify and calibrate earthbound measurements and calculations of both the Newtonian force constant $G$ and the gravitational velocity constant $G_v$.

Four Gravity Theories

There are four different basic gravity theories. These include the two pulling medium theories of homogeneous and infinite particle aether. The other two are the internal and external pushing particle theories. These four ideas each use different complementary equations to explain the many measurements that have been made of gravitational force and motion. Depending on their various assumptions, the calculations made by all these theories can be made to account for most gravity measurements.

The Gravity Cannon Experiment is an actual miniature version of the Hole-Through-Earth thought experiment that has been proposed by many gravitational theorists. The beauty of this measurement is that it would produce a different value for each of the four gravitational theories.

Currently, experimental physicists measure gravitational force with accelerometers and gravitational momentum with atomic clocks. These measurements were combined in the Pound-Rebka experiment to determine that Einstein’s equivalence principle was completely compatible with the measured values but completely unnecessary to explain the actual dynamics of gravity. The Gravity Cannon combines the force and motion of gravity into a single measurement that represents either force or motion. The results will determine whether the test measures gravitational force causing motion or if instead it actually measures gravitational motion causing force.
Two Pulling Gravity Aether Theories

Aethers and fields are defined as any description or condition of space that is not an eternal dimensionless void. Fields are local conditions of aether or spacetime that extend between and connect atoms. They can be either local to the atoms or they can extend to infinity.

The homogeneous aether theories explain gravity as a single, universal, solid or liquid all pervasive aether continuum. Curvatures, ripples, and waves within this universal substance cause bodies of matter to move toward one another. In the infinite particle aether theories, gravity is explained by a potentially infinite number of gravitational particles, waves, or fields that are usually called gravitons. These calculated wave-particle dualities are generated at the center of each body of mass and then spread out in all directions to infinity at the speed of light.

General Relativity is a homogeneous aether theory that has been mathematically crafted into several interpretations. Its equations usually calculate a four-dimensional spacetime continuum that connects all matter and interacts with an apparent but otherwise undetectable force that causes gravitational force and motion. The presence of a body of mass causes the continuum to curve and produce motion in the body.

General Relativity is sometimes classed as an infinite particle aether theory because in some versions the force of gravity is spread from atom to atom across the universe by great numbers of tiny wave-particle dualities called gravitons. These wavelike particles move through the continuum at the speed of light and are calculated to cause portions of the spacetime to curve in such a way as to cause the appearance of gravitational motion between bodies of matter.

Two Pushing Particle Gravity Theories

Pushing particle theories are divided into the external downward pushing aether particle theories and the internal upward push of the gravitational expansion of mass, space, and time. The external pushing gravity theories explain gravity by assuming that large bodies of matter like Earth are constantly being pushed inward toward their centers by great numbers of tiny undetectable particles impinging on them from all directions of space. The internal pushing particle principle explains gravity as the measured outward force caused by protons and electrons pushing on one another.

External pushing gravity theorists claim the imagined downward motion of falling bodies is produced by the absorption of tiny undetectable extremely high speed particles that are assumed to exist uniformly distributed throughout all of space. Some of these theories predict particle speeds many orders of magnitude
greater than the speed of light. When these particles strike matter, they give it a slight push. These omnidirectional particles push the surfaces of large bodies towards their centers. Such theories predict that the Gold ball would be pushed back and forth from one side of the glass sphere to the other in a similar manner to the predictions of pulling gravity aether theories.

An external pushing gravity theory was first proposed by Nicolas Fatio in 1690. Later, similar theories were proposed by Le Sage and others. Rene Descartes had a pushing gravity theory in which numerous tiny whirlpools within the aether pushed on matter.

While external pushing gravity theories have never gained much credibility among the physics establishment, they have a wide following among alternative gravitational theorists. These theories have no explanation for the equivalence principle and generally ignore the concept altogether.

In the internal pushing particle principle, the particles that do the pushing are the well established protons and electrons within atoms. This explanation of gravity is a principle of measurement and not a theory because the outward force and momentum of gravity is easily measured with accelerometers and clocks and there is no reason to assume anything more than what is measured. The motion of the gravity cannonball can easily indicate the truth between the internal and external pushing particle explanations of gravity.

In the internal pushing particle principle of the proton and electron, the Gold ball would move from the surface of the sphere to its center where it would gradually slow to a stop. All of the pushing forces are contained within the glass sphere and there is zero force exerted between the cannon and cannonball.

