

Introduction to the Physical Principles and Metaphysical Assumptions of Circlon Synchronicity

All theories are based on physical principles that are explained with metaphysical assumptions. Physical principles are the body of experimental mass, space, time, and gravity measurements that a theory tries to interpret. Metaphysical assumptions are hidden characteristics within a particular scientific experiment that can explain its measured values but are not subject to physical measurement. These assumptions are the four sole ideas of consciousness that our minds receive from the measuring instruments of our senses. Common sense is the perceived result that is shared by all our senses and measuring instruments.

Newton's laws of force and motion describe the four parameters of mass, space, time, and gravity and their complementary equation of $F = ma$. This equation is a general metaphysical principle of measurement. While an accelerometer gives a value for the magnitude and direction of a force, it fails to differentiate between acceleration and deceleration. The correct equation for absolute force is $F = ma*d$, (Force equals mass times a combination of the absolute values of acceleration and deceleration). For example, an automobile accelerating in a westerly direction at the equator is actually decelerating with respect to Earth's rotational velocity. However, there is no way to determine this without looking to the stars for reference.

Special relativity theory's initial metaphysical assumption is the idea of $e = mc^2$ and the massless photon. Physical principles of measurement always detect and calculate a photon's momentum, energy, and angular momentum. If the unmeasured assumption of a massless photon is not made at the beginning of the theory, then a photon's mass is easily calculated from measurements of its momentum, angular momentum and energy.

General relativity's initial metaphysical assumption is the idea that the force and motion of gravity point down. This is in contrast to our own sense of balance that shows conclusively that the vector of gravity's force and motion points up. We both feel and measure the constant upward force and motion of gravity. This assumption for the equivalence of gravity and inertia is a dual assumption of first a downward gravitational force and acceleration that cannot be measured and second the measurement of upward gravitational force and acceleration that does not produce real motion.

Newton described his assumption of gravitation as an undetectable

attractive force that accelerated distant bodies toward one another. Einstein's assumption of gravity was of an undetectable force that changed (curved) space in such a way as to make it only appear that distant bodies accelerated toward one another. Equivalence assumes an absolute change in the motion of a falling body where only a relative change in motion can be measured.

The metaphysical assumption of *quantum mechanics* is that protons, electrons, and photons are shapeless mass points with uncertain locations within a space and time of $h/2\pi$. All measurements show the exact size and location of photons to be $m\lambda c/2\pi$ and the size and location of circlon shaped atoms to be $M_{e_0} \alpha c/2\pi$. Each of these three equations calculates the same quantity of angular momentum; $mvr = 1.055 \times 10^{-34}$.

The primary metaphysical assumption of the *Standard Model of the Big Bang Theory* is that the 1/1836 mass and size ratio of the electron and proton is a universal constant and has not changed since the beginning of the universe. In order to account for subsequent astronomical measurements, it has been necessary to stack a number of additional metaphysical assumptions on top of this initial assumption of constant electron mass and size. If this assumption is not made at the beginning of the theory, and the mass and size of the electron are allowed to evolve over the course of cosmological time, then measurements of the Hubble red shift, the temperature of the Cosmic Blackbody Radiation, the universal 1/1 ratio of matter/antimatter, and the calculations of Dark Energy become conclusions of measurement and do not require any new metaphysical assumptions to explain them.

Evolving electron mass and size can also explain the creation of equal numbers of electrons and protons near the beginning of the universe. The only initial metaphysical assumption needed to reach this conclusion is the eternal existence of a single electron/proton (antimatter/matter) pair at the point in the history of the universe that we call the beginning. The evolution of electron mass and size is not an assumption but rather a conclusion reached from the values of astronomical measurements.

The Big Bang's initial metaphysical assumption for the beginning of the universe is that the two primary components of today's universe, protons and electrons, did not always exist. The assumption is made that during a single moment in the distant past, they all came pouring out of a single tiny hole in a miraculous metaphysical substance called a spacetime continuum. Once the universe became filled with at least 2^{256} electrons and protons, the hole in this 4-dimensional continuum closed up, never to open up again except possibly to create other universes in other dimensions.

