

Experimental Interactions of Mass, Space, Time, and Gravity

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Abstract

There is a great deal of confusion and contradiction in the standard model relativity theories of physics and the Big Bang. There is little consensus about the true experimental nature of **Mass, Space, Time and Gravity** and their measured physical quantities of **Momentum, Force, and Energy**. Most theoretical physicists calculate and believe that mass, momentum, Force, and energy are stand along entities that can be physically separated from one another.

Einstein's primary theoretical mistake was his metaphysical assumption of massless photons containing single and separate quantities of energy and momentum. Physical measurements of photons calculate them to be eternal units of a yin yang dichotomy of Energy/Mass = cC . Big Bang's initial assumption of a singularity of pure energy ($e = mc^2$) has never been reconciled with the measured Energy/Mass ($E/M = CC$) contained in the electrons, protons, photons, atoms, and stars in today's cosmos. The conservation of momentum as calculated by the Lorentz transformation is the primary parameter of all physical measurements. Energy is the secondary parameter used in calculating a change in momentum.

Einstein's second theoretical mistake was his metaphysical assumption of the Equivalence Principle with its downward direction of accelerating gravitational motion and force. All measurements with clocks and accelerometers clearly show that measured upward deceleration of Earth's gravitational momentum produces an upward gravitational force and a deceleration of time. The Force of gravity $F = MS/T^2$ extends no further than the surface of each atom. Gravity is measured as changing momentum and then calculated as kinetic energy.

Mass, Space, Time, and Gravity = MS/T & MS/T^2

Mass, Space, Time, and Gravity are the four basic metaphysical assumptions for the reality of physical measurement. They have no separate definitions outside of these two equations. Their separate values can be measured but only as a part of the whole. The following 12 equations contain the full spectrum of parameters in our measured reality. There are no measurements we can make that are not calculated by one or more of these equations.

$1 \text{ kg} = T/S, 1 \text{ meter} = T/M, 1 \text{ sec} = MS, P_G = MS/T, \text{ and } g = MS/T^2$

$p = ms/t = mv = \text{momentum and } F = ms/t^2 = ma = \text{Force}$

Kinetic energy $e = ms/t^2/2$ & Photon energy $e = mc^2/2 + e = mC^2/2$

Electron and photon angular momentum $I_{\omega} = m_e a_o c$ and $m\lambda C/2\pi$

Lorentz transformation $m' = M/\sqrt{1-s/t^2/c^2}$

Momentum and Force versus Kinetic Energy

All physical measurements are primarily based on changes in momentum vectors as measured by force and quantified with kinetic energy. These are ultimately the only measurements of Mass, Space, Time, and Gravity that can be made by experimental physicists.

The only two quantities in any physical measurement process are momentum and Force combined into two separate values of absolute acceleration and deceleration. Energy is a secondary quantity in the calculation used to separate a single Force into two equal changes in momentum. ***A moving body does not contain energy.*** Energy does not appear as a measured value until the momentum of one body is decelerated. Deceleration produces a Force that accelerates a second body and conserves the equal and opposite changes in the momentum of both bodies. Conservation of absolute momentum is the two-way Lorentz transformation relative to ZMR and conservation of energy is measured as single changes in momentum relative to a force. In this measured action and reaction, a quantity of momentum is equally divided and conserved and is calculated as multiple unequal conserved kinetic energies. The conservations of momentum and energy are just opposite calculations of the same thing. Momentum is the motion of mass relative to rest $p = mv$ and energy is the motion of mass relative to the speed of light $e = m(v/c)^2/2$.

Deceleration versus Acceleration

The deceleration in the momentum of one body is the Force that causes the accelerated momentum of a second body. Deceleration and acceleration produce equal and opposite momenta in the two bodies. The magnitude of a Force is measured as two separate and unequal energies of the bodies. Energy is simply the idea used to quantify a single body's change in momentum.

Deceleration is always the cause of a Force and acceleration is always the opposite effect of a Force. A Force always produces two equal momenta and two unequal relative quantities of energy.