In the external pushing particle theories, the cannon ball would not move at all because particles from opposite ends of the barrel would exert equal forces on it and it would not move, just as if it were alone in outer space.

### Three Possible Gravity Measurements

The force of gravity can only be measured as a downward pull, a downward push or an upward push. Almost all theoretical physicists imagine it to be a downward pull and a few believe it to be a downward push but only experimental physicists know it to be a measured upward push.

There can be only three possible outcomes to the gravity cannon experiment. This test will decide the absolute physical truth between whether gravity points down with equivalent force and acceleration as Einstein imagined and calculated or whether the force of gravity points up as he always felt and measured.
The first possibility is that the Gold ball will accelerate down at a decreasing rate and then decelerate to a stop at the center of the cannon. This outcome would match all other measurements of gravitational force and motion made at Earth’s surface. This result would not require a “theory” for a gravitational mechanism because the physical measurements are the mechanism. Gravity is nothing more than our measurements of its mass, space, and time.

The second possibility would be that the Gold ball will accelerate down at a decreasing rate until it reaches the center at maximum velocity and then decelerates to a stop at the other end of the barrel. This process then repeats itself as perpetual changing motion as the ball moves back and forth from one end of the barrel to the other. This result would require energy to be continuously transferred back and forth between cannon and ball as the gravitational momentum of the ball constantly changed. This result is predicted by Newton’s and Einstein’s theories of downward pulling fields. They use equations and calculations to explain the mechanism for the continuous unmeasured transfer of energy to and from the ball.

A third possibility is predicted by pushing particle aether theorists. This result would be similar to the pulling field theories but would be different due to the completely different proposed gravitational mechanism. In this proposal, there is no energy transfer between the ball and the cannon. The ball’s changing energy is produced by unseen impinging particles from the cosmos. Momentum is conserved between the particles and the ball and not between the cannon and ball.

**Conclusion**

If the ball moves back and forth like all theoretical theorists have predicted, then the pulling field, curving space, and aether particle theorists will have to fight it out to see who is right based on subtle differences between predicted and measured values. However, if the ball moves to the center and stops, then no mechanistic theory is needed to explain the transfer of energy since no energy is transferred. The theoretical physicists will all be wrong and only the experimental physicists will be correct right. The ball does not actually move and remains at rest while the outer surfaces of both ball and cannon move away from their inertial centers. There is no absolute momentum between the inertial centers of ball and cannon.
The Orbiting Chain Thought Experiment

To demonstrate the actual dynamics an orbit around Earth, we will first describe an experiment that was available even in Galileo’s time. A powerful cannon is fired over the surface of the Earth and the path of the cannonball is recorded. The cannon is then fired again from the point where the cannonball struck. This process continues until the cannonball has traveled all the way around Earth. In each shot, the cannonball traveled in a straight inertial line until it was struck by the upwardly moving Earth. However, any photos of the cannonball’s path would show it to have followed an apparent parabolic curve. In this digital orbit of the Earth, the cannonball always travels in a straight inertial line but at the same time its path always seems to curve downward. This apparent non-inertial curvature of the Earth’s internal space results from the expanding dimensions of mass, space, and time.

The orbiting chain is another possible model for creating an orbit around the expanding Earth. The chain is wrapped around the Earth and then spun at a high velocity. As the chain goes faster and faster, it tightens up and goes into an
Earth orbit defined by its length. The faster the chain is spun beyond its orbital velocity, the tighter it becomes due to its increasing centripetal force.

To better understand how orbits work around gravitationally expanding bodies of matter, we can cause the chain to slow until its centripetal acceleration becomes less than the acceleration of gravity. The individual links slacken and lose their tension with one another. However, the slack chain as a whole still maintains its overall orbit while each loosely connected link maintains its own individual orbit without physically touching other links. The dynamics of this orbiting chain satellite are the same whether we use the mechanics of gravitational expansion or the gravitational field theory of Newton or the curved spacetime of Einstein.