The problem here is that the physical principles and measurements of

atomic physics show no experimental way to permanently either create or destroy electrons and protons. Matter/antimatter pairs of these particles are easily created from high momentum photons but the antiparticles from these interactions quickly find a particle and decay back into a pair of photons. Although it can fluctuate slightly, the Living Universe's exact number of protons and electrons has been measured to be constant for a very long time. This means that Big Bang's primary assumption of a universe that once contained no protons and electrons and now contains no antimatter has no experimental merit or validation.

The Living Universe is described completely in terms of physical measurements made within the cosmos and does not contain any metaphysical assumptions for things like aether, continuums, gravitational fields, or an ultimate initial creation of mass, space, time and gravity. The only metaphysical assumption of Circlon Synchronicity is the perpetual existence of mass, space, time and gravitational motion in the form of the protons, electrons, photons and orbiting heavenly bodies. In the Living Universe, mass, space, time, and gravity always existed in their present forms but the physical relationships between them have been slowly evolving during the history of the universe to bring it to its present state of being that we experience and measure today.

Clear evidence for the gradual decrease in electron mass can be found in the extensive measurements of the Hubble red shifted photons. Quantum mechanics calculates that atoms with heavier electrons would emit spectral photons with less momentum and longer wavelengths. The Hubble shift is caused by the slow expansion of the electron and not the rapid expansion of the universe.

When we look far into the distant past of the Living Universe, we eventually reach a time when the mass and size of the proton and electron were identical. Then, we can look to a more distant point in time when the electron was smaller and more massive than the proton. At this point they were actually an antiproton and a positron. The logical progression in the evolution of electron/proton mass and size ratios provides an excellent quantum mechanical explanation for the reproduction and serial bifurcation of a single positron/antiproton atomic seed into the universe's present quantity of matter and photons.

Physical Principles and Constants of Measurement

The following equations represent the principles of measurement that all experimenters use to quantify their measurements of Mass, Space, Time, Force, Momentum, Energy, Speed of Light and the direction of Gravitational force and motion. These are principles and not

theories. They are the empirical foundations that all theories of physics must use in their experimental measurements and verifications. Different theories interpret the meanings of these mathematical relationships in different ways but the calculated values of each theory must match the measured values of these principles for the theory to be validated.

Principles are not the assumptions of any theory but rather the body of physical evidence from which all theories try to make the case for their individual metaphysical assumptions. These principles could be called “laws” of physics but more properly they are the laws of experimental measurement. Theories of physics assume various unmeasured exceptions to these laws, but no experiment has ever shown a measured deviation for any of these laws. The equations for these principles of measurement are complementary to one another and are all based on the absolute zero momentum rest frame of matter through which all photons move at the speed of light. Relative to this frame, each body of mass in the universe has its own unique absolute momentum vector that cannot be detected locally.

Force and Momentum $F = ma \cdot d$ $p = mv$

The Force measured by an accelerometer detects changes in a body’s momentum vector that are equal to mass times a combination of acceleration and deceleration $F = ma \cdot d$. A body’s momentum vector produced by a force is equal its mass times velocity $p = mv$

Forces are one-dimensional and produce equal changes in the one-dimensional momentum vectors of opposing mass bodies. This law of Force is similar to Newton’s 2nd law of motion $F = ma$ except that Newton made no distinction between measured acceleration and deceleration and no distinction between a push force and a pull force. This new principle of force defines the intrinsic measurable differences between the increasing momentum of acceleration and the decreasing momentum of a body’s deceleration.

The dichotomy between push and pull forces is demonstrated in rotating bodies. The radial centripetal pull force is an equal combination of constant acceleration and deceleration and the transverse centrifugal push force produces momentary accelerations or decelerations of a body’s rotation. The positive or negative centrifugal push force is added or subtracted to the value of centripetal force.

