IOSR Journal Of Applied Physics (IOSR-JAP)
e-ISSN: 2278-4861.Volume 17, Issue 1 Ser. 2 (Jan. – Feb. 2025), PP 23-50
www.Iosrjournals.Org

The Truth Of Light Speed

Edward T. H. Wu

Abstract
A detailed study of light speed is presented based on Newtonian physics in which photon is treated as a particle having inertia properties in both photon generation and propagation processes. With a clear understanding of the definition of light speed and the reference of observation, on one hand, Wu's Spacetime Shrinkage Theory based on a hypothetical Yanton and Yington Theory can be applied successfully in interpretation of physical phenomena of photon associated with Absolute Light Speed observed at light source (also at stationary reference point), such as Cosmological Redshift, Gravitational Redshift, Light Deflection, Anisotropic light speed, as well as Hubble's Law and Expansion of the Universe. On the other hand, Equation of Light Speed and Equations of Doppler Shifts based on a logical analysis can also be implemented perfectly in explanation of physical phenomena of photon associated with Normal Light Speed observed at reference point, such as Axial Doppler Shift, Acceleration Doppler Shift and Transverse Doppler Shift, as well as Acceleration Doppler Effect and Event Horizon. As a result, Normal Light Speed observed at the reference point is not constant, which can change with the relative motion between light source and reference point. Even though Absolute Light Speed observed at light source is constant, it is true only if at the same gravitational field and aging of the universe.

Keywords: *Light Speed, Absolute Light Speed, Vision of Light, Principle of Vision, Transformation of Vision, Photon Inertia Transformation, Equation of Relative Velocity, Equation of Light Speed, Michelson and Morley Experiment, Redshift, Gravitational Redshift, Cosmological Redshift, Doppler Effect, Equations of Doppler Shifts, Axial Doppler Shift, Acceleration Doppler Shift, Transverse Doppler Shift, Even Horizon, Yangton and Yington Theory, Wu's Spacetime Shrinkage Theory, Principle of Parallelism, Wu's Spacetime Equation, Deflection of Light, Expansion of Universe, Hubble's Law, Special Relativity, Velocity Time Dilation, Length Contraction.*

Date of Submission: 29-01-2025 Date of Acceptance: 09-02-2025

I. Introduction

Is light speed constant? This question has been bothering scientists for more than a century since 1905 first proposed by Einstein in his special relativity theory. A great number of discussions and debates regarding this topic have been published in thousands of journals and conferences. Despite that academic scholars like religion believers are obnoxiously stubborn in defending Einstein and Relativity Theory as their God and bible, a lack of fully understanding of light speed including even some very fundamental concepts such as the definition of light speed and the reference of observation, makes Newtonian physicists in a very weak and unconvincing position in the debate.

In this paper, a detailed study of light speed is presented based on Newtonian physics in which photon is treated as a particle having inertia properties in both photon generation and propagation processes. With a clear understanding of the definition of light speed and the reference of observation, on one hand, Wu's Spacetime Shrinkage Theory based on a hypothetical Yanton and Yington Theory can be applied successfully in interpretation of physical phenomena of photon associated with Absolute Light Speed observed at light source (also at stationary reference point), such as Cosmological Redshift, Gravitational Redshift, Light Deflection, Anisotropic light speed, as well as Hubble's Law and Expansion of the Universe. On the other hand, Equation of Light Speed and Equations of Doppler Shifts based on a logical analysis can also be implemented perfectly in explanation of physical phenomena of photon associated with Normal Light Speed observed at reference point, such as Axial Doppler Shift, Acceleration Doppler Shift and Transverse Doppler Shift, as well as Acceleration Doppler Effect and Event Horizon.

As a result, Normal Light Speed observed at the reference point is not constant, which can change with the relative motion between light source and reference point. Even though Absolute Light Speed observed at light source is constant, it is true only if at the same gravitational field and aging of the universe.

II. Reference Point And Reference System

A reference system contains a reference point (could be any point in space) and three designated perpendicular axes. A physical phenomenon is observed at the reference point (system) means that the physical

phenomenon is observed while the position of the reference point and directions of three designated perpendicular axes in the reference system remain unchanged during the entire observation process. (In this book, reference point and reference system are always together and means the same thing)

The position of an object (point) at an instance of time can be observed at a reference point (system) and represented by a set of three coordinates (Cartesian coordinate) that each is obtained by measuring the projection of the position vector on the corresponding reference axis with a scale of unit length.