**Gravitational Expansion of Mass, Space, and Time**

*Absolute gravitational momentum and force is not a theory of gravity. It is just the measurement of gravity that reveals why we have always felt the upward push of Earth's surface. Chicken Little, Newton, and Einstein were all wrong. The sky is not falling down. Earth is falling up!*

The principle of gravitational expansion reveals gravity totally in terms of its physical measurements with no metaphysical assumptions such as aethers, fields, actions at a distance, or unseen impinging particles from space. Expanding mass, space, and time show that our measurements of gravitational force are real and that the acceleration of gravity produces true upward motion. Gravity is merely the outward force produced by the gradual and constant dimensional expansion of mass, space, and time. A falling body does not accelerate downward because no such change in motion can be measured. Like the Gold ball in the gravity cannon, falling bodies do not change their state of motion while the surface of Earth moves upward with measured acceleration and velocity. Gravity and inertia are not just equivalent. They are exactly equal because they are the same thing.

**Successful Performance of the Gravity Cannon Experiment Could Save Billions of Dollars for World Governments.**

The gravity cannon test will provide a decisive experimental and mathematical difference between both aether and field theories and the many pushing gravity particle theories. In particular, it will demonstrate a precise difference between the principle of the gravitational expansion of mass, space, and time and the theory of general relativity with its ideas of equivalent force and momentum and the unseen transfer of gravitational “energy”.

Other previous precise experimental measurements of gravity such as GPS clock rates and the Pound-Rebka shifts all yield the same predicted results for both gravitational expansion and general relativity. The beauty of the Gravity Cannon Experiment is that a different result is predicted by each different theory
of gravitational force and motion.

The ultimate financial benefits of putting a gravity cannon in orbit could be enormous. Many billions of dollars have been spent to test one or another of General Relativity’s many predictions. Just one example is the LIGO experiment that is attempting to measure Einstein’s predicted continuum of gravitons and gravity waves. The gravity cannon would either verify General Relativity’s curved space interpretation of gravity or prove the opposite curving matter interpretation of absolute gravitational expansion. If this experiment verifies the gravitational expansion of mass, space, and time, governmental scientific organizations can save hundreds of millions of dollars by not testing Einstein’s foolish theories.

Once and for all, we will be able to know with certainty whether gravity points up or down and whether it is an upward push or a downward pull. Both general relativity and gravitational expansion explain gravity as a curvature in the geometry of space and time. In general relativity, it is the cosmic space and time surrounding a body of mass that appears to curve and in gravitational expansion it is the local space and time within each body of mass that is actually measured to curve.
Gravity Cannon Experiment

*If gravity is not the infinite pulling and curving of spacetime throughout the universe then maybe gravity’s quantum nature is just the purely local mechanical event of one atom pushing against another.*

The principle of the gravitational expansion of mass, space, and time measures outward acceleration at the surface of the glass sphere, but no acceleration of the ball toward the centers of mass can be measured. Without physical acceleration, the ball will appear to move toward the center of the sphere with decreasing deceleration but will not have the inertial motion necessary to move past the mass center.

Einstein’s idea of equivalent gravity predicts the opposite outcome for the Gravity Cannon experiment. Newton, Einstein, and all other gravitational pulling theorists make the complex prediction that the cannonball will accelerate toward the center of the sphere at a decreasing rate. It will reach maximum velocity at center and then is predicted to decelerate to a stop at the end of the barrel. This starts a new cycle where the ball accelerates back to the center and then decelerates to the other end of the barrel.
Joules of the Living Universe

This diagram shows the quantity of energy measured in Joules for everything from the extremely weak photons from AC transmission lines to the total energy of the Big Bang and the creation of the universe.

This diagram shows the energy transfer of a number of familiar events over the whole energy spectrum. Some of the least energetic photons that we commonly measure are those produced by 60 cycle alternating current power lines. At 18,000 km their wavelengths are almost three times greater than the Earth’s diameter and 10,000 times more energetic are AM radio photons, which have wavelengths of just less than one kilometer. Television photons have wavelengths of a few meters and 2.7° CBR photons are most intense at a wavelength of about one-millimeter. Several thousand times smaller are the many differently colored photons of the visible spectrum. Another million times smaller and more energetic are the photons produced when an electron and positron join and transform into photons.

The Cosmic Evolution of Matter  
James Carter
Up to this point on the scale, all individual energy units had been photons. The energy of the next item, hydrogen fusion, is released not as photons but as the kinetic energy of the Helium and Hydrogen nuclei and neutrons speeding away from one another. A few times more energy is produced in the fission of an atom of Uranium-235. Photons are produced in these events, but the majority of the energy is contained in rapidly moving neutrons and nuclei. The two photons produced in proton-antiproton annihilation each have energies of just under one billion electron volts.