Accelerometers measure force and motion and what they detect are equal changes in momentum. Accelerometer values form the basic structure of all physical measurements, but their readings measure only relative changes in momentum and offer no way to identify a body’s true momentum vector. An accelerometer’s reading is a single momentum vector

that cannot be separated into its individual acceleration and deceleration vectors relative to the universal zero momentum rest frame of all matter. Since clocks slow as their momentum increases, experimenters with atomic clocks are able to separate absolute deceleration from absolute acceleration.

Standard model physics theories try to defy the principle of force and momentum with metaphysical assumptions for forces and motions (momentum) that cannot be measured with accelerometers. These undetectable transfers in momentum include radial centrifugal force, the rate of falling bodies, and Hubble shifted photons.

Photon Momentum $p = mc$

A photon's measured momentum is equal to its mass times the speed of light.

This principle for the measured momentum of the photon, $p = mc$, establishes the measured parameters for mass, space, and time used in all scientific experiments. The constant speed of light sets the absolute standards for the dimensions of mass, space, time, and gravity that theories must apply to their experimental calculations. A photon with a mass of one and a wavelength of one has a momentum of one. A photon with a mass of 10 has a wavelength of 1/10 and a momentum of 10 ($p = 10 \times .1/.1 = 10$). If this photon is measured from a spacecraft moving away from it at $1/2c$, its momentum will be Doppler shifted to 5 ($p = 10 \times .1/.2c = 5$).

Physics theories try to defy this principle with metaphysical assumptions that propose photons to be massless "pure energy" particles. Some theories assume that photons are massless energy waves moving at c through a universal substance called a luminiferous aether. Other theories prefer to use terms like "light wave", "light signal", "light cone" "ray", and "beam" instead of the word "photon".

Photon Angular Momentum $I\omega = h/2\pi = m\lambda C/2\pi = 1.055 \times 10^{-34}$

All photons have the same measured value for angular momentum equal to Planck's constant divided by 2π equals a photon's mass times its wavelength times the rotational speed of light divided by 2π .

Electron Angular Momentum $I\omega = M_e a_o \alpha C = mvr = h/2\pi = 1.055 \times 10^{-34}$

The Angular Momentum of an electron in a ground state Hydrogen atom is the mass of the electron times the Bohr radius times the fine structure constant times the photon's rotational velocity. This is the amount of angular momentum required for an atom to emit a photon.

Photon Kinetic Energy $KE = mv^2/2 + mC^2/2 = MvC$

A photon's measured kinetic energy is equal to its mass times the Doppler shift velocity squared divided by 2 plus its mass times its rotational velocity squared divided by 2 equals photon mass times linear velocity times the rotational speed of light.

C represents the photon's rotational velocity and v represents its relative Doppler shift velocity. A photon's measured energy is a combination of the relative kinetic energy of its Doppler shift velocity and the absolute rotational kinetic energy of its spinning mass.

Any metaphysical assumption for a theory of photons must find a way to incorporate these measurements into the theory's conclusions. Most massless, pure energy photon theories assume that a photon's measured energy, momentum, and angular momentum do not represent the motions of mass. Other theories assume that mass and pure energy are equivalent but separate entities that can be transformed back and forth into one another. It is a principle of measurement that mass and energy are the same thing and inseparable like the two sides of a coin. Mass = energy = the atom or photon.

Mass is the atom's state of rest and energy represents its state of motion. The true equation for the relationship between mass and kinetic energy is $cC = e/m$. This equation represents the equality of a photon's mass and energy and not their equivalence. Energy and mass are a dichotomy that cannot be physically separated. Many theories use forms of this equation where mass and energy are on opposite sides such as $e = mc^2$ or $m = e/c^2$. In such an equation, mass and energy are equivalent but not equal. Such theories assume that photons are massless wave-particle dualities that move through spacetime fields or other aether-like media at the speed of light. No experimental measurement has ever shown a separation between a photon's mass and energy. The only reason to put them on opposite sides of the equation is for the purpose of calculating their individual but equal values. A one-kilogram photon would have 9×10^{16} Joules of energy, and a one-Joule photon has a mass of 1.111×10^{-17} kg.

