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The Truth Of Spacetime

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Abstract
Einstein's Spacetime is relative and inextricably interwoven into what has become known as the space-time continuum. It is also a solution of Einstein's Field Equations. In fact, Einstein's Spacetime is the potential energy of an object or event. Like any other property of the object or event, it is the image of Wu Unit Length of Wu's Pairs (building blocks of the universe) reflecting the local gravitational field and aging of the universe. In contrast, Wu's Spacetime is a single unit measurement system which contains Wu's Spacetime Units composed of exponents of Wu Unit Length of Wu's Pairs (in the reference corresponding identical elementary subatomic particle such as a designated up quark). Based on Wu's Spacetime Transformation, all the properties of an object or event such as dimension, duration, velocity and acceleration, as well as wavelength and Absolute Light Speed can be transformed to Wu's Spacetime Quantities composed of Wu's Spacetime Units. This accompanying Wu's Spacetime Shrinkage Theory can be applied successfully in explanation of many important physical phenomena such as Gravitational Redshift, Cosmological Redshift, Gravitational Time Dilation, Hubble's Law, Universe Expansion, Deflection of Light, Absolute Light Speed, Anisotropic Light Speed, Gravitational Waves, Perihelion Precession of Mercury and Einstein's General Relativity, Spacetime and Field Equations. Furthermore, Einstein's Field Equation is derived upon the equality between curvature of potential energy and acceleration from a geodesics non-linear coordination system. In contrast, Wu's Spacetime Field Equation is derived upon the equality between acceleration and gravitational field from a Cartesian system. They are equivalent with a common term GC_o^{-4} in both equations, only if acceleration is generated by gravitational field.
Keywords: *Spacetime, Special Relativity, General Relativity, Field Equation, Wu's Spacetime, Yangton and Yington, Wu's Pairs, Principle of Equilibrium, Principle of Parallelism, Principle of Correspondence, Wu's Spacetime Equation, Wu's Spacetime Shrinkage Theory, Wu's Spacetime Transformation, Gravitational Redshift, Cosmological Redshift, Gravitational Time Dilation, Hubble's Law, Universe Expansion, Deflection of Light, Absolute Light Speed, Anisotropic Light Speed, Gravitational Waves, Perihelion Precession of Mercury.*

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I. Introduction

Most people don't understand the true meanings of space and time. They often confuse "Space" and "Time" with "Dimension" and "Duration". Even including Einstein, that is why his Special Relativity [1] is based on a wrong postulation "Light Speed is constant", also, General Relativity [2] is derived from a wrong theory "Space and Time are dependent on Acceleration, instead of gravitational field". Even worse, Einstein and his believers created a magic word "Spacetime" trying to correlate space and time together, which fabricates a lot of illusions such as curveted space, velocity time dilation, spacetime ripples, time traveling and wormhole.

In this paper, based on Wu's Spacetime Equation [3], Wu's Spacetime as a single unit measurement system, containing Wu's Spacetime Units composed of exponents of Wu Unit Length is developed. Based on Wu's Spacetime Transformation [4], all the properties of an object or event such as dimension, duration, velocity and acceleration, as well as wavelength and Absolute Light Speed can be transformed to Wu's Spacetime Quantities composed of Wu's Spacetime Units. As a consequence, these Wu's Spacetime Quantities accompanying Wu's Spacetime Shrinkage Theory [3] can be applied successfully in explanation of many important physical phenomena such as Gravitational Redshift, Cosmological Redshift, Gravitational Time Dilation, Hubble's Law, Universe Expansion, Deflection of Light, Absolute Light Speed, Anisotropic Light Speed, Gravitational Waves, Perihelion Precession of Mercury and Einstein's General Relativity, Spacetime and Field Equations.

Einstein's Spacetime

Einstein's Spacetime is interpreted by theoretical physicist as a relative and inextricably interwoven into what has become known as the space-time continuum. Unlike Wu's Spacetime which are exponents of Wu Unit Length representing compound unit quantities of space and time. Einstein's Spacetime in fact is the potential energy [5] of an object or event. It is also a solution of Einstein's Field Equations [2] derived from the equality between the curvature of potential energy and acceleration [5] of an object or event, reflecting the distribution of matter and energy in the universe.

According to Principle of Equilibrium [6], just like space (dimension) and time (duration), Einstein's Spacetime as potential energy is also a property of the object or event, therefore under both thermal and subatomic equilibriums, it has a corresponding quantity at a gravitational field and aging of the universe. Also, based on Wu's Spacetime Shrinkage Theory and Wu's Spacetime Transformation (in accordance to Principle of Parallelism and Wu's Spacetime Equation), at massive gravitational field and early aging of the universe, the curvature of Einstein's Spacetime (potential energy) like the acceleration becomes smaller, while velocity also becomes smaller, but dimension and duration of the (corresponding identical) object or event become bigger. In fact, Einstein's Spacetime (potential energy) like any other property of the (corresponding identical) object or event is one of the images of Wu Unit Length of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) reflecting the local gravitational field and aging of the universe.

Wu's Spacetime

Wu's Spacetime is a measurement system which contains a single Spacetime unit (revised from [7]), Wu Unit Length of Wu's Pairs in a reference elementary subatomic particle such as a designated up quark, compared to MKS system which contains a dual space unit (meter of a ruler) and time unit (second of a clock).

Under thermal equilibrium at a constant temperature and pressure, and at a subatomic equilibriums at a constant gravitational field and aging of universe, according to Principle of Parallelism and Wu's Spacetime Equation, a compound unit quantity composed of both space and time units in MKS system can be converted to a single unit quantity composed of Wu Unit Length in Wu's Spacetime system. For example, meter/second^2 in MKS system can be converted to $m\ n^{-1}\ \gamma^{-1}\ l_{yy}^{-1/2}$ in Wu's Spacetime system composed of reference-dependent constants m and n, and exponent of Wu's Spacetime Constant γ (a true physical constant) [8] independent of local gravitational field and aging of the universe, also exponent of Wu Unit Length l_{yy} (the diameter of Wu's Pairs in the reference corresponding identical elementary subatomic particle such as a designated up quark) dependent on the local gravitational field and aging of the universe.

Furthermore, based on Wu's Spacetime Transformation (in accordance to Principle of Parallelism and Wu's Spacetime Equation), all the properties of an object or event such as dimension, duration, velocity and acceleration, as well as wavelength and Absolute Light Speed can be transformed to Wu's Spacetime Quantities. This accompanying Wu's Spacetime Shrinkage Theory can be applied successfully in explanation of many important physical phenomena such as Gravitational Redshift [9], Cosmological Redshift [10], Gravitational Time Dilation [11], Hubble's Law [12], Spacetime Reverse Expansion (Universe Expansion) [13], Deflection of Light [14], Absolute Light Speed [15], Anisotropic Light Speed [16], Gravitational Waves [17], Perihelion Precession of Mercury [14] and Einstein's General Relativity [18], Spacetime [19] and Field Equations [19], etc.

What Is Space?

Space is the place occupied by Yangton and Yington Bubbles (vacuum) [20], and Yangton and Yington Pairs (matter or energy) [21]. According to Yangton and Yington Theory [22], there are two types of Space: Vacuum Space and Matter Space [23]. Vacuum Space is made of Yangton and Yington Bubbles which is independent of any matter and energy. Matter Space on the other hand is made of Yangton and Yington Pairs (Wu's Pairs) which can change with Wu Unit Length and Wu Unit Time dependent on local gravitational field and aging of the universe.

Space and energy are co-generated with Yangton and Yington Bubbles and Wu's Pairs [23] from "None" (no space, time, energy, or matter) at Singularity in Big Bang Explosion 13.8 billion years ago. They can coexist in the universe for a great long time before recombination and cancellation with space and time at Singularities in black holes under massive gravitational force or in Wu's Pairs after trillion years aging of the universe, such that eventually everything can go back to None [24]. Space is continuous [7] except at the Singularities where there is nothing, no space, energy, matter and time at all.

Dimension is a piece of Matter Space generated by an object. It means the associated quantity [25] of the "Dimension" property of the object, which can change with Wu Unit Length subject to the local gravitational field and aging of the universe.

Furthermore, an object taking a position in space is known as "Location". The space between two objects or points is called "Distance". Both location and distance are independent of the objects. A three dimensional Cartesian system composed of three perpendicular axes with unit length dependent on the local gravitational field and aging of the universe at the reference point and time, is used to coordinate the positions of objects (or points) in space.

What is Time?

Time is the sequence of changes on the distribution of Matter and Energy in the universe. According to Yangton and Yington Theory, there are two types of Time: Vacuum Time and Matter Time. Vacuum Time is generated by Yangton and Yington Bubbles based on the cycling process between formation and cancellation of Yangton and Yington Bubbles. Matter Time on the other hand is generated by Yangton and Yington Pairs (Wu's Pairs) based on the circulating process between Yangton and Yington Pairs which can change with Wu Unit Time dependent on the local gravitational field and aging of the universe.

Vacuum Time is created simultaneously with the first Yangton and Yington Bubble from None at Singularity in Big Bang Explosion 13.8 billion years ago. At the end of the universe, Vacuum Time will be cancelled together with the last Yangton and Yington Bubble at Singularity in black holes under massive gravitational force.

Similarly, Matter Time can be applied on Wu's Pairs. However, only Matter Time can be practically applied for time measurement because of the visibility (measurability) of Matter. Time is also continuous [25]except at the Singularities where there is

Duration is a period of Matter Time generated by an event. It is an associated quantity [25] of the "Duration" property of the object, which can change with Wu Unit Time dependent on the local gravitational field and aging of the universe.

Furthermore, an event taking place at a point of time is known as "Moment". The period between two moments is called "Interval". Both moment and interval are independent of the events. A four dimensional system including a three dimensional Cartesian system composed of three perpendicular axes with a unit length, and time as 4^{th} dimension with a unit time dependent on the gravitational field and aging of the universe of the reference point and time, is used to coordinate the positions of objects (or points) and durations of events in the universe.

Dimension Of Object

"Dimension" (a property of object) is the size of an object. Under both thermal and subatomic equilibriums, it has a fixed quantity at a gravitational field and aging of the universe based on Principle of Equilibrium. Dimension of an object is dependent on the local gravitational field and aging of the universe according to Wu's Spacetime Shrinkage Theory. "Unit Length" is the dimension of a specific reference object such as Wu Unit Length is the diameter of Wu's Pairs and Foot is the length of a human foot which is also dependent on the local gravitational field and aging of universe.

In addition, under the same thermal equilibrium but different subatomic equilibriums, based on Principle of Correspondence, the amount of unit length of an object remains unchanged as the length of the object is measured by the Unit Length of the reference object (such as the meter of a ruler or Wu Unit Length of Wu's Pairs of up quark) no matter the gravitational field and aging of the universe. This phenomenon is named "Correspondence of Length". For example, a man on Saturn is 6 Saturn Feet height and his twin brother on Earth is 6 Earth Feet height (It is equivalent to that the same person comes from Saturn to Earth under the same thermal equilibrium but different subatomic equilibriums). However, the man on Saturn is taller than his twin brother on Earth, simply because that Saturn Foot is bigger than Earth Foot due to Saturn's large gravity.

In contrast, under thermal equilibrium (constant temperature and pressure) and subatomic equilibriums (constant gravitational field and aging of the universe), the length of an object is fixed. However, different amount of unit length can be obtained if it is measured by different Unit Length.

On the other hand, because distance between two objects (points) is not a property of the objects, therefore distance is fixed and independent of the objects (points), no matter the gravitational field and aging of the universe.

Duration Of Event

"Duration" (a property of event) is the period of an event. Under both thermal and subatomic equilibriums, it has a fixed quantity at a gravitational field and aging of the universe based on Principle of Equilibrium.

Duration of an event is dependent on the local gravitational field and aging of the universe according to Wu's Spacetime Shrinkage Theory. "Unit Time" is the duration of a specific reference event such as the vibration period of a quartz resonator and the period of electronic transition of an atomic clock which is also dependent on the local gravitational field and aging of universe.

