

Physical Conclusions of Experimental Physics Versus Metaphysical Assumptions of Theoretical Physics

Theoretical physicists create assumptions for their theories to explain the results of measurements made by experimental physicists. If the assumption corresponds to the measured values then it is a physical assumption and becomes a principle of measurement. If the initial assumption does not correspond to the experimental measurement it is a metaphysical assumption and becomes a theory of measurement. Experimental physicists validate principles for the measurement of mass, space, time, and gravity and theoretical physicists imagine unmeasured theories of atoms, photons, and the force and motion of gravity.

An example of a principle of measurement is an accelerometer reading. The physical assumption is that force ($F = ma$) changes the direction and magnitude of the motion of mass along a single vector. The result of change in motion is a positive or negative value of momentum $p = m \cdot v$. Change is measured as acceleration/deceleration ($a/d = F/m$). Measurements show that accelerometers measure an unknown combination of acceleration and deceleration along a single vector. The total quantity of a force is momentum and momentum is the basis of all measured physical interactions,

Another principle of measurement is the clock reading. The physical assumption of the clock is the idea that a spinning rigid body of mass will continue to spin at a constant rate (rpm) until its conserved quantity of angular momentum is changed by a centrifugal acceleration/deceleration. The rate of a Cesium clock is a function of the angular momentum of the Cesium-133 atom. When the momentum of a Cesium clock is changed by either accelerating or decelerating it either to or from a high velocity, its momentum in the form of mass will increase with acceleration or decrease with deceleration. This change in mass and momentum has no effect on the Cesium atom's conserved quantity of angular momentum. The result of this change in the atom's mass combined with a constant angular momentum is that its rotation and the rate of the clock slows down with acceleration and speeds up with deceleration.

Whereas accelerometers are able to measure the precise quantity of change in a body's relative momentum vector, they can tell us nothing about its absolute momentum vector. Measurements with atomic clocks allow us to differentiate between acceleration and deceleration and determine a body's absolute momentum vector relative to the zero momentum position of absolute rest where no bodies have any momentum and all clocks run at their maximum rate. All photons within the zero momentum

frame move at c and have no Doppler shifts at either emission or absorption.

The first principle of measurement (momentum) defines the relative linear motion of mass, the second principle of measurement (angular momentum) defines the absolute rotational motion of mass. The third principle of measurement (force) defines positive and negative changes in the motion of mass.

When the conclusions reached through measurement do not match a theory's initial assumption, it becomes metaphysical. A metaphysical assumption is one that cannot be verified or validated by the scientific method of physical measurement. A theory may produce a conclusion that matches the experiment but only by adding additional metaphysical assumptions. Many theoretical physicists discard metaphysical assumptions as soon as they realize they do not reach a logical conclusion. However, others find some metaphysical assumptions to be so psychologically and emotionally pleasing that they refuse to remove them from their theories despite their lack of logical resolution with experiment.

The prime example of this is the assumption (not a principle) of the equivalence of inertial motion and gravitational motion. All accelerometer and atomic clock measurements show that gravity and inertia are equal but certainly not equivalent. Even so, theories such as General Relativity conclude that atomic clocks and accelerometers are completely wrong when they measure the direction of the force and motion of gravity to be up instead of down.

The only assumptions of the Living Universe are that the measurements are as accurate as possible. How can accelerometer and atomic clock readings lack credibility. Peer reviews of experimental physics are only concerned with the accuracy of measurement and I have no reason to believe that the values I present are not reasonably accurate.

The whole point of this book is to describe the physical, philosophical and even the psychological and emotional differences between the physical principles of measurement and the metaphysical assumptions used to validate the conclusions of the standard model theories of physics and the Big Bang. This book is not really about any new theories. I do not assume, present, describe, or propose any ideas that I would consider to be new theories of physics or cosmology. My analysis of Living Universe dynamics is strictly limited to conclusions reached from experimental measurement.