Rest Mass Energy of Matter $E = MCC$

The rest mass energy of an electron or proton is equal to its mass rotating at the speed of light on two different planes.

An atom at rest contains the rotational kinetic energy of its circlon-shaped mass rotating at the speed of light in two different directions. The atom's primary coils rotate on different planes from its secondary coils. Atomic rest energy equals mass times two different rotations at the speed of light $e = mCC$. An atom's mass and energy are always equal regardless

of its changes in momentum. An increase in a body's mass (momentum) produces an equal increase in its energy.

Photon Masslength Constant $Y = h/c = M\lambda = 2.201220789 \times 10^{-42}$ kg m

The photon Masslength constant is equal to Planck's constant divided by the speed of light equals a photon's mass times its wavelength.

This is the constant value for the mass of any photon times its wavelength. For example, a photon with a wavelength of one meter has a mass of 2.2×10^{-42} kg and a photon with a mass of one kilogram has a wavelength of 2.2×10^{-42} meter.

Planck's Constant $h = Yc = M\lambda c = 6.6260755 \times 10^{-34}$ J sec.

$$e = hf = M\lambda cC/\lambda = mc^2$$

Planck's constant is equal to the photon masslength constant times the speed of light equals the mass of a photon times its wavelength times the speed of light.

Planck's "constant" is a useful equation in the many different applications in atomic physics, but it is a combination the Y and C constants not itself a separate constant.

Kinetic Mass $m' = M/\sqrt{1-v^2/c^2}$

Kinetic mass is equal to rest Mass divided by the square root of 1 minus velocity squared divided by the speed of light squared.

A body has a minimum mass of 1.0 at rest $M = \sqrt{1 - 0^2/c^2}$. A 1kg Cs-137 clock moving at one-half the speed of light has a kinetic mass of 1.15 kg. A 1kg GPS clock with an escape/surface velocity of 5,471 m/s has a kinetic mass of 1.000000000167 kg. These values are the same as the clock's recorded intervals.

Time Dilation $t' = T/\sqrt{1-v^2/c^2}$

The recorded time intervals of a moving clock are equal to the time interval 1.0 of a rest clock divided by the square root of 1 minus the velocity squared divided by the speed of light squared. The shortest recorded time interval of a clock at rest is $T = \sqrt{1 - 0^2/c^2} = 1$.

The physical measured cause of time dilation in moving clocks is the conservation of angular momentum. When a clock is accelerated, its momentum (mass) is increased but its angular momentum remains constant. As a clock's rotating and vibrating components increase in mass and energy the only way to conserve angular momentum is to slow the rate of

the clock's time keeping components. A simple example is the basic Earth clock with its interval of the day = 1.0. If a large amount of mass such as water were added to Earth, the time interval of the Day would increase to 1.0+ and Earth's angular momentum would be conserved.

The above equations for kinetic mass and time dilation represent the Lorentz Transformation measurements of momentum-induced changes in both the mass and recorded intervals of moving clocks. The measured mass and the recorded intervals of a moving clock both increase or decrease with respective increases or decreases in the clock's absolute momentum. Both a clock's increased kinetic mass and its increased time intervals have the same measured value.

This increase in mass is simply the kinetic mass of the moving clock's linear kinetic energy. This means that 9×10^{16} Joules of energy weigh 1.0 kg. The Titanic moving at 20,000 m/s (.0000666 c) would have a similar kinetic energy of $KE = 42,000,000 \text{ kg} \times 20,000 \text{ m/s}^2/2 = 1.7 \times 10^{16} \text{ J}$ and would increase the Titanic's total mass by about 1 kg.