In addition, under the same thermal equilibrium but different subatomic equilibriums, based on Principle of Correspondence, the amount of unit time of an event remains unchanged as the duration of the event is measured by the Unit Time of the reference event (such as the second of clock or Wu Unit Time of Wu's Pairs of up quark) no matter the gravitational field and aging of the universe.

This phenomenon is named "Correspondence of Time". For example, a pendulum on Saturn swings 3000 Saturn Cycles (Saturn Seconds) and an identical pendulum on Earth swings 3000 Earth Cycles (Earth Seconds) (It is equivalent to that the same pendulum comes from Saturn to Earth under the same thermal equilibrium but different subatomic equilibriums). However the pendulum on Saturn is slower than that on Earth, simply because that Saturn Second (the period of pendulum swing) is larger than Earth Second due to Saturn's large gravity.

In contrast, under thermal equilibrium (constant temperature and pressure) and subatomic equilibriums (constant gravitational field and aging of the universe), the duration of an object is fixed. However, different amount of unit time can be obtained if it is measured by different Unit Time.

On the other hand, because interval between two events is not a property of the events, therefore interval is fixed and independent of the events, no matter the gravitational field and aging of the universe.

II. Yangton And Yington Theory

Yangton and Yington Theory [22] is a hypothetical theory based on a pair of superfine Yangton and Yington antimatter particles with built-in inter-attractive Force of Creation circulating against each other on an orbit. These pairs of Yangton and Yington circulating particles are named "Wu's Pairs" which is considered as the building blocks of the universe.

Yangton and Yington Theory can successfully explain that elementary subatomic particles are composed of string structures built upon Wu's Pairs with String Force in accordance to String Theory [26]. Also, String force and Four Basic Forces are induced from Force of Creation in compliance with Unified Field Theory [27].

Furthermore, Yangton and Yington Theory can bridge Quantum Theory with Relativity, also interprets and correlates space, time, energy and matter in the universe. Therefore, it is believed that Yangton and Yington Theory is a theory of everything.

III. Five Principles Of The Universe

It is proposed that the formation of the universe from beginning to the end of the universe is based on the following "Five Principles of the Universe" [20][24]:

1. There was None (no Space, Energy, Matter and Time) in the universe in the beginning.
2. None to Something must be an instantly reversible process.
3. The Something must be a pair of Antimatter particles with inter-attractive force such that they can instantly attract and destroy each other. In addition, the Corresponding Space is generated in order to hold Something in a volume of Space and Corresponding Energy is produced due to the interaction between Space and inter-attractive force.
4. From Something to permanent matter, an external force is needed to drive the pair of Antimatter particles into circulation motion so as to avoid them from recombination and destruction. Consequently, additional Corresponding Energy and Corresponding Space are generated due to the circulation motion.
5. Eventually the whole universe will end and go back to None.

IV. Yangton And Yington Bubbles

To fulfill 3rd principle of the Five Principles of the Universe, a temporary Yangton and Yington antimatter particle pairs with a built-in inter-attractive Force of Creation named "Yangton and Yington Bubbles" was produced from None (no Space, Energy, Matter and Time) together with Corresponding Space (Vacuum Space) and Corresponding Energy (Vacuum Energy) [23]. Because of the attraction nature of Force of Creation, Yangton and Yington will recombine to destroy each other with the Corresponding Space and Corresponding Energy immediately after creation, such that Yangton and Yington Bubbles are enforced to return back to None. The Corresponding Space (Vacuum Space) generated by Yangton and Yington Bubbles is the building blocks of Vacuum. It is totally independent of everything, no matter of local gravitational field and aging of the universe. On the other hand, the Corresponding Energy (Vacuum Energy) generated by Yangton and Yington Bubbles can be applied in quantum field theories. However, because it is bonded with Corresponding Space (Vacuum Space), it cannot be applied to Dark Energy for expansion of the universe.

V. Wu's Pairs (Yangton and Yington Pairs)

To fulfill 4th principle of the Five Principles of the Universe, once Yangton and Yington Bubbles were generated at the Singularity from Big Bang Explosion, by further absorbing external energy (activation energy) generated from Big Bang Explosion, the temporary Yangton and Yington Bubbles can become a permanent Yangton and Yington Pairs (Wu's Pairs) [21][22] with a circulation motion balanced between the centrifugal force generated by external force and the built-in inter-attractive Force of Creation. In addition, Corresponding Space (Matter Space) and Corresponding Energy (Matter Energy) can also be cogenerated with Wu's Pairs, which can coexist with Wu's Pairs permanently until the end of universe by recombination and destruction with Wu's Pairs and Time. The Corresponding Space (Matter Space) generated by Wu's Pairs is the diameter of Wu's Pairs (Wu Unit Length) which is dependent on the local gravitational field and aging of the universe. On the other hand, the Corresponding Energy (Matter Energy) generated by Yangton and Yington Pairs is the foundations of all the energies in the universe.

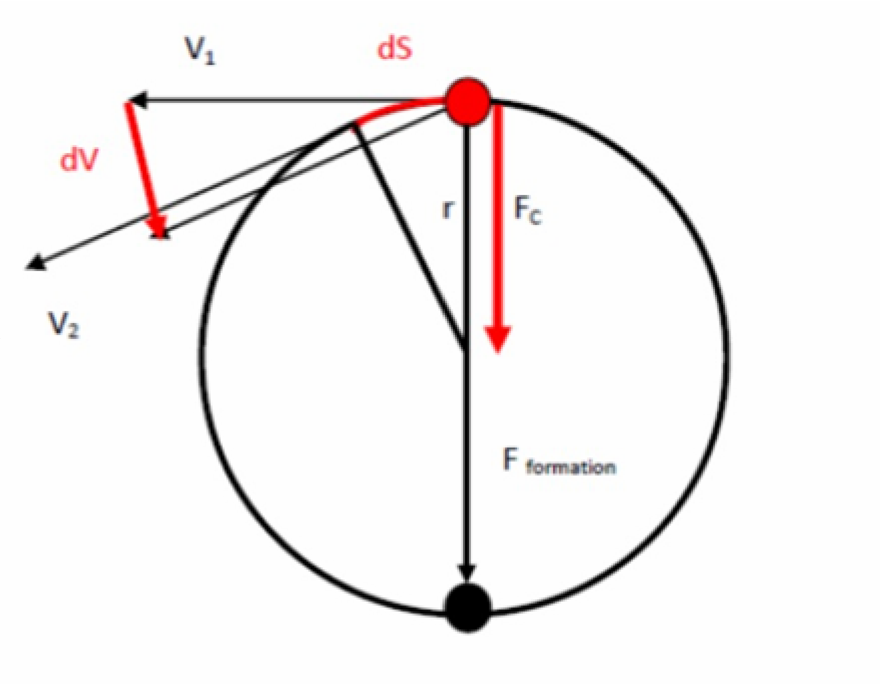
VI. **Wu Units**

Since Wu's Pairs are the building blocks of all matters in the universe, therefore Wu Units (Wu's Unit Quantities) including Wu Unit Mass, Wu Unit Time and Wu Unit Length of Wu's Pairs of the reference subatomic particle (such as a designated up quark) are used as the fundamental unit mass, unit time and unit length [3] for the measurements of the properties of an object or event at the same gravitational field and aging of the universe.

(1) Wu Unit Mass (m_{yy}) – the mass of a single Wu's Pair
(2) Wu Unit Time (t_{yy}) – the circulation period of Wu's Pair
(3) Wu Unit Length (l_{yy}) – the diameter of Wu's Pair

VII. **Wu's Spacetime Equation**

The circulation of Yangton and Yington Antimatter particles in Wu's Pairs can be illustrated in Fig. 1, where a pair of antimatter Yangton and Yington particles with inter-attractive force is circulating against each other in an orbit around the center axis.



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ge of a Yangton or Yington

adius of the circulation orbit.

Fig 1 Schematic diagram of a Wu's Pair.

$T = 2\pi K^{-1/2} r^{3/2} = \pi (2K)^{-1/2} d^{3/2}$

Given

$\gamma = \pi (2K)^{-1/2}$

Because

$T = t_{yy}$

$d = l_{yy}$

Therefore,

$t_{yy} = \gamma l_{yy}^{3/2}$

Where t_{yy} is the circulation period (T) of Wu's Pairs, named "Wu Unit Time", l_{yy} is the size of the circulation orbit (2r = d) of Wu's Pairs dependent on gravitational field and aging of the universe, named "Wu Unit Length", and γ is "Wu's Spacetime Constant" which is an Absolute Physical Constant [8] [28] independent of gravitational field and aging of the universe. This equation is named "Wu's Spacetime Equation" [3].

Wu's Spacetime Equation gives the correlation between Wu Unit Time and Wu Unit Length. As a result, according to Wu's Spacetime Transformation (in accordance to Wu's Spacetime Equation and Principle of Parallelism), all quantities of the properties of an object or event such as dimension, duration, velocity and acceleration, as well as wavelength and light speed of a photon can be correlated to Wu Unit Length of the reference corresponding identical subatomic particle (such as a designated up quark) at the same gravitational field and aging of the universe (same location and time). In addition, with Wu's Spacetime Shrinkage Theory, they can be applied successfully in explanation of many important physical phenomena such as Gravitational Redshift, Cosmological Redshift, Gravitational Time Dilation, Hubble's Law, Spacetime Reverse Expansion (Universe Expansion), Deflection of Light, Absolute Light Speed, Anisotropic Light Speed, Gravitational Waves, Perihelion Precession of Mercury and Einstein's General Relativity, Spacetime and Field Equations.

VIII. Three Principles of Subatomic Equilibrium

Thermal Equilibrium and Subatomic Equilibrium

All the quantities of the properties of an object or event are dependent on two equilibriums:

(1) Thermal Equilibrium: At a constant temperature and pressure, each atom and subatomic particle in the object or event is stabilized at a corresponding atomic and subatomic structure in various phases such as gas, liquid and solid through thermodynamic interactions. This phenomenon is called Thermal Equilibrium.

(2) Subatomic Equilibrium: Under thermal equilibrium at a constant temperature and pressure, also at a constant gravitational field and aging of the universe, each Wu Unit Length and Wu Unit Time of Wu's Pairs in the elementary subatomic particle of the object or event is stabilized at a corresponding quantity through graviton bombardment and attraction of Force of Creation. This phenomenon is called Subatomic Equilibrium [29].

Principle of Equilibrium

Under both thermal equilibrium at a constant temperature and pressure, and also subatomic equilibrium at a constant gravitational field and aging of the universe, each atom and subatomic particle in the object or event is first stabilized at a corresponding atomic and subatomic structure through thermodynamic interactions, and subsequently the Wu Unit Length and Wu Unit Time of each Wu's Pair in the elementary subatomic particle of the object or event is stabilized at a corresponding quantity through graviton bombardment and attraction of Force of Creation. Because the quantity of each property of an object or event is dependent on every atomic and subatomic structures of the atoms and subatomic particles in the object or event, and also every Wu Unit Length and Wu Unit Time of the Wu's Pairs in the elementary subatomic particles of the object or event, therefore, under both thermal and subatomic equilibriums, at a constant temperature and pressure, and also at a constant gravitational field and aging of the universe, each property of the object or event should stabilize and have a corresponding quantity. This phenomenon is named "Principle of Equilibrium" [6].

Corresponding Identical Object or Event

Under thermal equilibrium at a constant temperature and pressure, an object or event moving between two subatomic equilibriums at different constant gravitational field or aging of the universe, or two identical objects or events stay at two subatomic equilibriums at different constant gravitational field or aging of the universe, are called "Corresponding Identical Object or Event" [6].

A corresponding identical object or event, under thermal equilibrium at a constant temperature and pressure, has the same intrinsic structures in each corresponding atom and subatomic particle due to the same thermodynamic interactions at the constant temperature and pressure. However, different Wu Unit Length and Wu Unit Time of Wu's Pairs in each corresponding elementary subatomic particle can be obtained due to the different graviton bombardment and Force of Creation generated by different gravitational field and aging of the universe. The actual influences caused by gravitational field and aging of universe can be better realized by Wu's Spacetime Transformation and Wu's Spacetime Shrinkage Theory.