Atoms and Photons are Composed of Momentum and Not Energy

A photon does not contain Energy. It contains equal quantities of Linear Momentum $p = mc$ and Angular Momentum $I\omega = m\lambda C/2\pi$. When a photon is absorbed, the change in its momentum is measured as two separate unequal energies $e = mc^2/2 + e = mC^2/2 = mcC$. The energy of its linear momentum is Doppler shifted relative to each observer's inertial frame but its angular momentum is absolute and has the same value for all photons in all frames.

The atomic value of any photon is Energy/Mass = cC . When a photon is absorbed, the energy of its two momenta change the momentum of the absorbing atom. The atomic value of any atom is Energy/Mass = CC . It is an inseparable unit of the atom's mass spinning at C in two different directions.

All experimental measurements of photons and atoms are calculations of changes in momentum produced by force. Energy is the general quantity of a force being divided into multiple momenta. When we watch TV, photons are emitted by atoms at the screen and absorbed in our eyes. Our optical cells record that violet photons produce a change in momentum about twice as great as red photons. Energy plays no part in this process because our cells cannot detect and record something that does not physically exist.

There are many ways that momentum can be measured but there are no measurements that do not quantify momentum. Energy is always calculated from a change in momentum and physically exists only as an idea in the theorist's mind. Energy is positive when it results from a deceleration and negative when measured as an acceleration. In this way, energy is always conserved but only as a relative effect of momentum conservation.

Energy is a Momentary Quantity, Not a Continuous Substance

Energy has no definition in experimental physics other than as the calculated value of a single change in momentum.

All measurements of energy are combinations of changes in linear momentum, angular momentum or gravitational momentum. Momentum is the absolute quantity of a single body's motion and angular momentum is the relative angular motion between two bodies. Momentum can only be measured as energy relative to a stationary force and angular momentum is always measured as centripetal forces relative to a center of mass.

Momentum is a Conserved Absolute and Equal Dual Quantity.

Energy is a Single Quantity of Motion Relative to a Force.

Momentum $(+p = mv) + (-p = mv) = 0$ is conserved as dual equal and opposite quantities of momenta that together equal zero relative to Zero Momentum Rest. Kinetic energy $e = mv^2/2 + e = mv^2/2$ is conserved as two unequal quantities relative to the deceleration and acceleration produced by a single force.

Momentum $p = mv$ is the primary passive measure of the motion of matter and kinetic energy $e = mv^2/2$ is the secondary active measure of change in momentum. Momentum has eternal existence and energy is just a momentary measurement of changing momentum. *Energy does not "exist" before or after a measurement.* Energy is merely a potential property of momentum and does not show itself until one momenta is changed and conserved with an opposite momenta. A Force creating two equal momenta is measured as two unequal quantities of energy $F = mv^2 = (e = Mv^2/2 + e = mV^2/2)$.

*Momentum is the true, absolute and eternal reality.
Energy is just an arbitrary value for its relative measurement.*

Matter-Antimatter Annihilation

The only time that the creation of two equal momenta is measured as two equal energies is when an matter/antimatter pair such as an electron and positron annihilate into a pair of identical photons (electron $-E/M = CC$) + (positron $+E/M = CC$) > (photon $e = mcC$) = (photon $e = mcC$). This is only exactly true when the interaction occurs at ZMR and neither photon is Doppler shifted.

General Relativity's Metaphysical Calculation of Potential Energy

With its Equivalence Principle, General Relativity imagines an upside down and backward non-experimental view of gravity in which a one kilogram Gold ball located at one kilometer above Earth's surface is said to have 10,000 Joules of virtual Potential Energy.

$$\begin{aligned} \text{Potential Energy} &= mgh = 1\text{kg} \times 10 \text{ m/sec}^2 \times 1000 \text{ m} = 10,000 \text{ Joules} \\ \text{Velocity of fall } v &= gt \text{ from } 1000 \text{ m} = 141.4 \text{ m/sec} \\ \text{Time of fall } t &= v/g \text{ from } 1000 \text{ m} = 14.14 \text{ sec} \end{aligned}$$

The problem with the idea of potential energy as a real quantity is that it can never be given a measurable value. If the gold ball has PE = 10,000 J with Earth, then it must also have PE = 886,205,000 J with the sun and ?????? J with the Andromeda galaxy. It is illogical to believe that the Gold ball contains a near infinite amount of potential energy relative to all bodies in the cosmos. If this energy had mass, as all energy does, we would be able to weigh it as we can with other quantities of energy.