The time intervals of all clocks, whether they are mechanical pocket watches or Cs-133 atoms, are based on the constant rotation or vibration of their internal mechanisms. Linear accelerations increase the mass and momentum of the atom or the watch's balance wheel. When this increase in mass is added to a clock's spinning components, it causes them to slow down in order to conserve their angular momentum. As the mass of a Cesium-133 atom increases with increase in momentum, the atom's rotational and vibratory rates decrease due to the conservation of angular momentum. Deceleration causes a clock's mass, energy and recorded intervals to decrease.

Speed of Light $c = h/m\lambda = p/m = e/mC = e/p = 299,792,458 \text{ m/s}$

The speed of light is equal to Planck's constant divided by photon masslength equals its momentum divided by its mass equals its energy divided by its mass times its rotational speed equals its energy divided by its momentum.

Speed of Gravity Constant $G_V = \sqrt{2g_E a_o^2/R_E M_L^3} = 9.2116 \times 10^{-14} \text{ m/s}$

The gravitational velocity constant is equal to the square root of two times the force of gravity at Earth's surface times the Bohr radius squared divided by Earth's radius times Earth's Masslength cubed.

This is the gravitational escape surface/velocity of a Hydrogen atom at the Bohr radius. This three-dimensional escape/surface velocity constant has the same value for all bodies in the universe.

Earth's Escape/Surface Velocity $V_{es} = \sqrt{2gR_E} = 11,189 \text{ m/s}$

The escape/surface velocity of Earth at a distance from its center is equal to the square root of 2 times the local acceleration of gravity times the distance to Earth's center. The escape/surface at Earth's sea level is $V_{es} = \sqrt{2g_E R_E} = 11,189 \text{ m/s}$ and the escape/surface velocity at a GPS satellite is $V_{es} = 5,471 \text{ m/s}$.

This is the law for the measurement of the upward gravitational velocity on Earth's surface and above. It is the measurement of these upward forces and velocities that are used to calculate the momentary positions of falling bodies and orbiting satellites. These measured velocities are used to determine the Lorentz transformations of both gravitational mass and inertial mass in orbiting satellite clocks. The decreased gravitational mass of an orbiting clock caused by the decrease in its escape/surface velocity causes it to run faster in order to conserve its constant angular momentum $p = mvr$.

Force of Earth Gravity $g_E = \sqrt{M_E G_V^2 M_L^3 / 2a_o^2} = 9.807 \text{ m/s}^2$

The force of gravity at Earth's surface is equal to the square root of Earth's mass times the speed of Gravity squared times Earth's Masslength cubed divided by two times the Bohr radius squared.

The speed of light and the speed of gravity are the two velocity constants that control the dynamics of the Living-Universe. The speed of light is a constant for the masslengths of all photons and atoms and the speed of gravity is a separate velocity constant for the masslength of each individual body of mass. Their difference in magnitude between the two is approximately $C/G_V = 1/300,000,000,000,000,000,000$.

Time Intervals of Orbiting Clocks $t' = T/\sqrt{1 - (v_{es}^2 + v_o^2)/c^2}$

The recorded intervals of an orbiting clock is equal to the clock's rest time interval divided by its escape/surface velocity squared plus its orbital velocity squared divided by the speed of light squared.

The recorded time interval of a GPS clock with an escape/surface velocity of 5471 m/s, and an orbital velocity 3868 m/s is $t' = T/\sqrt{1 - 5471^2 + 3868^2/c^2} = 1.0000000002497$. Clocks at the equator with $V_{es} = 11,189 \text{ m/s}$ and $v_o = 448 \text{ m/s}$ are calculated to have longer intervals of 1.000000000696. This difference of 4.479×10^{-10} interval must be added to the rate of GPS clocks to synchronize them with equator clocks.

Bohr Radius $a_o = \lambda_{Ly} \alpha / 4\pi = 5.29177294 \times 10^{-11} \text{m}$

The Bohr radius is equal to the wavelength of the Hydrogen ionization photon times the fine structure constant divided by 4 Pi.