Also, the instance of time can be measured by the following two methods: (1) Real time onsite measurement, in which time is measured onsite with the object in real time by an optical sensor, such that any time delay caused by the optical signal communication process can be avoided, and (2) Delay time offsite measurement, in which time is measured by an offsite optical sensor at the reference point (system) where the time delay caused by optical signal communication process must be considered.

III. Absolute Space System

In the universe, everything (object) is moving relatively to the Space. There is no such thing (object) as a fixed reference point (system) in the Space. However, when a photon emitted from a light source, it generates a straight optical path from its light origin (not light source) into space. This light origin is a point without substance and has a fixed position in the Space that doesn't move with the light source, nor the earth or anything else. Therefore, an Absolute Space System [1] can be defined by the light origin and three fixed perpendicular axes with each axis pointing to a fixed far distance star (such as North Star) from the light origin.

IV. Vision Of Object

Vision of Object is the image of an object observed at a reference point (system) during a period of time. More specifically, Vision of Object is a group of consecutive positions of an object observed at a reference point (system) during a period of time.

V. Principle Of Vision – Only Vision Theory

The position and direction (coordination) of an object observed at a designated reference point (system) at an instance of time is always constant (one and only vision), no matter of other objects. As a consequence, the relative positions and directions between two objects at an instance of time remain unchanged no matter of the reference point (system). This phenomenon is named "Principle of Vision" – Only Vision Theory [1].

According to Principle of Vision, positions of all objects at an instance of time remain unchanged observed at any reference point in a stationary system.

VI. Theory Of Vision – Transformation Of Vision

Based on Principle of Vision, a vision of object, in addition to being observed (measured) directly at a designated reference point (system) during a period of time, can also be transformed from a vision of object observed (measured) at a third party reference point (system) to a corresponding vision of object at the designated reference point (system) by the following process: The image (position) of the object at each time frame observed (measured) at the third party reference point (system) can be transformed to the corresponding position in the designated reference point (system) by complete overlapping the designated reference point and system observed (measured) at each time frame at the third party reference point (system) on top of each others, while maintaining the same relative positions and directions between the object and the designated reference point (system) at the same time frame, such that the vision of object in the designated reference point (system) can be produced. This theory is named "Theory of Vision" – Transformation of Vision [1].

Two schematic diagrams are illustrated here to explain the transformation process of vision of object from a reference point (system) to the designated reference point (system):

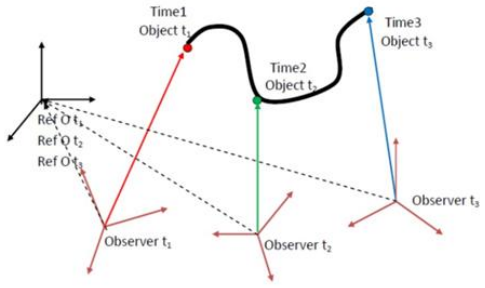

Fig.1 Vision of an object observed at a reference point.

Fig. 1 shows the vision of object and vision of observer (designated reference point) observed (measured) at reference point O in different time frames. Object t_1, Object t_2 and Object t_3 represent the positions and directions of the objects; and Observer t_1, Observer t_2 and Observer t_3 represent the positions and directions of the observer (designated reference point), which are observed (measured) at a reference point O in the time frame t_1, t_2 and t_3 respectively. The curve from Object t_1 to object t_2 and Object t_3 represents the vision of the object observed (measured) at reference point O during the time period from t_1 to t_3.

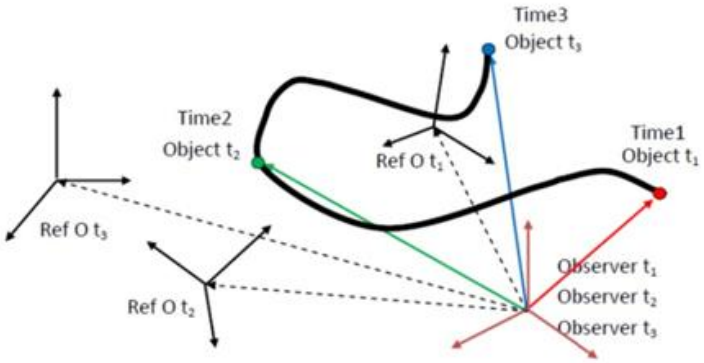

Fig. 2 Vision of an object observed at an observation point constructed from a reference point.