The descriptions in this book are the opposite and are opposed to the assumptions of theoretical physics. They are strictly about the conclusions of experimental physics. I describe a series of experimental measurements that reveal principles of measurement that have been widely accepted by experimental physicists since the time of Newton and before. These are the natural “laws” that all theoretical physicists must use to describe the proposed metaphysical assumptions of their theories. I simply describe the physics that we measure and use only conclusions of measurements. I do not propose any metaphysical assumptions such as aethers or fields that could be characterized as “theories”.

4 Conclusions of Physical Measurement that are Not Assumptions

I reach four conclusions of measurement that are opposite to the four basic initial metaphysical assumptions of the Standard Model Theories of Physics and Cosmology.

In my *first conclusion*, I use accelerometers and atomic clocks to measure the upward direction of the force and motion of gravity. Accelerometers are used to measure an upward force at Earth’s surface and atomic clocks are used to measure the upward gravitational motion produced by that force. The conclusions of these experiments is that gravity is the constant upward motion of Earth’s surface caused by a combination of the upward acceleration of mass and the downward deceleration of time. Orbits are caused by the combined vectors of the satellite’s transverse orbital velocity and its upward radial escape/surface velocity.

The conclusion of these measurements is the principle of the gravitational expansion of mass, space, and time. This is just a measurement and not a theory of gravity that would be applicable to peer review. The standard model gravity theories have all adopted the metaphysical assumption of the equivalence of gravitational motion and inertial motion even though all measurement shows them to be equal. The conclusion of the imagined equivalence of gravity and inertia is that the force and motion of gravity point down and the conclusion of the measured equality of gravity and inertia is that the motion and force of gravity point up.

These measurements do not lack the slightest credibility. Is the peer reviewer going to say that atomic clocks and accelerometers can’t be relied on to make accurate measurements? Theoretical physicists all seem to have an unconscious psychological or emotional stake in their idea that gravity points down even though their subconscious minds use their sense of balance to constantly adjust the orientation of their bodies to match the

upward force of gravity. We all feel gravity's upward push but only crackpot theoretical physicists try to imagine that it is a downward pull.

My **second conclusion** is that all measurements of photons can be used to determine their mass. This is not a new theory of the photon. I describe the many ways that photons can be measured but I do not prescribe any theories or attributes to photons that cannot be directly measured. The only conclusion I reach from measurement is that the photon is a mechanical particle produced in an interaction between an electron and proton.

The Standard Model Theories of Physics are all based on the unmeasured metaphysical assumption ($e = mc^2$) that the mass of electrons and protons can be converted into the pure energy of massless photons. This formula and its idea of the massless photon has been widely acclaimed but it has never received any experimental verification. The proper equation for the photon is $cC = e/m$.

We measure photons the same way we measure electron and protons. They all have precise values for momentum, angular momentum, energy, and wavelength (size). Each of these values is a function of mass. The scientific method for the measurement of mass requires that photons have the same kind of mass as electrons and protons. There has never been any scientific evidence for the metaphysical assumption of the massless photon. The only evidence in support of it is purely psychological, emotional, or irrational in nature. Peer reviewers might say that they have a firm psychological belief in the idea of the massless photon because even Einstein believed it be true. The massless photon is what all standard model physicists have voted for and they believe in it even though they have never been able to measure and verify a negative.

My **third conclusion** is that the mechanical circlon shapes of the electron, proton and neutron can be fitted together into an equation-like nuclear stability model to represent all of the stable isotopes on the periodic table of the elements. This nuclear structure model accommodates all of the more than 2000 nuclear isotopes that have been discovered. The circlon shape is not a theoretical assumption. It can be observed and measured on all levels of scale from photos of electrons and other atomic particles in cloud chambers to the smoke rings produced by supernova explosions. Nor is the nuclear stability model equation the assumption of a theory. It is simply a work of scientific art that is just a new formulation of the standard periodic table. It contains not just a space for each of the known chemical elements like the standard periodic table, but also a space for each of their isotopes.