Corresponding Identical Object likes a stretched rope of rubber bands. Each rubber band has a unit length. The inter-connection and the total amount of rubber bands (intrinsic structure) remain unchanged, but the length of each rubber band and the total length of the rope can be different subject to the stretching force. Corresponding Identical Object also likes the giant in "Jack and the Beanstalk" and the dwarfs in "Snow White". They all have the same features and structures as that of a normal man except in different sizes.

Corresponding Identical Event on the other hand likes a movie, where each picture runs at a unit time, the sequence and the total amount (intrinsic structure) of pictures remain unchanged, but the duration of each picture and the total playing time can be different subject to the running speed of the movie. Corresponding Identical Event also likes the Mickey Mouse cartoon pictures, the entire show can be completed by different time durations subject to the rolling speed of the pictures.

When a photon (free Wu's Pairs) intrudes into earth at an extremely high speed $3x10^8$ m/s from a star 5 billion light years away, it carries Wu Unit Length and Wu Unit Time of the light source (for example H_α) 5 billion years ago from the star. In comparison to the photon generated from the same light source (H_α) on the present earth, they both have the same subatomic structure but different Wu Unit Length and Wu Unit Time due to different aging of the universe. In other words, both photons are corresponding identical object or event. In addition, according to Aging Affected Wu's Spacetime Shrinkage Theory, Wu Unit Length is bigger at ancient star than that on the present earth. Also, based on Principle of Parallelism, the wavelength of the photon generated from ancient star is bigger than that on the present earth. As a result, it is believed that the wavelength of the incident photon generated at 5 billion years ago is preserved and quenched down to the present earth without collision during the journey, such that Cosmological Redshift can be observed on the present earth.

IX. Principle of Parallelism

Under thermal equilibrium at a constant temperature and pressure, and in a subatomic equilibrium at a constant gravitational field and aging of the universe, the ratio between the quantities of the same property of two corresponding identical objects or events remains a real number constant, no matter of the subatomic equilibriums at different constant gravitational field and aging of the universe. This is named "Principle of Parallelism" which can be represented as follows [30]:

$P = nP'$

Where P and P' are the quantities of the same property of two different corresponding identical objects or events Under thermal equilibrium at a constant temperature and pressure, and in a subatomic equilibrium at a constant gravitational field and aging of the universe, n is a real number constant.

Principle of Parallelism works not only for simple properties of an object or event such as dimension (meter) and duration (second), but also the compound properties such as velocity (m/s) and acceleration (m/s^2). In fact, Principle of Parallelism is true, only if Wu's Pairs is the building blocks of the universe and law of conservation of mass are true as well.

X. Principle of Correspondence

Under thermal equilibrium at a constant temperature and pressure, and in a subatomic equilibrium at a constant gravitational field and aging of the universe, as the quantity of the property of a corresponding identical object or event is measured by the unit quantity of the same property of the reference corresponding identical object or event (such as meter or up quark), the amount of the unit quantity remains a real number constant, no matter of the subatomic equilibriums at different constant gravitational field and aging of the universe. This is named "Principle of Correspondence" which can be represented as follows [31]:

$P = mU$

Where P is the quantity of the property of a corresponding identical object or event and U is the unit quantity of the same property of the reference corresponding identical object or event (such as meter or up quark) Under thermal equilibrium at a constant temperature and pressure, and in a subatomic equilibrium at a constant gravitational field and aging of the universe, m is a real number constant.

As a matter of fact, Principle of Correspondence is a special case of Principle of Parallelism.

XI. Wu's Spacetime Shrinkage Theory

Under thermal equilibrium at a constant temperature and pressure, an object or event in subatomic equilibrium at a large constant gravitational field or an early constant aging of the universe has bigger Wu Unit Length and Wu Unit Time of Wu's Pairs in every elementary subatomic particle of the object or event than that in the corresponding identical elementary subatomic particle of the corresponding identical object or event in subatomic equilibrium at a small constant gravitational field or a later constant aging of the universe. This is named "Wu's Spacetime Shrinkage Theory" [3]. Accordingly, in case that the corresponding identical object or event is a designated up quark, based on Wu's Spacetime Shrinkage Theory, Wu Unit Length and Wu Unit Time of Wu's pairs in the up quark in subatomic equilibrium at a large constant gravitational field or an early constant aging of the universe are bigger than that in the corresponding identical up quark in subatomic equilibrium at a small constant gravitational field and a later constant aging of the universe, such that the designated up quark can be applied as the reference corresponding identical elementary subatomic particle for Wu's Spacetime Transformation.

More specifically, under thermal equilibrium at a constant temperature and pressure, in case that an object or event is in subatomic equilibrium at a large constant gravitational field with massive graviton bombardment through graviton flux from parent object based on Graviton Radiation and Contact Interaction Theory [32]. Because the circulation speed of Wu's Pairs V is slower, therefore Wu Unit Length l_{yy} (Wu's Pair Circulation Equation $V^2R = K$ and $l_{yy} = 2R$) [3] and Wu Unit Time t_{yy} (Wu's Spacetime Equation $t_{yy} = \gamma\ l_{yy}^{3/2}$) [3] of Wu's Pairs in every elementary subatomic particles of the object or event are bigger than that in the corresponding identical elementary subatomic particles of the corresponding identical object or event in subatomic equilibrium at a small constant gravitational field. This phenomenon is named "Gravity Affected Wu's Spacetime Shrinkage Theory" [3].

On the other hand, under thermal equilibrium at a constant temperature and pressure, in case that an object or event is in subatomic equilibrium at a later constant aging of the universe, with large attraction force based on the built-in Force of Creation in Wu's Pairs. Because the circulation speed of Wu's Pairs V is faster, therefore Wu Unit Length and Wu Unit Time of Wu's Pairs in every elementary subatomic particle of the object or event are smaller than that in the corresponding identical elementary subatomic particles of the corresponding identical object or event in subatomic equilibrium at an early constant aging of the universe. This phenomenon is named "Aging Affected Wu's Spacetime Shrinkage Theory" [3].

Furthermore, under thermal equilibrium at a constant temperature and pressure, based on Wu's Spacetime Shrinkage Theory and Wu's Spacetime Transformation (in accordance to Principle of Parallelism and Wu's Spacetime Equation), a bigger dimension and duration with smaller velocity and acceleration of a corresponding identical object or event, as well as a larger wavelength and smaller light speed of a corresponding identical photon can be obtained in subatomic equilibrium at a large constant gravitational field or an early constant aging of the universe than that of the corresponding identical object or event in subatomic equilibrium at small gravitational field or later aging of the universe.

As a result, Wu's Spacetime Shrinkage Theory and Wu's Spacetime Transformation can be applied to explain many important physical phenomena such as Gravitational Redshift, Cosmological Redshift, Gravitational Time Dilation, Hubble's Law, Spacetime Reverse Expansion (Universe Expansion), Deflection of Light, Absolute Light Speed, Anisotropic Light Speed, Gravitational Waves, Perihelion Precession of Mercury and Einstein's General Relativity, Spacetime and Field Equations.

XII. **Wu's Spacetime Transformation**

Under thermal equilibrium at a constant temperature and pressure, and in a subatomic equilibrium at a constant gravitational field and aging of the universe, all the quantities of the properties of an object or event can be measured and represented by (transformed to) a group of quantities containing the amount of normal unit quantity, ratios of normal unit quantities, and exponents of Wu Unit Length and Wu Unit Time of Wu's pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) at the same gravitational field and aging of the universe as follows:

$L = l\ m\ l_{yy}$

$T = t\ n\ t_{yy}$

$V = v\ (m/n)(l_{yy}/t_{yy})$

$A = a\ (m/n^2)(l_{yy}/t_{yy}^2)$

Furthermore, under thermal equilibrium at a constant temperature and pressure, and in a subatomic equilibrium at a constant gravitational field and aging of the universe, because of Wu's Spacetime Equation $t_{yy} = \gamma l_{yy}^{3/2}$, therefore all the quantities of the properties of a corresponding identical object or event, as well as the quantities of wavelength and Absolute Light Speed of a corresponding identical photon, can be measured and represented by (transformed to) a group of quantities containing the constant amount of normal unit quantity, reference-dependent constants of normal unit quantities, and exponents of Wu's Spacetime Constant and Wu Unit Length of Wu's pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) as follows:

$L = l\ m\ l_{yy}$

$T = t\ n\ \gamma\ l_{yy}^{3/2}$

$V = v\ m\ n^{-1}\ \gamma^{-1}\ l_{yy}^{-1/2}$

$A = a\ m\ n^{-2}\ \gamma^{-2}\ l_{yy}^{-2}$

$\lambda = \lambda_0\ m\ l_{yy}$

$C = c\ m\ n^{-1}\ \gamma^{-1}\ l_{yy}^{-1/2}$

Where L is the length, T is the time, V is the velocity, A is the acceleration, λ is wavelength and C is the Absolute Light Speed. l, t, v, a, λ_0 and c ($c = 3x10^8$) are constant amounts of normal unit quantities of the corresponding identical object or event, m and n are reference-dependent constants of normal unit quantities, γ, γ^{-1} and γ^{-2} are exponents of Wu's Spacetime constant, and l_{yy}, $l_{yy}^{3/2}$, $l_{yy}^{-1/2}$, l_{yy}^{-2} are exponents of Wu Unit Length of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) at the same gravitational field and aging of the universe. These transformations are called "Wu's Spacetime Transformation" [4] and these quantities are called "Wu's Spacetime Quantities".

Fig. 2 shows the quantities of properties of various corresponding identical objects and events at different gravitational field and aging of the universe, under thermal equilibrium at a constant temperature and pressure. In addition, it demonstrates the correlations between the quantities of the properties of various corresponding identical objects and events in accordance to Principle of Equilibrium, Principle of Parallelism, Principle of Correspondence, Wu's Spacetime Equation and Wu's Spacetime Shrinkage Theory.

In addition, Fig. 2 provides a road map for Wu's Spacetime Transformation. For example, Wu's Spacetime Transformation of Length begins from object length "L" (represented by P_1) to ruler unit length quantity "meter" (represented by P_1'), and then Wu Unit Length quantity "l_{yy}" of Wu Pairs of up quark (represented by l_{yy1}), such that $L = lml_{yy}$. Therefore Z7 is also called "Wu's Spacetime Transformation Diagram".

Furthermore, Wu's Spacetime Transformation and Wu's Spacetime Shrinkage Theory can be applied in explanation of the properties of various corresponding identical objects or events affected by gravitational field and aging of the universe such as Cosmological Redshift, Hubble's Law, Universe Expansion, Gravitational Redshift, Light Deflection, Absolute Light Speed, Anisotropic Light Speed, Gravitational Waves, Perihelion Precession of Mercury, Gravitational Time Dilation, etc. Also, it can be applied in the derivation of Wu's Spacetime Field Equation in comparison to Einstein's Field Equation.

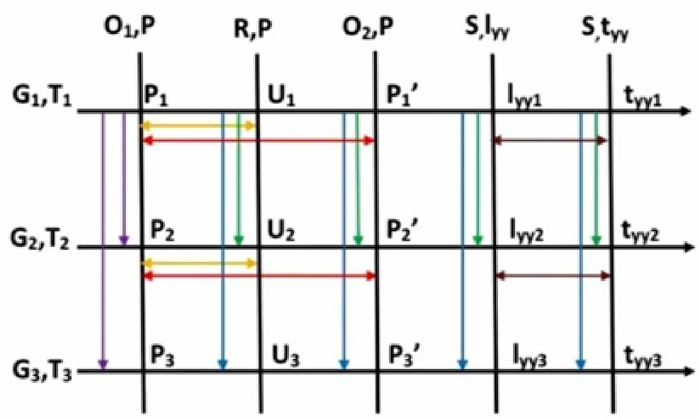

Fig. 2 Wu's Spacetime Transformation Diagram shows the effects of gravitational field and aging of the universe on objects and events under thermodynamic equilibrium and subatomic equilibrium, including Principle of Equilibrium that all properties have fixed quantities (P_i, U_i, l_{yyi}, t_{yyi}), Principle of Correspondence P = mU (Yellow Lines), Principle of Parallelism P = nP' (Red and Yellow Lines), Wu's Spacetime Equation $t_{yy} = \gamma\, l_{yy}^{3/2}$ (Brown Lines), Wu's Spacetime Shrinkage Theory (Purple, Green, Blue Lines). Where G = gravitational field, T = aging of the universe, O = object or event, R = reference, S = reference subatomic particle, P = property, t_{yy} = Wu's Unit Time and l_{yy} = Wu's Unit Length.