Some General Relativity theorists believe it is a GPS clock's "relative potential energy" that causes it to run faster than sea level clocks. This cannot be true because potential energy cannot be measured. It is the decreased gravitational momentum P_g of the clock's escape/surface velocity V_{es} that decreases its mass and decreases the length of its recorded intervals due to the Lorentz transformation of mass, space, and time combined with the conservation of angular momentum.

The Principle of Absolute Gravitation Momentum

With the Principle of Absolute Gravitation Momentum it is calculated and measured that the Gold ball's 10,000 Joules of relative kinetic energy is actually contained within Earth's upward gravitational momentum and not within the relative motion of the "falling" ball.

When the Gold ball is accelerated up to a point 1000 m above Earth's surface its gravitational momentum is actually being decelerated from $V_{es} = 11,179.5$ m/sec at its surface to $V_{es} = 11,178.6$ m/sec at the ball's location. As the ball

Gravitational Momentum = P_g vs Energy = PE

Energy of momentum difference
between escape/surface velocities at
sea level and 1000 meters above.

Momentum
Clock Interval

Difference in $P_g = mv = .88$ m/s
Energy of .88 m/s @ $V_{es} = 9838$ Joules

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

GPS Orbit = 4.175 R
GPS $V_{es} = P_g = 5,471$ m/sec
GPS Clock Interval $P_g = t' = 1.0000000002497$ sec

Sea Level = 1 R
SL $V_{es} = P_g = 11,198$ m/sec
SL Clock Interval $P_g = t' = 1.0000000006976$ sec

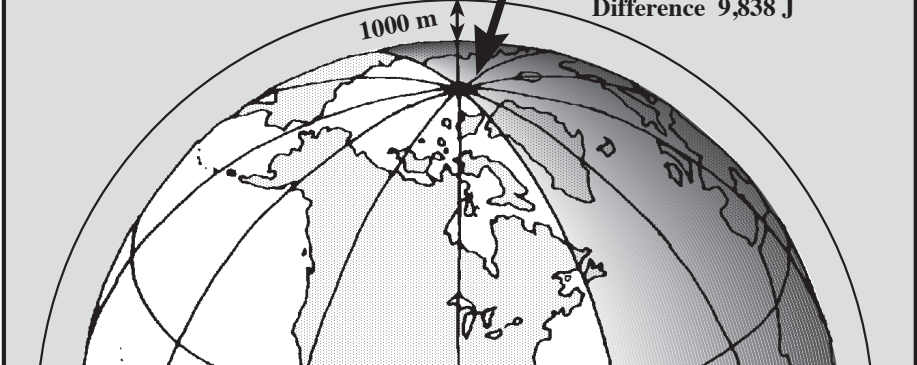
Energy of 1 kg ball falling 1000 m
 $g = 9.832$ m/s
Height of Fall = 1000 m
Energy of Fall = 9832 Joules
Velocity of Fall $mv = 140$ m/s
Potential Energy $PE = 9832$ J at top

Energy is relative
Momentum is absolute
Relative Momentum $p = 140$ m/s
Absolute Momentum $P_g = .88$ m/s
Kinetic Energy $e = mv^2/2$ is the same

Radius = 6,379,137 m
 $g = 9.8291$ m/s
 $V_{es} = 11,178.6$ m/s = P_g
Energy of $V_{es} = 62,480,549$ J

Radius = 6,378,137 m
 $g = 9.8322$ m/s²
 $V_{es} = 11,179.48$ m/s = P_g
Energy of $V_{es} = 62,490,387$ J

$E = 62,490,387$ J Bottom
- $E = 62,480,549$ J Top
Difference 9,838 J



appears to “fall” back to Earth, it actually remains stationary and undergoes no change in motion and its upward gravitational momentum of 11,179.5 m/sec remains constant. When the greater momentum of the upwardly moving Earth impacts the ball, its faster momentum is conserved with the ball’s slower momentum and this change in its absolute gravitational momentum is measured as 10,000 Joules of kinetic energy. The same value of energy can be calculated from either the ball’s relative velocity with Earth at 140 km/sec or the difference in kinetic energy between the ball’s momentum and the momentum at Earth’s surface .88 m/sec.