The Bohr radius is one-half the distance between the proton and electron in the ground state Hydrogen atom. In three dimensions, it is the physical size of the photon-producing portion of the Hydrogen atom. On the cosmic time scale of the Living Universe, the Bohr radius is not constant and grows smaller in response to the increasing mass to size ratios between electrons and protons.

Fine Structure Constant $\alpha = 4\pi a_o / \lambda_{Ly} = .0072973531$
 $1/\alpha = 137.0359891$

The fine structure constant is equal to 4 pi times the Bohr radius divided by the wavelength of the Hydrogen ionization photon.

This is the evolving ratio between the fractal layers of the circlon shape within the photon-producing portion of the Hydrogen atom. $1/\sqrt{\alpha} = 11.7$ is the ratio between the radii of the primary, secondary and tertiary coil structures within the circlon shape of the electron and proton. $1/\alpha = 137$ is the ratio of coil radii between the primary coils and the tertiary coils the of the circlon shape. In the Living-Universe, the fine structure “constant” grows larger with decreasing electron mass. Quantum mechanics uses the fine structure constant in many of its calculations but has yet to develop a physical assumption to explain its meaning and function within the structure of atoms.

Neutron Stability Number $\#_{NS} = M_p / M_e \sqrt{\alpha} = 157$

Today the neutron stability number is equal to the mass of the proton divided by the mass of the electron times by the square root of the fine structure constant = 157. This is the ratio between the primary coils of the electron and the secondary coils of the proton’s circlon shape.

This ratio controls the formation and stability of the neutron. As the stability number rises with the electron’s decreasing mass and increasing size, the neutron’s stability decreases. In the distant past, when its stability number was less than one the neutron was stable.

Neutrons are formed when an electron is “captured” inside the circlon shaped structure of a proton. Today it takes an appropriate amount of energy to compress the circlon shape of an electron and force it inside of the proton’s much smaller circlon shape. When the neutron decays back into an electron and proton, this stored up energy is released in the form an

antineutrino and the kinetic energy between electrons and protons. In the past, when electrons had greater mass and the fine structure was smaller, neutrons were more stable and it took less energy for them to form and decay.

Temperature of the Cosmic Blackbody Radiation $T_{\text{CBR}} = 2.726^\circ\text{K}$

This is the universal and constant temperature of the CBR spectral photons that fill the Living-Universe. The value of this temperature is predicted by the evolving neutron stability number.

Today the electron/proton mass ratio is $1/1836$ and the value of the neutron stability number is 157. In the Living Universe, the spectral photons of the 2.7°K CBR were emitted when the electron/proton mass ratio was $1/146$ and the neutron stability number went from $N_{s\#} = M_p/M_E\sqrt{\alpha} = \text{less than } 1.0$ to more than one $1.0+$. The blackbody radiation temperature of matter at this atomic mass ratio was 2.7°K , and the temperature of wavelengths of these blackbody photons have not changed since they were produced. Big Bang's metaphysical assumption of an expanding spacetime continuum is not needed to cool the CBR temperature.

Dipole Anisotropy of the Cosmic Blackbody Radiation = 375 km/s

The photons of the Cosmic Blackbody Radiation form a virtually perfect blackbody distribution curve for the temperature of 2.7°K .

The only defect in this perfection is that the temperature is slightly warmer in the direction of the constellation Leo and cooler in the opposite direction toward Aquarius. These temperature differences produce Doppler effects for the relative velocity of 375 km/s. Careful measurements of these shifts can be used to locate the zero momentum rest frame of matter through which all photons move at the speed of light. From this we can conclude that Earth is moving with absolute motion toward Leo at approximately 375 km/s. This is also true for the rest of the solar system. If we take the rotation of the Milky Way into account we can see that it is moving at about 600 km/s in a somewhat opposite direction.

Hubble Constant $M_E/M_p = 1/1836$

The Hubble constant is a measure of the evolving value of the mass of the electron divided by the mass of the proton. This is the rate that electron mass decreases in relationship to proton mass.