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Wu's Pairs in every elementary
subatomic particle of the object or event than that in the corresponding identical elementary subatomic particle of the corresponding identical object or event in subatomic equilibrium at small gravitational field or later aging of the universe.

Furthermore, in compliance with both Wu's Spacetime Shrinkage Theory and Wu's Spacetime Transformation (in accordance to Principle of Parallelism based on the intrinsic atomic and subatomic structures, and Wu's Spacetime Equation based on the correlation between the circulation velocity and diameter of Wu's Pair), a bigger dimension and duration with smaller velocity and acceleration of a corresponding identical object or event, as well as a larger wavelength and smaller light speed of a corresponding identical photon can be obtained with large Wu Unit Length and Wu Unit Time of Wu's Pairs in the reference corresponding identical subatomic particle (such as a designated up quark) at large gravitational field or early stage aging of the universe.

As a result, all the properties of an object or event can be affected by gravitational field and aging of the universe. This is the reason that causes many mysterious physical phenomena such as Cosmological Redshift, Hubble's Law, Universe Expansion, Gravitational Redshift, Light Deflection, Absolute Light Speed, Anisotropic Light Speed, Gravitational Waves, Perihelion Precession of Mercury, Gravitational Time Dilation, etc.

B. Map of Gravitational Field and Wu Unit Length

Under thermal equilibrium at a constant temperature and pressure, and in a subatomic equilibrium at a constant gravitational field and aging of the universe, according to Wu's Spacetime Transformation (in accordance to Principle of Parallelism and Wu's Spacetime Equation), all the properties of a corresponding identical object or event such as dimension, duration, velocity and acceleration, as well as wavelength and light speed of a corresponding identical photon can be transformed and represented by a group of quantities containing constant amount of normal unit quantity, reference-dependent constants of normal unit quantities, and exponents of Wu's Spacetime Constant and Wu Unit Length of Wu's pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark), no matter of the subatomic equilibrium at different constant gravitational field and aging of the universe.

Furthermore, based on Wu's Spacetime Shrinkage Theory, under thermal equilibrium and in subatomic equilibrium at a large constant gravitational field or an early constant aging of the universe, Wu Unit Length of Wu's Pairs in the reference corresponding identical elementary subatomic particle becomes bigger than that at a small constant gravitational field or a later constant aging of the universe. Consequently, complying with Wu's Spacetime Transformation, the dimension and duration are bigger while the velocity and acceleration of the corresponding identical object or event are smaller, also the wavelength is bigger while the light speed of the corresponding identical photon is smaller.

As a result, under thermal equilibrium at a constant temperature and pressure, Wu Unit Length of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) can be considered as the image of local gravitational field and aging of the universe, which can reflect the properties of a corresponding identical object or event at the local gravitational field and aging of the universe.

Fig. 3 shows that under thermal equilibrium at a constant temperature and pressure, a two dimensional coordination matrix composed of Wu Unit Length Square of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark), can serve as a map to reflect the distribution of the local gravitational field and aging of the universe, as well as the distribution of quantity of the same property of a corresponding identical object or event at local gravitational field and aging of the universe, such as dimension, duration, velocity, acceleration, wavelength and Absolute Light Speed, as well as Einstein's Spacetime (potential energy), the space-time continuum in General Relativity [19].

In case of a dying star, due to the massive gravity generated by the extremely large density in the center of the star, Wu Unit Length of Wu's Pairs in the subatomic particles are getting bigger while approaching to the center of the star. Eventually a Black Hole with surrounding hollow structure composed of large Wu's Pairs and a Singularity at the center of the Black Hole can be formed where Wu's Pairs are ripped apart and Yangton and Yington are crashed to destroy each other with the corresponding space and energy.

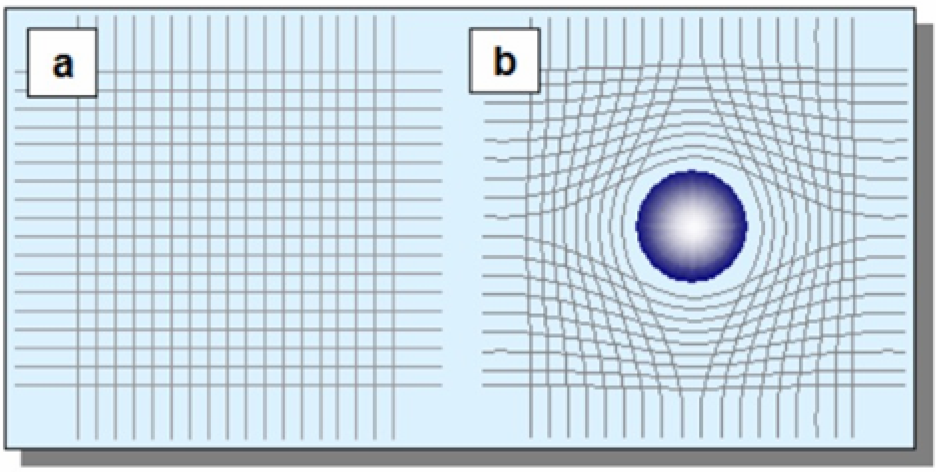

Fig. 3 (a) A coordination matrix in a homogeneous gravitational field (b) The same coordination matrix in an inhomogeneous field with a big massive core in the center.

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Therefore, the length of the corresponding identical object (L) is proportional to Wu Unit Length (l_{yy}) of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) at the same gravitational field and aging of the universe (same location and time).

$L \propto l_{yy}$

As a result, according to Wu's Spacetime Shrinkage Theory, Wu Unit Length (l_{yy}) of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) in subatomic equilibrium at a large constant gravitational field or an early constant aging of the universe is bigger than that in subatomic equilibrium at a small constant gravitational field and a later constant aging of the universe. Also, the length of the corresponding identical object (L) is proportional to Wu Unit Length (l_{yy}) of Wu's Pairs in the reference corresponding identical elementary subatomic particle at the same gravitational field and aging of the universe (same location and time). In other words, the length of the corresponding identical object (L) increases while Wu Unit Length (l_{yy}) of Wu's Pairs increases. Therefore the length of the corresponding identical object or event in subatomic equilibrium at a large constant gravitational field or an early constant aging of the universe is bigger than that in subatomic equilibrium at a small constant gravitational field and a later constant aging of the universe.

When a photon (free Wu's Pairs) intrudes into earth at an extremely high speed from a far distance star or a massive star, it carries Wu Unit Length and Wu Unit Time of its original light source (for example H_α) from the star, which are bigger than that of the photon generated from the same light source (H_α) on the present earth. In other words, the intruded photon is quenched from its original quantum energy state from the star to the present earth (assuming no interference such as graviton bombardment during the journey to earth). This "quenching effect" is the reason that causes Cosmological Redshift and Gravitational Redshift.

D. Duration and Spacetime

The duration of an event measured by the normal unit time (such as second) of the reference normal event (such as clock), also by the Wu Unit Time of Wu's Pairs in the reference elementary subatomic particle (such as a designated up quark) can be represented as follows:

Because

$T = t\ t_s$

And

$t_s = n\ t_{yy}$

Therefore,

$T = t\ n\ t_{yy}$

Also according to Wu's Spacetime Equation,

$t_{yy} = \gamma\ l_{yy}^{3/2}$

Therefore,

$T = t\ n\ \gamma\ l_{yy}^{3/2}$

Where T is the time of the event, t is the amount of normal unit time, t_s is the normal unit time of the reference normal event. n is the ratio between the normal unit time of the reference normal event and Wu Unit Time of Wu's Pairs in the reference elementary subatomic particle (abbreviated as "the ratio of normal unit time"), γ is Wu's Spacetime Constant, t_{yy} is Wu Unit Time and l_{yy} is Wu Unit Length of Wu's Pairs in the reference elementary subatomic particle.

Under thermal equilibrium at a constant temperature and pressure, and in a subatomic equilibrium at a constant gravitational field and aging of the universe, according to Principle of Parallelism and Wu's Spacetime Equation, the time of a corresponding identical event can be represented as follows:

$T = t\ n\ \gamma\ l_{yy}^{3/2}$

Where T is the time of the corresponding identical event, t is constant amount of normal unit time and n is the reference-dependent constant of normal unit time, γ is Wu's Spacetime Constant, l_{yy} is Wu Unit Length of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark), no matter the gravitational field and aging of the universe.

Therefore, the time of the corresponding identical event (T) is proportional to 3/2 power of Wu Unit Length ($l_{yy}^{3/2}$) of Wu's Pairs in the reference corresponding identical elementary subatomic particle at the same gravitational field and aging of the universe (same location and time).

$T \propto l_{yy}^{3/2}$

As a result, according to Wu's Spacetime Shrinkage Theory, Wu Unit Length (l_{yy}) of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) in subatomic equilibrium at a large constant gravitational field or an early constant aging of the universe is bigger than that in subatomic equilibrium at a small constant gravitational field and a later constant aging of the universe. Also, the time of the corresponding identical event (T) is proportional to 3/2 power of Wu Unit Length ($l_{yy}^{3/2}$) of Wu's Pairs in the reference corresponding identical elementary subatomic particle at the same gravitational field and aging of the universe (same location and time). In other words, the time of the corresponding identical event (T) increases while Wu Unit Length (l_{yy}) of Wu's Pairs increases. Therefore the time of the corresponding identical object or event in subatomic equilibrium at a large constant gravitational field or an early constant aging of the universe is bigger than that in subatomic equilibrium at a small constant gravitational field and a later constant aging of the universe. This is the reason to cause Gravitational Time Dilation [33].

E. Velocity and Spacetime

The velocity of an object or event measured by the normal unit length (such as meter) and normal unit time (such as second) of the reference normal object (such as ruler) or event (such as clock), also by the Wu Unit Length and Wu Unit Time of Wu's Pairs in the reference elementary subatomic particle (such as a designated up quark) can be represented as follows:

Because

$V = v\ (l_s/t_s)$

And

$l_s = m\ l_{yy}$

$t_s = n\ t_{yy}$

Therefore,

$V = v\ (m/n)(l_{yy}/t_{yy})$

Also, because of Wu's Spacetime Equation,

$t_{yy} = \gamma l_{yy}^{3/2}$

$l_{yy}/t_{yy} = \gamma^{-1}\ l_{yy}^{-1/2}$

Therefore,

$V = v\ m\ n^{-1}\ \gamma^{-1}\ l_{yy}^{-1/2}$

Where V is the velocity of the object or event, v is the amount of normal unit velocity, I_s is the normal unit length and t_s is the normal unit time of the reference normal object or event, m is the ratio of normal unit length, n is the ratio of normal unit time, γ is the Wu's Spacetime Constant, l_{yy} is Wu Unit Length and t_{yy} is Wu Unit Time of Wu's Pairs in the reference elementary subatomic particle.

Under thermal equilibrium at a constant temperature and pressure, and in a subatomic equilibrium at a constant gravitational field and aging of the universe, according to Principle of Parallelism and Wu's Spacetime Equation, the velocity of a corresponding identical object or event can be represented as follows:

$V = v\ m\ n^{-1}\ \gamma^{-1}\ l_{yy}^{-1/2}$

Where V is the velocity of the corresponding identical object or event, v is the constant amount of normal unit velocity, m is the reference-dependent constant of normal unit length, n is the reference-dependent constant of normal unit time, γ is the Wu's Spacetime Constant, l_{yy} is Wu Unit Length of Wu's Pairs in the reference corresponding identical elementary subatomic particle, no matter the gravitational field and aging of the universe.