The nuclear stability model on the back cover of this book is not a new theory of nuclear structure since quantum mechanics does not have a real theory of nuclear structure other than the old liquid drop model. What I have done is to take each of the 2000 or more nuclear isotopes that have been identified by experimental physicists and fitted them into an already existing nuclear jigsaw puzzle based on the periodic table. All the pieces fit perfectly in the puzzle and none are left over. This is not a theory of nuclear structure because no assumption is made other than the accuracy of the measurements identifying the individual isotopes. This model requires an art critic not a peer reviewer.

My *forth conclusion* of measurement explains the evolution of matter in the cosmos without proposing any initial metaphysical assumptions. The only assumption made is for the eternal existence, equality, and stability of electrons and protons. This assumption is actually a conclusion based on measurements of the cosmos that show the eternal relationship between mass, space, inertial time, and gravitational time. What these measurements show is that the electron has been gradually losing mass and increasing in size over the history of the universe. This can be considered as a new class of entropy or even a new law of thermodynamics.

The Big Bang is a theory based on the initial metaphysical assumption of constant electron mass. In contrast, the Living Universe is a series of physical conclusions reached from astronomical measurements of the cosmos for which no initial metaphysical assumptions are made.

I will go into more detail about the principle of the Living Universe and its relationship to Big Bang theory in an attempt to explain what I believe to be the difference between the assumptions of theories made before measurement and the conclusions of experimental measurements that are made without prior metaphysical assumptions. I will go from one astronomical measurement to the next without using any metaphysical assumptions to explain their values.

Physical Conclusions of Measurement Versus the Metaphysical Assumptions of the Big Bang Theories

The Standard Model Big Bang Theory of creation has been developed around a single metaphysical assumption for which there has never been any supporting physical evidence. It is assumed that the electron/proton mass ratio of 1/1836, that we measure today, is an eternal and universal constant that had the same value at the beginning of the universe and will remain the same in the future. All subsequent metaphysical assumptions of the theory have been made in an attempt to validate and comply with this initial assumption.

There is no logical reason to make the assumption of constant electron mass. It taints every measurement that we make within the cosmos, and requires additional metaphysical assumptions to account for each new and unexpected astronomical measurement. For example, since we measure almost no positrons and antiprotons in the universe today, it is necessary to make the assumption that the laws of quantum mechanics were violated during the Big Bang singularity creation process because protons and electrons were created from pure energy photons without their antiparticles.

The Living Universe is a duality creation process in which today's electrons and protons were formed in a serial bifurcation event at the point in time when their mass ratio was 1/1 and they were matter/antimatter pairs contained within the structure of neutrons.

Cosmological Red Shifts

When Hubble discovered the red shift in spectral photons from distant galaxies in the 1920's, the assumption was made, first by Hubble and later by Einstein, that the 1/1836 electron/proton mass ratio was a universal constant. The conclusion reached from this assumption was that the observed red shifts had to be Doppler shifts caused by all of the Galaxies moving apart at high velocities. This led to the conclusion that the universe was once much smaller and may even have emerged from a single point in spacetime called a singularity. It was believed that protons and electrons with mass ratios of 1/1836 came pouring out of a tiny hole in the fabric of spacetime. Once they reached their present day numbers, the hole closed, never to open again. It was then concluded that this enormous cloud of electrons and protons spread out evenly within the spacetime continuum and then eventually somehow congealed into today's universe of stars and galaxies while all the time perfectly maintaining their mass ratio of 1/1836. There are many ways that Big Bang theorists use several quite preposterous metaphysical assumptions explain the details of this creation event, but all agree on the final result. Today, we live in a universe occupied by countless photons and perhaps about 2^{256} electrons and protons with a mass ratio of 1/1836. All Big Bang theorists have an almost religious devotion to the idea of a constant and eternal electron/proton mass ratio of 1/1836. If they ever were to doubt their faith in this ratio, their cosmological theories would be far different.