The next few items on the scale are the units of energy used in science and commerce. The erg is the energy of a gram of mass moving at a velocity of $\sqrt{2}$ centimeters per second. A foot pound is the energy of one pound moving at $\sqrt{2}$ feet per second. A calorie is the amount of energy required to raise the temperature of one gram of water one degree Celsius.

At about 50 Joules, the most energetic cosmic rays to be measured are probably photons with wavelengths of about $10^{-25}$ meters and masses of about $10^{-15}$ kilograms. They are part of a background photon spectrum that originated when the matter of the universe was created. The photons at the upper end of this creation spectrum are extremely rare but they have almost unlimited energies with masses approaching that of the universe itself. The masses and wavelengths of selected photons from this spectrum are shown at random points on the spiral.

One British thermal unit raises the temperature of a pound of water by one degree. A watt-hour is a standard unit of electricity. A horsepower is a unit of work. Natural gas, gasoline, TNT, coal, and hydrogen are common fuels used to produce energy.

The kinetic energy of a human being’s motion relative to the CBR photon rest is similar to the energies of the Titanic’s fall to the bottom of the ocean, the first atomic bomb exploded in New Mexico or a bumblebee flying at half the speed of light. The photon energy produced by the annihilation of one gram of matter with one gram of antimatter is similar to the energy produced by the fission of 1000 grams of Uranium-235.

The mysterious explosion that occurred in 1908 near the Tunguska River in Siberia could well have been caused by a photon from the creation photon spectrum hitting the atmosphere.

The kinetic energy of a human being moving at half the speed of light is only a few times less than the annual electricity production of the United States. The Earth’s daily receipt of energy from the sun is about 10 times greater than all the electricity generated since Tesla both invented and discovered three-phase alternating current and about 30 times less than the kinetic energy of the Titanic moving at half the speed of light.

The kinetic energy inherent in the earth’s motion relative to CBR photon rest is equal to the sun’s total energy output for about 100 years. If the earth were moving at half the speed of light its kinetic energy would be equal to the sun’s output for about 10,000,000 years.

On May 8th 1997 a gamma ray burst was detected far off in the universe that released as much energy in a few seconds as the sun has produced since its formation. On December 14th of that year a much larger burst was detected that produced more energy than the entire Milky Way galaxy puts out in 10,000 years and even larger bursts have been measured since.
Physics without Metaphysics
James Carter

Physical Measurements of Atoms, Photons, Gravity, and the Big Bang are Examined and Explained without the Basic Metaphysical Assumptions Used in Quantum Mechanics and Einstein’s Relativity Theories.

Physics Without Metaphysics contains a complete description of the Living Universe’s cosmic creation process. It illustrates full color models of all nuclear isotopes with circlon shapes for electrons, protons, neutrons, and photons. The book contains many illustrations of gravity and photon experiments and explanations of astronomical observations. To purchase this, or other books by James Carter go to: www.living-universe.com. The site contains more information on Circlon Synchronicity, the Big Bang, gravitational expansion and explains Plate Tectonics and large dinosaur bones.
**Pound-Rebka Experiment**

The Pound-Rebka experiment can be used to disprove Einstein’s foolish idea of the equivalence of gravitational force and motion.

This drawing depicts the actual values for photon momentum and wavelength measured by the Pound-Rebka experiment.

Observers at the bottom and top of the tower observe the photons from green light bulbs located at the tower’s top and bottom. The bottom green light photons are shifted to blue by an upward moving linear actuator. These blue photons are transverse red shifted back to green by the top observer’s faster clock. This transverse shift transforms the top green light photons to blue in all directions. Top observers sees these photons as green due to the faster top clock. Blue photons from the top are Doppler red shifted to green by the bottom observer’s downward actuator velocity. These direct Doppler shifts and Lorentz transverse shifts are actually shifts in photon momentum caused by the inertial motion of the actuators and Earth’s slower escape/surface velocity at the top of the tower. Due to the Mossbauer effect, the observers are only capable of seeing green photons. When the linear actuators are turned off, the top and bottom observers would not be able to see any photons.

These are the indisputable measurements of the experiment and everyone believes them to be true. Where the disputes arise are in the strikingly different ideas that theoretical physicists have to explain the physical mechanisms underlying these momentum measurements by Harvard’s experimental physicists.

Einstein imagined these shifts to be caused by equivalent force and motion and not by actual measured changes in momentum.