Therefore the velocity of the corresponding identical object or event (V) is proportional to inverse square root of Wu Unit Length ($l_{yy}^{-1/2}$) of Wu's Pairs in the reference corresponding identical elementary subatomic particle at the same gravitational field and aging of the universe (same location and time).

$V \infty\ l_{yy}^{-1/2}$

As a result, according to Wu's Spacetime Shrinkage Theory, Wu Unit Length (l_{yy}) of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) in subatomic equilibrium at a large constant gravitational field or an early constant aging of the universe is bigger than that in subatomic equilibrium at a small constant gravitational field and a later constant aging of the universe. Also, the velocity of the corresponding identical object or event (V) is proportional to inverse square root of Wu Unit Length ($l_{yy}^{-1/2}$) of Wu's Pairs in the reference corresponding identical elementary subatomic particle at the same gravitational field and aging of the universe. In other words, the velocity of the corresponding identical object or event (V) decreases while Wu Unit Length (l_{yy}) of Wu's Pairs increases. Therefore the velocity of the corresponding identical object or event in subatomic equilibrium at a large constant gravitational field or an early constant aging of the universe is slower than that in subatomic equilibrium at a small constant gravitational field and a later constant aging of the universe. This correlation can be applied to interpret "Perihelion Precession of Mercury", Defection of Light, Anisotropic Light Speed and Gravitational Waves.

F. Acceleration and Spacetime

The acceleration of an object or event measured by the normal unit length (such as meter) and normal unit time (such as second) of the reference normal object (such as ruler) or event (such as clock), also by the Wu Unit Length and Wu Unit Time of Wu's Pairs in the reference elementary subatomic particle (such as a designated up quark) can be represented as follows:

Because

$A = a\ (l_s/t_s^2)$

And

$l_s = ml_{yy}$

$t_s = nt_{yy}$

Therefore,

$A = a\ (m/n^2)(l_{yy}/t_{yy}^2)$

Also, because of Wu's Spacetime Equation,

$t_{yy} = \gamma l_{yy}^{3/2}$
$l_{yy}/t_{yy}^{2} = \gamma^{-2} l_{yy}^{-2}$
Therefore,
$A = a\ m\ n^{-2}\ \gamma^{-2}\ l_{yy}^{-2}$

Where A is the acceleration of the object or event, a is the amount of normal unit acceleration, I_s is the normal unit length and t_s is the normal unit time of the reference normal object or event, m is the ratio of normal unit length, n is the ratio of normal unit time, γ is the Wu's Spacetime Constant, l_{yy} is Wu Unit Length of Wu's Pairs in the reference elementary subatomic particle.

Under thermal equilibrium at a constant temperature and pressure, and in a subatomic equilibrium at a constant gravitational field and aging of the universe, according to Principle of Parallelism and Wu's Spacetime Equation, the acceleration of a corresponding identical object or event can be represented as follows:
$A = a\ m\ n^{-2}\ \gamma^{-2}\ l_{yy}^{-2}$

Where A is the acceleration of the corresponding identical object or event, a is the constant amount of normal unit acceleration, m is the reference-dependent constant of normal unit length, n is the reference-dependent constant of normal unit time, γ is the Wu's Spacetime Constant, l_{yy} is Wu Unit Length of Wu's Pairs in the reference corresponding identical elementary subatomic particle, no matter the gravitational field and aging of the universe.

Therefore the acceleration of the corresponding identical object or event (A) is proportional to the inverse square of Wu Unit Length (l_{yy}^{-2}) of Wu's Pairs in the reference corresponding identical subatomic particle at the same gravitational field and aging of the universe (same location and time).
$A \propto l_{yy}^{-2}$

As a result, according to Wu's Spacetime Shrinkage Theory, Wu Unit Length (l_{yy}) of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) in subatomic equilibrium at a large constant gravitational field or an early constant aging of the universe is bigger than that in subatomic equilibrium at a small constant gravitational field and a later constant aging of the universe. Also, the acceleration of the corresponding identical object or event (A) is proportional to the inverse square of Wu Unit Length (l_{yy}^{-2}) of Wu's Pairs in the reference corresponding identical elementary subatomic particle at the same gravitational field and aging of the universe (same location and time). In other words, the acceleration of the corresponding identical object or event (A) decreases while Wu Unit Length (l_{yy}) of Wu's Pairs increases. Therefore the acceleration of the corresponding identical object or event in subatomic equilibrium at a large constant gravitational field or an early constant aging of the universe is smaller than that in subatomic equilibrium at a small constant gravitational field and a later constant aging of the universe.

However, the gravitational acceleration caused by the remote gravitational force in Newton's Law of Universal Gravitation is not an associated property of target object. Like local gravitational field, it is a fixed quantity dependent on the mass of parent object and the distance between target object and parent object. Therefore the gravitational acceleration of the target object is not a corresponding identical quantity of target object such that it doesn't comply with Wu's Spacetime Transformation.

G. Photon and Spacetime

1. Wavelength

Under thermal equilibrium at a constant temperature and pressure, and in a subatomic equilibrium at a constant gravitational field and aging of the universe, according to Principle of Parallelism, the wavelength of a corresponding identical photon can be represented as follows:
$\lambda = zm\ l_{yy}$

Where λ is the wavelength of the corresponding identical photon, z is the constant amount of normal unit length and m is a reference-dependent constant of normal unit length, l_{yy} is Wu Unit Length of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark), no matter the gravitational field and aging of the universe.

Therefore, the wavelength of the corresponding identical photon (λ) is proportional to Wu Unit Length (l_{yy}) of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) at the same gravitational field and aging of the universe (same location and time).
$\lambda \propto l_{yy}$

As a result, according to Aging Affected Wu's Spacetime Shrinkage Theory, Wu Unit Length (l_{yy}) of the Wu's Pairs in the reference elementary subatomic particle (such as a designated up quark) in subatomic equilibrium at an early constant aging of the universe on the star is bigger than that in subatomic equilibrium on the present earth. Also, the wavelength of the corresponding identical photon (λ) is proportional to Wu Unit Length (l_{yy}) of Wu's Pairs in the reference corresponding identical elementary subatomic particle at the same gravitational field and aging of the universe (same location and time). In other words, the wavelength of photon (λ) increases while Wu Unit Length (l_{yy}) of Wu's Pairs increases. Therefore the wavelength of the corresponding identical photon (λ) emitted from the star in subatomic equilibrium at an early constant aging of the universe is bigger than that in subatomic equilibrium on the present earth. This explains “Cosmological Redshift”.

Similarly, based on “Gravity Affected Wu’s Spacetime Shrinkage Theory”, the wavelength of the corresponding identical photon emitted from a massive star in subatomic equilibrium at a large constant gravitational field is bigger than that in subatomic equilibrium on the present earth. This explains “Gravitational Redshift”.

Photon is a free Wu’s Particle traveling in the vacuum space. Without collisions with gravitons in the vacuum space, its original wavelength, momentum and energy generated from the light source on the parent star can be completely preserved as it quenches onto earth. This is the reason why redshift can be observed on the incident light emitted from a star 5 billion light years away. As a result, the wavelength of the incident photon from a star can be considered as an age or distance marker, or as a DNA of its light source, which can be applied in explanation of Cosmological Redshift as well as in derivation of Hubble’s Law.

2. Absolute Light Speed

Under thermal equilibrium at a constant temperature and pressure, and in a subatomic equilibrium at a constant gravitational field and aging of the universe, according to Principle of Parallelism and Wu’s Spacetime Equation, the Absolute Light Speed (the light speed observed at light source) of a corresponding identical photon can be represented as follows:

$C = c\ m\ n^{-1}\ \gamma^{-1}\ l_{yy}^{-1/2}$

Where C is the Absolute Light Speed of the corresponding identical photon observed at light source, c is the constant amount of normal unit velocity, m is reference-dependent constant of normal unit length and n is reference-dependent constant of normal unit time, γ is Wu’s Spacetime Constant, l_{yy} is Wu Unit Length of Wu’s Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark), no matter the gravitational field and aging of the universe.

Therefore the Absolute Light Speed of the corresponding identical photon (C) is proportional to -1/2 power of Wu Unit Length ($l_{yy}^{-1/2}$) of Wu’s Pairs in the reference corresponding identical elementary subatomic particle at the same gravitational field and aging of the universe (same location and time).

$C \propto l_{yy}^{-1/2}$

As a result, according to Wu’s Spacetime Shrinkage Theory, Wu Unit Length (l_{yy}) of Wu’s Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) in subatomic equilibrium at a large constant gravitational field or an early constant aging of the universe is bigger than that in subatomic equilibrium at a small constant gravitational field and a later constant aging of the universe. Also, the Absolute Light Speed of the corresponding identical photon (C) is proportional to inverse square root of Wu Unit Length ($l_{yy}^{-1/2}$) of Wu’s Pairs in the reference corresponding identical elementary subatomic particle at the same gravitational field and aging of the universe. In other words, the Absolute Light Speed (C) decreases while Wu Unit Length (l_{yy}) of Wu’s Pairs increases. Therefore the Absolute Light Speed of the corresponding identical photon emitted from the star in subatomic equilibrium at a large constant gravitational field or an early constant aging of the universe is smaller than that in subatomic equilibrium on the present earth.

Based on Principle of Correspondence, Absolute Light Speed (C) of a corresponding identical photon observed at light source can be transformed to a constant amount of normal unit velocity (c) multiples normal unit velocity (m/s) of reference normal object (such as ruler) and event (such as clock) dependent on the local gravitational field and aging of the universe as follows:

$C = c\ (m/s)$

Because c is a real number constant,

$c = 3 \times 10^8$

Therefore,

$C = 3 \times 10^8\ m/s$

In addition, m/s is dependent on the local gravitational field and aging of the universe, therefore Absolute Light Speed is also dependent on the local gravitational field and aging of the universe at the light source.

Furthermore, because that the ejection force in the photon emission process is constant equal to the string force between two adjacent Wu’s Pairs on the surface of the subatomic particle (such as electron), therefore regardless of the frequency, a photon emitted from the same light source should always have a constant Absolute Light Speed observed at the light source (3×10^8 m/s, where m/s is the normal unit velocity at light source).

3. Frequency

Under thermal equilibrium at a constant temperature and pressure, and in a subatomic equilibrium at a constant gravitational field and aging of the universe, according to Principle of Parallelism and Wu's Spacetime Equation, the frequency of a corresponding identical photon can be represented as follows:

$\nu = T^{-1} = t^{-1}n^{-1}t_{yy}^{-1} = t^{-1}n^{-1}\gamma^{-1}l_{yy}^{-3/2}$

Where ν is the frequency of the corresponding identical photon, t is constant amount of normal unit time and n is the reference-dependent constant of normal unit time, γ is Wu's Spacetime Constant, t_{yy} is Wu Unit Time and l_{yy} is Wu Unit Length of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark), no matter the gravitational field and aging of the universe.

Therefore the frequency of the corresponding identical photon is proportional to -3/2 power of Wu Unit Length ($l_{yy}^{-3/2}$) of Wu's Pairs in the reference corresponding identical elementary subatomic particle at the same gravitational field and aging of the universe (same location and time).

$\nu \propto l_{yy}^{-3/2}$

As a result, according to Wu's Spacetime Shrinkage Theory, Wu Unit Length (l_{yy}) of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) in subatomic equilibrium at a large constant gravitational field or an early constant aging of the universe is bigger than that in subatomic equilibrium at a small constant gravitational field and a later constant aging of the universe. Also, the frequency (ν) of the corresponding identical photon is proportional to -3/2 power of Wu Unit Length ($l_{yy}^{-3/2}$) of Wu's Pairs in the reference corresponding identical elementary subatomic particle at the same gravitational field and aging of the universe (same location and time). In other words, the frequency of photon (ν) decreases while Wu Unit Length (l_{yy}) of Wu's Pairs increases. Therefore the frequency of the corresponding identical photon emitted from the star in subatomic equilibrium at a large constant gravitational field or an early constant aging of the universe is smaller than that in subatomic equilibrium on the present earth.