In the Living Universe principle, measurements of the Hubble shift are taken at face value. The measurements show that long ago atoms in distant galaxies emitted spectral photons that had substantially less momentum and longer wavelengths than the spectral photons emitted by the same atoms here on Earth. This is what we measure without making any assumptions.

When an experimental physicist examines the Hubble shift, there is no reason to begin with the assumption that the current electron/proton 1/1836 mass ratio is a universal constant and then conclude that the Hubble photons are Doppler shifted by atoms moving away from us at high velocity and blue shifted in the opposite directions. In fact, the steadily increasing red shift with time and distance is virtual proof that electron mass has been gradually decreasing over the history of the universe. It can be calculated that the most distant Hubble galaxies with Z numbers of around 10 would have electron/proton mass ratios of about 1/900. From this it is concluded that all of the galaxies are relatively stationary and are not racing away from one another in a Big Bang explosion.

2.7°K Cosmic Blackbody Radiation

When the Cosmic Blackbody Radiation was discovered in 1965, Big Bang enthusiasts still insisted that the electron/proton mass ratio of 1/1836 had to be an eternal and universal constant. From this they concluded that atoms in the distant past would emit their classic blackbody radiation curve at a temperature of about 3000°K just as they do today. In order to cool the CBR photons to their present temperature of 2.7°Kelvin, and still maintain their perfect blackbody distribution curve, it was necessary to make the very strange metaphysical assumption that CBR photons travel in their own peculiar type of expanding spacetime continuum that increases their wavelengths and the distances between them by equal amounts, while at the same time decreasing their energy and momentum by proportional amounts.

This is the ultimate metaphysical assumption since it requires the violation of most of the physical conservation laws. First, it assumes a separate expanding spacetime medium of travel for just the CBR photons that doesn't effect the inertial spacetime in which galaxies and their photons move. It predicts a process by which 99.9% of the momentum and energy of CBR photons has simply disappeared from the universe without a trace into the fabric of this peculiar and unprecedented expanding continuum. This violates the first and second laws of thermodynamics, as well as the conservation of momentum and the laws of electrodynamics. However, the Big Bang buffs claim that this assumption is necessary to finally resolve Olbers' paradox. Without this miraculous method for cooling of the CBR temperature by a factor of 1000, the universe would be far too hot for human habitation.

In the Living Universe, where the mass of the electron is measured to decrease with time, the CBR was produced when the electron/proton mass ratio was 1/146 and the temperature of the classic blackbody radiation

produced by atoms was 2.7°K . It can then be concluded that the CBR photons have not cooled or changed in anyway from the time that they were emitted and no conservation laws need be violated by the metaphysical assumption of an expanding spacetime continuum.

Without a completely separate expanding spacetime continuum for both the Hubble photons and the CBR photons, theorists have been unable to explain why galaxies near the edge of the universe are red shifted by a factor of about $Z = 10$ and the CBR photons traveling a similar distance have been red shifted to about $Z = 1000$.

In the Living Universe, CBR photons move through space with inertial motion in the same way as all other photons. When an experimental physicist examines the photons of the 2.7°K Cosmic Blackbody Radiation it is a simple calculation to determine that this enormous blast of energy was produced when the electron/proton mass ratio was $1/146$. These photons have the same momentum, energy and wavelengths today as when they were emitted.

Electron and Proton Creation Equality

In the standard model Big Bang theories, it is a conclusion of the assumption of eternal electron mass that protons were created when the temperature of photons from the singularity cooled to the point to where they could create proton/antiproton pairs. As the temperature cooled from this point, the photons were no longer able to produce these matter/antimatter pairs. The theory then concludes that when the singularity cooled by a factor of 1836 the remaining singularity photons were suddenly able to create electron/positron pairs. Then as the temperature cooled a few more degrees, these photons were no longer able to produce matter/antimatter (electron/positron) pairs. Big Bang theory offers no explanation why the electron/proton ratio is $1/1836$ and not some other ratio.