This evolving mass and size ratio between electrons and protons is the value that determines the momentum and wavelengths of the spectral photons of the elements. The Hubble constant is the historic record of de-

creasing mass and expanding size of the electron during the evolution of the Living Universe. It is not the expansion of the galaxies that produces the Hubble shift. The red shift results from the synchronous expansion of electron size in the Living-Universe as a whole.

Hydrogen's Ionization Photon $\lambda_{Ly}^{\infty} = 4\pi a_0 / \alpha = 9.11267052 \times 10^{-8} \text{m}$

The intrinsic photon of the Lyman series of Hydrogen's radiation spectrum is equal to 4 pi times the Bohr radius divided by the fine structure constant.

This is the last and most energetic in the infinite group of the Lyman series of Hydrogen's spectral photons. Its energy of $E = mc^2 = 2.179 \times 10^{-18} \text{ J}$ represents the total ionization energy between an electron and proton. In the Living Universe, the wavelengths of this and other spectral photons gradually decrease with the decrease in electron mass as measured by the Hubble constant.

All of Hydrogen's spectral photon wavelengths can be calculated with variations of this formula. For example, the intrinsic photon of the Balmer series is $\lambda_B^{\infty} = 16\pi a_0 / \alpha = 3.645982 \times 10^{-9} \text{ m}$. Measurements of atomic spectral photons from deep in the Living-Universe show that they have longer and longer wavelengths that correlates with the time and distance of the stars that emitted them.

Based on the above laws there are only two plausible theories for this Hubble red shift. The most logical and simple local explanation is that during the evolution of the Living Universe, the mass of the electron has been gradually decreasing in value. As the electron decreased in mass and increased in size, it caused the Bohr radius to contract and the fine structure constant to grow larger. This gradual process is slowly increasing the energy of spectral photons and decreasing their wavelengths. This solution for the cause of the Hubble shift only requires the physical assumption of evolving electron mass. This decrease in electron mass is a physical measurement based on the above physical laws.

The standard non-local Big Bang theory explanation of the cosmological red shift requires the unmeasured metaphysical assumption that the outer galaxies are all moving away from Earth with a tremendous amount of momentum and energy that cannot be accounted for by any physical processes. The alternative to this explanation is the unmeasured metaphysical assumption that the galaxies are not actually moving apart with the inertial motion that would produce Doppler shifts but rather the "space" between but not within the galaxies is expanding in such a way that it absorbs the momentum of both the galaxies and the photons mov-

ing between them. The main problem with this theory is that it completely violates the conservation laws for mass, momentum, and energy. There is no physical way, within the laws of electrodynamics that this proposed expanding space could absorb such large amounts of momentum and energy from these photons without leaving a trace. Also, this theory leaves open the mechanism of the red shift. Does the expansion cause the photons to slow down to produce a relative motion Doppler shift or does their speed at c remain constant with a non-Doppler shift occurring from an unspecified internal reduction in the photon's mass, momentum and energy?

Conclusion

The above group of physical principles, constants, and equations are used by all theoretical physicists in their calculations to predict the measured values of physical events to match the assumptions of their theories. In particular, these are the physical laws that describe the basic dynamics of the proton, electron, photon, and gravity and any theories for their interactions must incorporate these principles of measurement into their assumptions.

These laws are just the measurements that we make of our physical reality. They are not part of any theory proposed to explain the cause of their dynamics. The accuracy of these equations has never been convincingly challenged. All that remains in question for theories to describe are the true underlying dynamic structures of the matter and photons being measured. These laws are the measured effects of experiments for which the assumptions of theories predict causes. For theorists to make one of these laws an assumption instead of a principle of measurement, they would have to present a physical measurement in which the law was not valid. For example, all gravitational attraction theories assume a downward direction for the force and motion of gravity when all physical measurements calculate the motion and force of gravity to be in an upward direction.