In conclusion, as a corresponding identical photon emitted from an ancient star and quenched onto earth, because Wu Unit Length l_{yy} of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) is bigger on the ancient star, therefore the wavelength of the corresponding identical photon emitted from the ancient star in subatomic equilibrium at an early constant aging of the universe is larger ($\lambda \propto l_{yy}$), Absolute Light Speed is slower ($C \propto l_{yy}^{-1/2}$) and frequency is smaller ($\nu \propto l_{yy}^{-3/2}$) than that in subatomic equilibrium on the present earth. Thus Cosmological Redshift can be obtained.

Similarly, as a corresponding identical photon emitted from a massive star and quenched onto earth, because Wu Unit Length l_{yy} of the Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) is bigger on the massive star, therefore the wavelength of the corresponding identical photon emitted from the massive star in subatomic equilibrium at a large constant gravitational field is larger ($\lambda \propto l_{yy}$), Absolute Light Speed is slower ($C \propto l_{yy}^{-1/2}$) and frequency is smaller ($\nu \propto l_{yy}^{-3/2}$) than that in subatomic equilibrium on the present earth. Thus Gravitational Redshift can be obtained.

Furthermore, because Absolute Light Speed of the corresponding identical photon is proportional to -1/2 power of Wu Unit Length ($l_{yy}^{-1/2}$) of Wu's Pairs in the reference corresponding identical subatomic particle (such as a designated up quark) at the same gravitational field and aging of the universe (same location and time),

$C \propto l_{yy}^{-1/2}$

Also because of Wu's Spacetime Equation,

$t_{yy} = \gamma l_{yy}^{3/2}$

Therefore,

$l_{yy} \propto 1/C^2$

$t_{yy} \propto 1/C^3$

Also,

$L \propto l_{yy} \propto 1/C^2$

$T \propto l_{yy}^{3/2} \propto 1/C^3$

$V \propto l_{yy}^{-1/2} \propto C$

$A \propto l_{yy}^{-2} \propto C^4$

Where l_{yy} is Wu Unit Length and t_{yy} is Wu Unit Time of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark), C is the Absolute Light Speed of a photon observed at the light source, L is the dimension, T is the duration, V is the velocity and A is the acceleration of an object or event. All quantities are at the same gravitational field and aging of the universe (same location and time).

Since Absolute Light Speed C is a gravity dependent physical constant, no matter the frequency and reference corresponding identical elementary subatomic particle, therefore, it can be considered as an one to one corresponding image to the local gravitational field and aging of the universe so as to reflect the distributions of all the properties of an object or event.

XIV. Wu's Spacetime and Physical Phenomena

Based on Principle of Parallelism and Wu's Spacetime Equation (in accordance to Wu's Spacetime Transformation) as well as Wu's Spacetime Shrinkage Theory, the correlations of dimension, duration, velocity and acceleration of a corresponding identical object or event with respect to Wu Unit Length of Wu's Pairs of the reference corresponding identical subatomic particle (such as a designated up quark) at the same gravitational field and aging of the universe (same location and time) can be applied to explain many physical phenomena such as Gravitational Redshift, Cosmological Redshift, Gravitational Time Dilation, Hubble's Law, Spacetime Reverse Expansion (Universe Expansion), Deflection of Light, Absolute Light Speed, Anisotropic Light Speed, Gravitational Waves, Perihelion Precession of Mercury and Einstein's General Relativity, Spacetime and Field Equations, etc. Some typical examples are discussed in the followings.

A. Perihelion Precession of Mercury

A long-standing problem in the study of the Solar System was that the orbit of Mercury did not behave as required by Newton's equations. In fact, it is found that the point of closest approach (Perihelion) of Mercury to the sun does not always occur at the same place but that it slowly moves around the sun (Fig. 4). This rotation of the orbit is called a "Perihelion Precession" [34].

As seen from Earth the precession of Mercury's orbit is measured to be 5600 seconds of arc per century (one second of arc=1/3600 degrees). Newton's equations, taking into account all the effects from the other planets (as well as a very slight deformation of the sun due to its rotation) and the fact that the Earth is not an inertial frame of reference, predicts a precession of 5557 seconds of arc per century. There is a discrepancy of 43 seconds of arc per century.

This discrepancy cannot be accounted for using Newton's formalism. Many ad-hoc fixes were devised (such as assuming there was a certain amount of dust between the Sun and Mercury) but none were consistent with other observations. In contrast, Einstein was able to predict, without any adjustments whatsoever, that the orbit of Mercury should precess by an extra 43 seconds of arc per century.

In a curved spacetime a planet does not orbit the Sun in a static elliptical orbit, as in Newton's theory. Rather, the orbit is obliged to precess because of the curvature of spacetime. When Einstein calculated the magnitude of this effect for Mercury he got precisely the previously unexplained 43". He correctly took the view that this was an important confirmation of his general relativity theory.

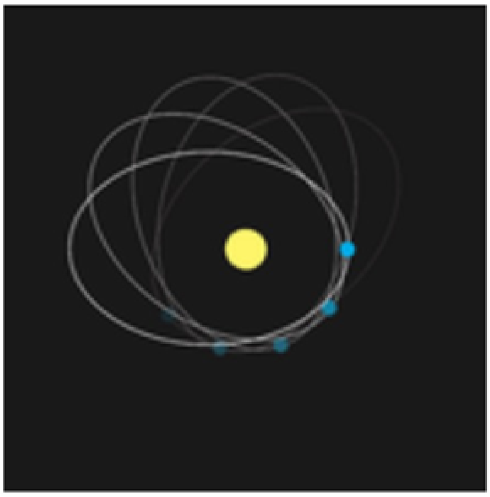

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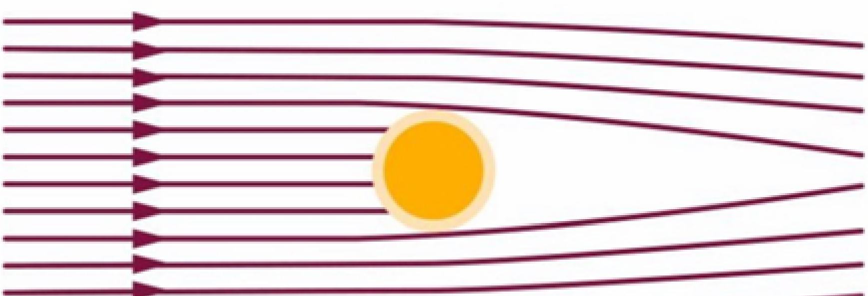
Fig. 4 Artist's version of the precession of Mercury's orbit.

The first observation of light deflection was performed by Arthur Eddington and his collaborators during the total solar eclipse of May 29, 1919 [35] when the stars near the Sun (at that time in the constellation Taurus) could be observed. Starlight that passes close to the sun before reaching us gets deflected (Fig. 5). This starlight will thus reach us from a slightly different direction than when the sun is in some different region of the sky. Accordingly, the star's position in the night sky is shifted slightly.



In the early 20th century, Einstein successfully explained this phenomenon by his general relativity theory. He claimed that because space-time is highly curved around heavy mass, light rays can thus be deflected when passing by.

One important application of the light deflection effect is "Gravitational Lensing", in which two or more images of one far-away object can be observed (Fig. 6). Masses acting as gravitational lenses have now become a standard tool of astronomy. They allow astronomers to infer the masses of cosmic objects, and the structure and size scale of the universe (with some caveats). Through their magnifying effect, gravitational lenses have also been used to observe the properties of very distant galaxies and quasars, as well as to search for planets around distant stars.

Light deflection can also be explained by Yangton and Yington Theory. Photon emitted from a light source, such as H_α photon from Hydrogen atom (light source) on a star, is considered as a corresponding identical object or event under the same thermal equilibrium but at different subatomic equilibriums. According to Wu's Spacetime Transformation (in accordance to Principle of Parallelism and Wu's Spacetime Equation), the Absolute Light Speed C observed at light source (also on earth which is stationary to the star because of far distance) is proportional to -1/2 order of the Wu Unit Length ($l_{yy}^{-1/2}$) of Wu's Pairs in the reference corresponding identical elementary subatomic particle at the same gravitational field and aging of the universe. In other words, Absolute Light Speed (C) decreases while Wu Unit Length (l_{yy}) of Wu's Pairs in the reference corresponding identical elementary subatomic particle increases (here the reference corresponding identical elementary subatomic particle is the corresponding identical photon itself so as to be sure that both the photon and the reference corresponding identical elementary subatomic particle are at the same gravitational field and aging of the universe at all times).

As a result, when photon moves close to sun, gravitational field becomes extremely large due to the massive gravitational field of sun. According to Gravity Affected Wu's Spacetime Shrinkage Theory, Wu Unit Length (l_{yy}) of the photon becomes bigger because of the heavy graviton bombardment caused by the large gravitational field of the sun via graviton flux based on Graviton Radiation and Contact Interaction Theory. Consequently, according to Wu's Spacetime Transformation, wavelength increases and Absolute Light Speed decreases while Wu Unit Length of the photon increases, and such that photon moves toward the sun, so as to maintain its structural coherency.

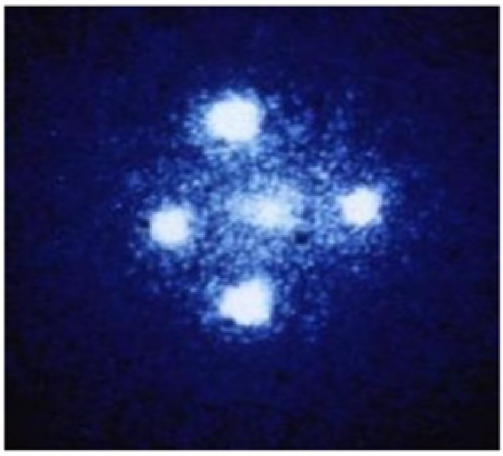


Fig. 6 Gravitational lenses generate an Einstein cross, image of the Hubble Space Telescope © NASA/ESA/STScI.

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wavelength (λ ∞ l_{yy}) than that emitted from the corresponding identical light source on the present earth. When the photon quenches onto earth, Redshift can thus be observed. This phenomenon is called "Cosmological Redshift".

Furthermore, according to Aging Affected Wu's Spacetime Shrinkage Theory and Principle of Parallelism, the normal unit length (such as meter) of the reference normal object (such as a ruler) is getting smaller through aging of the universe. Although the distance between the star and earth never changed, the amount of the normal unit length of the distance is getting bigger due to the shrinking ruler. Therefore it seems that the star is moving away from earth while observing on the present earth. This phenomenon is called Wu's Spacetime Reverse Expansion Theory (aka Earth Shrinkage Theory) which can be derived mathematically to explain Hubble's Law and expansion of the universe without Dark Energy.

D. Gravitational Redshift

Similarly, according to Gravity Affected Wu's Spacetime Shrinkage Theory, under thermal equilibrium at a constant temperature and pressure, and in subatomic equilibrium at a massive star (a large constant gravitational field), because of the heavy bombardment of gravitons caused by large gravitational field of the star via graviton flux based on Graviton Radiation and Contact interaction Theory, the circulation speed (V) of Wu's Pairs in the subatomic particle of a corresponding identical object or event is slower than that in subatomic equilibrium on earth (a small constant gravitational field). Thus the diameter of the circulation orbit ($2r = 2K/V^2$) - Wu Unit Length, and the circulation period of the circulation orbit ($T = 2\pi r/V$) - Wu Unit Time, of Wu's Pairs in the subatomic particle of the corresponding identical object or event are bigger than that on earth. Consequently, at the massive star, the Wu Unit Length (l_{yy}) and Wu Unit Time (t_{yy}) of Wu's Pairs in a reference corresponding identical elementary subatomic particle (such as a designated up quark) are bigger than that on earth. Furthermore, based on Wu's Spacetime Transformation (in accordance to Principle of Parallelism and Wu's Spacetime Equation), the dimension of the corresponding identical object or event is larger ($L \propto l_{yy}$), also its duration is larger ($T \propto l_{yy}^{3/2}$), velocity is slower ($V \propto l_{yy}^{-1/2}$) and acceleration is smaller ($A \propto l_{yy}^{-2}$) compared to that on earth.