At this point, we now have a universe containing vast numbers of photons mixed with electron/positron and proton/antiproton antimatter pairs. It is then concluded from the assumption of constant electron mass that all of these original positrons and antiprotons somehow just disappeared from the universe, even though all of the original protons and electrons are still present and accounted for. Big Bang theorists have several smoke and mirrors explanations of how all this “antimatter” could vanish from the Cosmos, but all of these ideas violate one or more laws of experimental physics.

A major contradiction is charge parity. You can't create a proton's positive charge with also creating an identical negative charge. How can you destroy the antiproton's negative charge without a positive charge?

Also, you can't create an electron's negative charge without creating a positive charge. The theorists have no physical way to destroy the positive charge of the positron without somewhere getting negative charges from somewhere to balance them out.

Theorists have never been able reach a conclusion as to why the numbers of electrons and protons in the universe appears to be nearly equal. They were created at greatly different singularity temperatures and the electrons were created from fewer available photons. Also, theorists have never produced a logical explanation as to why the electron/proton mass ratio is 1/1836 and not some other value.

Based on the electron mass constant, some Big Bang cosmologists assume that somehow all of the original antiprotons and positrons annihilated into photons immediately after they were created. They are then forced to the conclusion that all of this photon energy has completely disappeared from the Cosmos between the time of the annihilation and today. How is it possible that there exists a perfect record of the CBR photons but no photon record of the so called great matter/antimatter annihilation? This event would have had far greater energy than the CBR by several orders of magnitude and only occurred about 300,000 years earlier.

In an attempt to verify and validate their assumption of constant electron mass, Big Bang enthusiasts make the contradictory metaphysical assumptions that annihilation photons can simply disappear into the standard spacetime continuum and then that CBR photons are able to slowly dissolve their momentum and energy into their own special expanding spacetime continuum.

In the Living Universe, the 1/1836 mass ratio is the momentary function of a point in time of the evolution of electron mass. Our protons and electrons were produced from electron/positron pairs when the electron/proton mass ratio was 1/1. Because these matter/antimatter pairs were locked within the structures of stable antineutrons, they bifurcated into pairs of stable neutrons rather than pairs of gamma photons. The conclusion reached is that the numbers of electrons and protons in the universe are exactly equal and have had an eternal existence from the time they were formed. This process was exact and no photon momentum or energy was assumed to disappear into the idea of an expanding spacetime continuum field.

Dark Energy

When it was discovered in the 1990's that the most distant supernovas had less energy and intensity than would be expected from their Hubble shifts, cosmologists still insisted that the electron mass constant was correct. From this they concluded that supernovas would have had the same energy and intensity in the distant past as they do today. To validate this conclusion, another metaphysical assumption was proposed for a new type of medium/dimension/aether/plenum that produced a repulsive antigravity field called Dark Energy. It was concluded that this otherwise undetectable energy field produced a more powerful repulsion than the attraction of gravity and caused the universe to expand at an accelerating rate.

In the Living Universe, it is natural to conclude that in the distant past, the atoms in supernovas had heavier electrons that emitted photons with less momentum and energy than the photons emitted by nearby supernovas. This caused standard candle supernovas in the distant past to have less energy and be less intense than they are today.

Conclusion

In the Living Universe all of the measured components of the standard model theories of physics and the Big Bang can be explained using the standard well established laws of physics. No metaphysical assumptions such as constant electron mass, a singularity, Guth inflation, CBR cooling or Dark Energy are needed. There is no disparity between matter and anti-matter, there is absolute charge conjugation, and there is no transformation between matter and pure photon energy. Once formed, photons are eternal and do not disappear or slowly dissolve into a peculiar expanding spacetime continuum. The universe has gone through several eras or stages of electron evolution but there can be no beginning or end to the positive/negative duality of matter's mass, space, time, and gravity.