Every event in the above descriptions can be accurately calculated and measured with clocks, and accelerometers. General Relativity's description of these events can be accurately calculated based on metaphysical assumptions like the equivalence principle but they can never be verified by any actual physical measurements of linear momentum p or radial gravitational momentum P_g .

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

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

The Lorentz Transformation is the principle of measurement used to calculate and measure the conservation linear momentum, angular momentum and gravitational momentum. It calculates the changing measured values of Mass, Space, Time, and Gravity produced by the absolute deceleration and acceleration of the Energy/Mass = CC of atoms. The equation is arranged in three different configurations to calculate the changing measured values of Mass, Time, Space, gravity, and the speed of light c .

$$\text{Mass } m' = M/\sqrt{1-v^2/c^2}, \text{ Time } t' = T/\sqrt{1-v^2/c^2}, \text{ \& Space } s' = S\sqrt{1-v^2/c^2}$$

These equations are used to calculate the measured values of changes in momentum produced by the deceleration and acceleration of the E/M = CC of clocks and the E/M = cC of photons. They are used to calculate the clock time intervals of GPS satellites and the momentum changes of photons and linear actuators in the Pound-Rebka experiments.

GPS Satellite Clock Corrections

Corrections in GPS clocks are made with two separate Lorentz transformations of momentum. The gravitational momentum V_{es} is less at the satellite's position than at Earth's surface and this causes its clock to run faster. The linear momentum of the surface clock (Earth's rotation) is less than the satellite's orbital velocity and this causes its clock to run slower. The true rate of the satellite clock is calculated by combining and conserving these two separate momenta into a single momentum vector.

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 (tdV) of two velocities at right angles to one another. The Lorentz mass transformation at the combined vector of orbital velocity (oV) and escape velocity (esV) causes the time dilation of orbiting clocks,

$tdV = \sqrt{esV^2 + oV^2}$

Time dilation velocity (tdV) of an orbit is equal to the square root of the sum of the escape velocity squared (esV^2) and the orbital velocity squared (oV^2).

$$T_k = \frac{T_0}{\sqrt{1 - \frac{esV^2 + oV^2}{C^2}}}$$

A clock's kinetic time interval (T_k) is equal to its rest time interval (T_0) divided by the square root of one minus the escape velocity squared (esV^2) plus the orbital velocity squared (oV^2) divided by the speed of light squared (C^2).

Measuring the Speed of Light c and C

When the mass of a clock is accelerated from Zero Momentum Rest, where it has no linear momentum, to an absolute momentum vector of $p = mv$, its Energy/Mass = cc increases. As the rotating and vibrating components of the clock gain mass, the clock's rate must slow in order to conserve angular momentum $I\omega = mvr$.

At a position of ZMR, $M = 1$ kilogram, $S = 1$ meter, $T = 1$ second, and the speed of light $c = 299,792,223.8$ m/s. Here on Earth, the speed of light is measured to be $299,792,458$ m/s. With this value, the Lorentz transformation calculates that on Earth $m' = 1.00000078$ kg, $t' = 1.00000078$ sec, and Earth's momentum is $p = m \times 375$ km/s. For astronauts traveling at 86.7% c , $m' = 2$ kg, $t' = 2$ sec and the speed of light would be measured at $2c$.

The two-way speed of light does not change but is measured to increase due to the slowing of the clocks used in its measurement. If the astronauts do not consider their clocks slowing to one half and assume c to be constant, they will measure that their meter sticks have contracted to 500 mm. Astronauts or technicians on Earth can always determine the velocity of their absolute momentum, but not its vector, by measuring the two-way speed of light in their inertial frames. The slowing of their clocks from increasing momentum causes either the speed of light to be measured as increasing or the length of their meter sticks to be measured as contracting. In both cases, neither the speed of light nor the length of the meter actually changes. The only change is in the Energy/Mass = cc of clocks used to measure them.

From all of the above, it is concluded that all measurements of force are reduced to calculations of changes in absolute momentum that are quantified as units of energy.

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