As a result, under thermal equilibrium a corresponding identical photon emitted from a light source in subatomic equilibrium on a massive star has slower speed ($C \propto l_{yy}^{-1/2}$), lower frequency ($\nu \propto l_{yy}^{-3/2}$) and longer wavelength ($\lambda \propto l_{yy}$) than that emitted from the corresponding identical light source in subatomic equilibrium on earth. When the photon quenches onto earth, Redshift can thus be observed. This phenomenon is called "Gravitational Redshift".

XV. A summary of Wu's Spacetime and Properties of Object or Event

As an object or event measured by the normal unit length (meter) and normal unit time (second) of the reference object or event such as ruler and clock, their length L, time T, velocity V, acceleration A and light speed C can be represented as follows:

$L = l\, l_s$

$T = t\, t_s$

$V = v\, (l_s/t_s)$

$A = a\, (l_s/t_s^2)$

$C = c\, (l_s/t_s)$

Where l is the amount of normal unit length, l_s is normal unit length; t is the amount of normal unit time, t_s is normal unit time; v is the amount of normal unit velocity, l_s/t_s is normal unit velocity; a is the amount of normal unit acceleration, l_s/t_s^2 is normal unit acceleration; c is the amount of normal unit light speed.

Under thermal equilibrium at a constant temperature and pressure, and in a subatomic equilibrium at a constant gravitational field and aging of the universe, according to Principle of Parallelism and Wu's Spacetime Equation, the length L, time T, velocity V, acceleration A and Absolute Light Speed C of a corresponding identical object or event (or photon) can be represented as follows:

$L = l\, m\, l_{yy}$

$T = t\, n\, \gamma l_{yy}^{3/2}$

$V = v\, m\, n^{-1}\, \gamma^{-1}\, l_{yy}^{-1/2}$

$A = a\, m\, n^{-2}\, \gamma^{-2}\, l_{yy}^{-2}$

$C = c\, m\, n^{-1}\, \gamma^{-1}\, l_{yy}^{-1/2}$

Where L is the dimension, T is the period, V is the velocity, A is the acceleration and C is Absolute Light Speed of a corresponding identical object or event (or photon), m is reference-dependent constant of normal unit length, n is reference-dependent constant of normal unit time, γ is Wu's Spacetime Constant and l_{yy} is Wu Unit Length of Wu's pairs of the reference corresponding identical elementary subatomic particle (such as a designated up quark). Also l, t, v, a, c ($c = 3x10^8$) are all constants no matter the local gravitational field and aging of the universe. These equations are called "Wu's Spacetime Transformations".

Furthermore, according to Wu's Spacetime Shrinkage Theory, under thermal equilibrium at a constant temperature and pressure, and in a subatomic equilibrium at a large constant gravitational field (high gravity) or an early constant aging of the universe (young universe), Wu Unit Length of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) is bigger, such that the dimension ($L \propto l_{yy}$) and duration ($T \propto l_{yy}^{3/2}$) of the corresponding identical object or event are bigger, while the velocity ($V \propto l_{yy}^{-1/2}$) and acceleration ($A \propto l_{yy}^{-2}$) are smaller. Also the wavelength ($\lambda \propto l_{yy}$) of the corresponding identical photon is larger, while the frequency ($\nu \propto l_{yy}^{-3/2}$) and Absolute Light Speed ($C \propto l_{yy}^{-1/2}$) are smaller, than that in a subatomic equilibrium at a small constant gravitational field (low gravity) or a later constant aging of the universe (old universe).

In conclusion, Table 1 is a summary (revised from my previous publication [103]) of the effects of gravitational field and aging of the universe on Wu Unit Length (l_{yy}), Wu Unit Time (t_{yy}) and Wu's Pairs circulation speed (V) of the reference corresponding identical elementary subatomic particle (such as a designated up quark), as well as the dimension (L), duration (T) , velocity (V) and acceleration (A) of a corresponding identical object or event, also the wavelength (λ), frequency (ν) and Absolute Light Speed (C) of a corresponding identical photon, under the same thermal equilibrium but at different subatomic equilibrium, based on Wu's Spacetime Transformation (in accordance to Principle of Parallelism and Wu's Spacetime Equation) and Wu's Spacetime Shrinkage Theory.

Table 1 Physical Properties of Wu's Pairs, Photons and Corresponding Identical Objects and Events

		Young Universe	Old Universe	High Gravity	Low Gravity
Wu's Pairs					
l_W (=2r)	l_W	Large	Small	Large	Small
t_W (=T)	$t_W = \gamma l_W^{3/2}$	Large	Small	Large	Small
V (=2πr/T)	$V \propto l_W^{-1/2}$	Small	Large	Small	Large
Corresponding Identical Objects and Events					
L	$L \propto l_W$	Large	Small	Large	Small
T	$T \propto l_W^{3/2}$	Large	Small	Large	Small
V	$V \propto l_W^{-1/2}$	Small	Large	Small	Large
A	$A \propto l_W^{-2}$	Small	Large	Small	Large
Photons					
ν	$\nu \propto l_W^{-3/2}$	Small	Large	Small	Large
C	$C \propto l_W^{-1/2}$	Small	Large	Small	Large
λ	$\lambda \propto l_W$	Large	Small	Large	Small

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ton's law of [36].

Exact solutions for the EFE can only be found under simplifying assumptions such as symmetry. Special classes of exact solutions are most often studied as they model many gravitational phenomena, such as rotating black holes and the expanding universe. Further simplification is achieved in approximating the actual spacetime as flat spacetime with a small derivation, leading to the linearized EFE. These equations are used to study phenomena such as gravitational waves.

XVII. Wu's Spacetime Field Equations

According to Newton's Law of Universal Gravitation and Newton's Second Law of Motion, the remote gravitational force F generated between a target object m and a parent object M at a distance R can be applied to move the target object toward the parent object at acceleration A. This can be represented as follows:

$F = G\,m\,M/R^2$

$F = m\,A$

Therefore,

$A = GM/R^2$

Where A is the acceleration of the target object and it is independent of the target object (also A is measured at a reference point stationary to the parent object, under both thermal and subatomic equilibriums with the target object), G is Newton's gravitational constant, m is the mass of target object, M is the mass of the star (parent object), R is the distance between the target object and the star M. This equation is called "Field Equation" (gravitational field $F_g = GM/R^2$).

Furthermore, under both thermal and subatomic equilibriums with the target object, the acceleration of the target object observed at a reference point stationary to the star (parent object) can be measured by Wu Unit

Length of Wu's Pairs in the reference elementary subatomic particle (such as a designated up quark) at the same gravitational field and aging of the universe (same location and time) as the target object.

$A = a\ m\ n^{-2}\ \gamma^{-2}\ l_{yy}^{-2}$

Where A is the acceleration of the target object, a is the amount of normal unit acceleration, m is the ratio of normal unit length, n is the ratio of normal unit time, γ is the Wu's Spacetime Constant and l_{yy} is Wu Unit Length of Wu's Pairs in the reference elementary subatomic particle (such as a designated up quark) at the same gravitational field and aging of the universe (same location and time) as the target object.

In addition, under the same thermal equilibrium but at different subatomic equilibrium, according to Wu's Spacetime Transformation, the Absolute Light Speed of a corresponding identical photon emitted and observed at the light source on target object can also be transformed to Wu Unit Length of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) at the same gravitational field and aging of the universe (same location and time) as the target object.

$C = c\ m\ n^{-1}\ \gamma^{-1}\ l_{yy}^{-1/2}$

Where C is the Absolute Light Speed observed at the light source, c is the amount of normal unit velocity of the photon (3×10^8), γ is the Wu's Spacetime Constant, m is reference-dependent constant of normal unit length, n is reference-dependent constant of normal unit time, and l_{yy} is Wu Unit Length of Wu's Pairs in the reference elementary subatomic particle (such as a designated up quark) at the same gravitational field and aging of the universe (same location and time) as the target object.

Under both thermal and subatomic equilibriums with target object, because

$A = GM/R^2$

$A = a\ m\ n^{-2}\ \gamma^{-2}\ l_{yy}^{-2}$

$C = c\ m\ n^{-1}\ \gamma^{-1}\ l_{yy}^{-1/2}$

Also,

$C^{-4} = c^{-4}\ m^{-4}\ n^4\ \gamma^4\ l_{yy}^2$

Given

$\sigma = m^{-1}\ n^2$

$\delta = m^3 n^{-2} c^4$

Where c is the amount of normal unit velocity of photon (3×10^8), m is reference-dependent constant of normal unit length, n is reference-dependent constant of normal unit time, such that σ and δ are also reference-dependent constants no matter of gravitational field and aging of the universe.

Therefore, under both thermal and subatomic equilibriums with target object,

$a = \sigma\ \gamma^2 l_{yy}^2\ (GM/R^2)$

$a = \delta\ \gamma^{-2} C^{-4}\ (GM/R^2)$

Where a is the amount of normal unit acceleration of target object measured at a reference point stationary to the star (parent object), σ and δ are reference-dependent real number constants associated with the reference corresponding identical elementary subatomic particle (such as a designated up quark), γ is Wu's Spacetime Constant (absolute physical constant), l_{yy} is Wu Unit Length of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) dependent on the gravitational field and aging of the universe on target object and C is the Absolute Light Speed observed at light source ($C = 3\text{x}10^8$ m/s where $3\ \text{x}10^8$ is a constant number and m/s is the unit quantities on target object). M is the mass of the star (absolute physical quantity), G is gravitational constant ($G = 6.674 \times 10^{-11}\ m^3 kg^{-1} s^{-2}$ universal physical constant measured on earth) and R is the distance between target object and the star (fixed physical quantity measured on earth). These equations are named "Wu's Spacetime Field Equations" [5].

Wu's Spacetime Field Equation represents, under both thermal and subatomic equilibriums with target object, the correlation between the amount of normal unit acceleration "a" and Wu Unit Length l_{yy} of Wu's Pairs in the reference elementary subatomic particle (such as a designated up quark) at the same gravitational field and aging of the universe (same location and time) as the target object, which reflects the changes of distribution of energy and motion of matter. Because Wu Unit Length l_{yy} of Wu's Pairs in up quark is an unknown quantity, therefore Absolute Light Speed C at the same gravitational field and aging of the universe (same location and time) are used in Wu's Spacetime Field Equation, which is dependent only on the gravitational field and aging of the universe, no matter the reference corresponding identical elementary subatomic particles.

Furthermore, as the same target and parent objects observed on earth, under both thermal and subatomic equilibriums with the target object, the acceleration of the target object A can be represented by Wu Unit Length l_{yy0} of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) on earth as follows:

$A = a_0\ m\ n^{-2}\ \gamma^{-2}\ l_{yy0}^{-2}$

Also, the Absolute Light Speed C_0 of the photon on earth can be represented by Wu Unit Length l_{yy0} of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) on earth as follows:

$C_0 = c\ m\ n^{-1}\ \gamma^{-1}\ l_{yy0}^{-1/2}$

Given

$\delta = m^3 n^{-2} c^4$

Therefore, Wu's Spacetime Field Equation observed on earth can be represented as follows:

$a_0 = \delta\ \gamma^{-2}\ C_0^{-4}\ (GM/R^2)$

Where a_0 is the amount of normal unit acceleration of target object measured on earth, σ and δ are reference-dependent real number constants associated with the reference corresponding identical elementary subatomic particle (such as a designated up quark), γ is Wu's Spacetime Constant (absolute physical constant), l_{yy0} is Wu Unit Length of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) dependent on the gravitational field and aging of the universe on earth and C_0 is the Absolute Light Speed measured on earth ($C_0 = 3x10^8$ m/s where 3 $x10^8$ is a constant number and m/s is earth units), M is the mass of the star (absolute physical quantity), G is gravitational constant (universal physical constant, $G = 6.674x10^{-11}\ m^3kg^{-1}s^{-2}$ where $6.674x10^{-11}$ is the amount measured on earth and $m^3kg^{-1}s^{-2}$ is earth units) and R is the distance between the target object and the star (fixed physical quantity measured on earth). This equation is named "Wu's Spacetime Field Equation on earth" [5].

Fig. 7 [29] is a Wu's Spacetime Transformation Diagram which shows the transformation of acceleration "A" to the amount of normal acceleration "a" and Wu Unit Length l_{yy} of Wu's Pairs in the reference elementary subatomic particle (such as a designated up quark) at the same gravitational field and aging of the universe (same location and time) on the target object. Also the transformation of the same acceleration "A" to the amount of normal acceleration "a_0" and Wu Unit Length l_{yy0} of Wu's Pairs in the reference elementary subatomic particle (such as a designated up quark) on earth. In addition, Fig. 7 shows the transformations of the corresponding identical Absolute Light Speeds to the corresponding identical Wu Unit Length l_{yy} of Wu's Pairs in the reference corresponding identical elementary subatomic particle (such as a designated up quark) on both target object and on earth. Furthermore, Fig. 7 shows the correlations between Acceleration and Absolute Light Speed with Wu's Spacetime Transformations in derivations of Wu's Spacetime Field Equations.

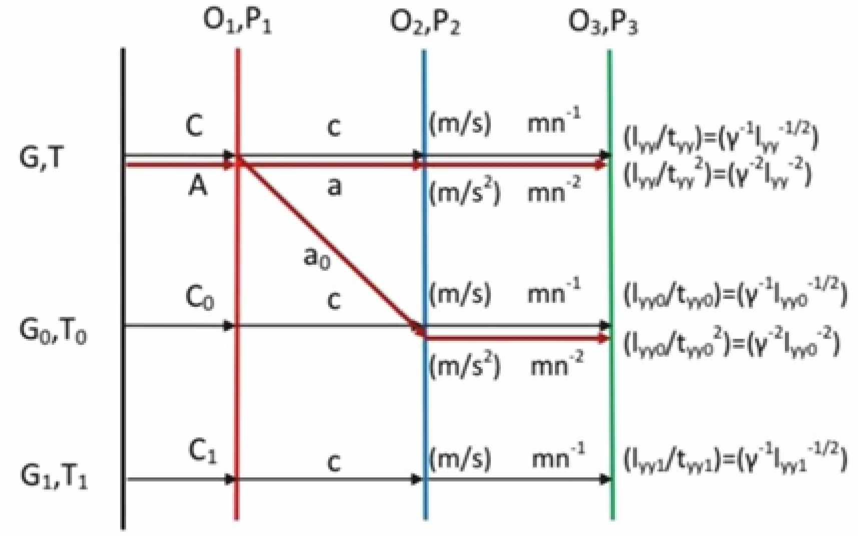

Fig. 7 The transformations of the same acceleration A to two different subatomic equilibrium systems and the transformations of the corresponding identical Absolute Light Speed C to the same corresponding identical subatomic equilibrium system (G = gravitational field, T = aging of the universe, O = object

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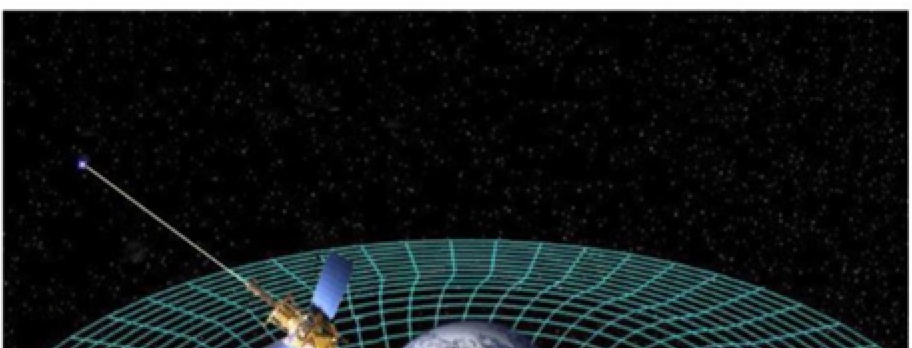

ation "a") observed

XVIII. Wu's Spacetime Field Equations versus Einstein's Field Equations

Einstein's Field Equation is derived from the equality between acceleration and the derivative of potential energy (curvature of potential energy). Einstein's Field Equation gives a solution, Einstein's Spacetime, the potential energy as a property function of the object or event, having derivative in compliance with the acceleration reflecting the distribution of matter and energy. It is a space-time continuum originated from a nonlinear geometry system (geodesics) and transformed to 3D Cartesian System on earth.

In contrast, Wu's Spacetime Field Equation is derived from the equality between acceleration and gravitational field. Wu's Spacetime Field Equation gives a solution, the amount of normal unit acceleration, as a property function of the object or event reflecting the distribution of matter and energy. It is generated in 3D Cartesian System on earth.

In comparison between Wu's Spacetime Field Equation and Einstein Field Equation,

$a_0 = \delta\, \gamma^{-2} C_0^{-4}\, (GM/R^2)$

$$R_{\mu\nu} - \frac{1}{2} R\, g_{\mu\nu} + \Lambda\, g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}$$

Because the same terms GC_0^{-4} and G/C^4 (C in Einstein's Field Equation is the Absolute Light Speed on earth $C = C_0$ which is the same as that in Wu's Spacetime Field Equation on earth. $G = 6.674 \times 10^{-11}\ m^3kg^{-1}s^{-2}$ where 6.674×10^{-11} is the amount measured on earth and $m^3kg^{-1}s^{-2}$ is earth units) appeared in both equations, Einstein's Field Equation and Wu's Spacetime Field Equation are considered equivalent. However, there is no gravitational force in Einstein's Field Equation. Spacetime is the potential energy of the object or event. Also, the curvature of spacetime is the acceleration which reflects to the distribution of matter and energy in the universe. On the other hand, in Wu's Spacetime Field Equation, matter does exist, as is the gravitational field. Also, the acceleration applied is only caused by the gravitational field.

As a result, Einstein's Field Equation is Energy and Acceleration correlated field equation, and Wu's Spacetime Field Equation is Acceleration and Gravity correlated Field Equation. Both Einstein Field Equation and Wu's Spacetime Field Equation on earth are equivalent only if acceleration is generated by gravitational field.

XIX. Wu-Einstein Field Equation

A similar equation to Einstein's Field Equation can be derived from Wu's Spacetime Transformation to reflect the correlation between Acceleration and Potential Energy as follows:

Because the potential energy E and the attractive force F applied on target object (m) can be represented as follows:

$dE = F\, dR$

$F = mA$

Therefore,

$dE/dR = mA$

Given

$E = E_0\, m$

Therefore,

$dE_0/dR = A$

Where E_0 is the potential energy of a unit mass (1kg).

Under both thermal and subatomic equilibriums with target object, acceleration of target object observed at the same gravitational field and aging of the universe (same location and time) as target object can be obtained as follows:

$A = a\, m^{-3}n^2\gamma^2c^{-4}C^4$

Furthermore, according to Principle of Parallelism and Wu's Spacetime Equation, the same acceleration of target object observed on earth can also be represented as follows:

$A = a_0\, m^{-3}n^2\gamma^2c^{-4}C_0^4$

Therefore,

$a_0 = m^3n^{-2}\gamma^{-2}c^4C_0^{-4}\,(dE_0/dR)$

Where a_0 is the amount of normal unit acceleration observed on earth, m is reference-dependent constant of normal unit length, n is reference-dependent constant of normal unit time, γ is the Wu's Spacetime Constant, c is the amount of normal unit velocity of light speed (3×10^8) and C_0 is Absolute Light Speed on earth ($C_0 = 3 \times 10^8$ m/s on earth, where 3×10^8 is a constant number and m/s are earth units).

Given

$\delta = m^3 n^{-2} c^4$

Therefore,

$a_0 = \delta\ \gamma^{-2} C_0^{-4} (dE_0/dR)$

Also,

$a_0 = \delta\ \gamma^{-2} C_0^{-4} G(dE_0/GdR)$

Where a_0 is the amount of normal unit acceleration on earth, E_0 is Potential Energy of a unit mass, δ is a constant of the reference subatomic object or event, γ is Wu's Spacetime Constant, C_0 is Absolute Light Speed on earth, G is gravitational constant, E_0 is the potential energy and R is the distance from the star. This equation is named "Wu-Einstein Field Equation" [4](revised from [37]).

Compare Wu-Einstein Spacetime Field Equation to Einstein's Field Equation,

$a_0 = \delta\ \gamma^{-2} C_0^{-4} G(dE_0/GdR)$

$$R_{\mu\nu} - \frac{1}{2} R\, g_{\mu\nu} + \Lambda\, g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}$$

The left hand side of Einstein Field Equation is curvature which is equivalent to a_0 the amount of normal unit acceleration on earth. The right hand side of Einstein Field Equation is stress-energy which is equivalent to $\delta\ \gamma^{-2}\ C_0^{-4}\ G(dE_0/GdR)$ the derivative of potential energy, which is related to mass, energy and momentum of target object. Also, a common term C_0^{-4} G can be found in both equations.

XX. Wu's Spacetime Field Equation versus Quantum Field Theory

Wu's Spacetime Field Equation is derived upon the equality between acceleration and gravitational field based on Graviton Radiation and Contact Interaction Theory, as well as Wu's Spacetime Transformation. Therefore, Wu's Spacetime Field composed of the amount of acceleration observed on earth ($a_0 = \delta\ \gamma^{-2}\ C_0^{-4}$ (GM/R^2)) is a function of gravitational field ($F_g = (GM/R^2)$). Furthermore, gravitational field is composed of the static remote gravitational force applied on a unit mass which can be calculated by Newton's Law of Universal Gravitation. Since Static Remote Gravitational Force is generated by the contact interaction between two groups of gravitons, one group on the stationary target object and the other group through static graviton flux from parent object, it is different from Gravitational Force which is generated by the contact interaction between two adjacent gravitons on the same object. As a result, because gravitational field is made of Static Remote Gravitational Force (long range force) which is different from quantum fields made of four basic forces (short range forces) including Gravitational Force [38], therefore Wu's Spacetime Field as a function of static remote gravitational force is also different from quantum fields.

XXI. Conclusion

Einstein's Spacetime is the potential energy of an object or event. Like any other property of the object or event, it is the image of Wu Unit Length of Wu's Pairs (building blocks of the universe) reflecting the local gravitational field and aging of the universe. In contrast, Wu's Spacetime is a single unit measurement system which contains Wu's Spacetime Units composed of exponents of Wu Unit Length of Wu's Pairs (in the reference corresponding identical elementary subatomic particle such as a designated up quark). Based on Wu's Spacetime Transformation, all the properties of an object or event such as dimension, duration, velocity and acceleration, as well as wavelength and Absolute Light Speed can be transformed to Wu's Spacetime Quantities composed of Wu's Spacetime Units. This accompanying Wu's Spacetime Shrinkage Theory can be applied successfully in explanation of many important physical phenomena such as Gravitational Redshift, Cosmological Redshift, Gravitational Time Dilation, Hubble's Law, Universe Expansion, Deflection of Light, Absolute Light Speed, Anisotropic Light Speed, Gravitational Waves, Perihelion Precession of Mercury and Einstein's General Relativity, Spacetime and Field Equations. Furthermore, Einstein's Field Equation is derived upon the equality between curvature of potential energy and acceleration from a geodesics non-linear coordination system. In contrast, Wu's Spacetime Field Equation is derived upon the equality between acceleration and gravitational field from a Cartesian system. They are equivalent with a common term GC_o^{-4} in both equations, only if acceleration is generated by gravitational field.

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