Fig. 2 shows the vision of object observed (measured) at the observer (designated reference point) transformed from that observed (measured) at reference point O in Fig. 1 In which, Observer t_1, Observer t_2 and Observer t_3 and their reference systems observed (measured) at the reference point O in Fig. 1 are completely matched and overlapped on top of Observer t_3. Meanwhile, the relative positions and directions of the Object t_1, Object t_2 and Object t_3 with respect to Observer t_1, Observer t_2 and Observer t_3 are maintained the same as that observed at reference point O in Fig. 1. As a consequence, the vision of object as the curve from Object t_1 to Object t_2 and Object t_3 observed (measured) at the observer (the designated reference point) during the time period from t_1 to t_3 is transformed from the vision of object observed (measured) at the reference point O.

Furthermore, according to Principle of Vision, the positions and directions of the object and observer at a time frame observed (measured) at any reference point (system) are the same such that the same vision of object observed (measured) at the observer (the designated reference point) can always be obtained.

VII. Vision Of Light

Like vision of object, Vision of Light [1] is the image of a photon observed (measured) at a reference point (system) during a period of time. The photon is correlated to the reference point (system) by distance and direction (coordination). Similar to vision of object, in addition to being observed (measured) directly at the reference point (system), Vision of Light can also be produced by transformation from that observed at a third party reference point (system) such as the light origin in Absolute Space System.

VIII. Definition Of Object Speed

Speed of object is the property of an object that can only be generated by observation at a reference point (system). It is defined by the traveling distance of the object observed and measured at the reference point (system) divided by the traveling time of the object measured onsite with the object or offsite at the reference point. Since the traveling distance of an object is measured based on the Vision of Object observed at the reference point (system) during a period of time, therefore the speed of object is calculated by Vision of Object divided by the traveling time of the object observed at the reference point (system).

To obtain Vision of Object, the position of the object at each instance of time observed at a reference point (system) must be transformed to the corresponding position observed at the designated reference point (system) by superimposing the designated reference point (system) at each instance of time on to that of the last instance of time, while maintaining the relative position and direction between the object and the designated reference point (system). Consequently, Vision of Object observed at the designated reference point (system) can be produced.

As to the traveling time of the object, it is measured offsite at the reference point (system) where time delay caused by optical signal communication process is negligible simply because that light speed is much faster than object speed.

IX. Definition Of Light Speed

Like speed of object, Speed of Light is also defined by the Vision of Light observed at the reference point (system) divided by the traveling time of the photon measured on site with the photon. In case that photon traveling time is measured at the reference point (system), optical signal (photon or EM waves) traveling times from starting point and ending point to the reference point need to be considered in order to get the actual photon traveling time.

X. Equation Of Relative Velocity

As illustrated in Fig. 3 [2], at any instant of time, the relative velocities ${}_{O}\mathbf{V}_{P}$, ${}_{O}\mathbf{V}_{S}$ and ${}_{S}\mathbf{V}_{P}$ observed at any three reference points O, P and S with a 3D Cartesian Reference System obey the following equation:

$${}_{O}\mathbf{V}_{P} = {}_{O}\mathbf{V}_{S} + {}_{S}\mathbf{V}_{P}$$

Where ${}_{O}\mathbf{V}_{P}$ is the velocity of reference point P observed at reference point O, ${}_{O}\mathbf{V}_{S}$ is the velocity of reference point S observed at reference point O, and ${}_{S}\mathbf{V}_{P}$ is the velocity of reference point P observed at reference point S respectively with a 3D Cartesian Reference System. This equation is called "Equation of Relative Velocity" [2].

Equation of Relative Velocity is true at any instant time. In case two of the three velocities are constant then the third one is also constant and Equation of Relative Velocity should be true at all times. For example, ${}_{O}\mathbf{V}_{S}$ and ${}_{O}\mathbf{V}_{P}$ are constant velocities then ${}_{S}\mathbf{V}_{P}$ is also a constant velocity.

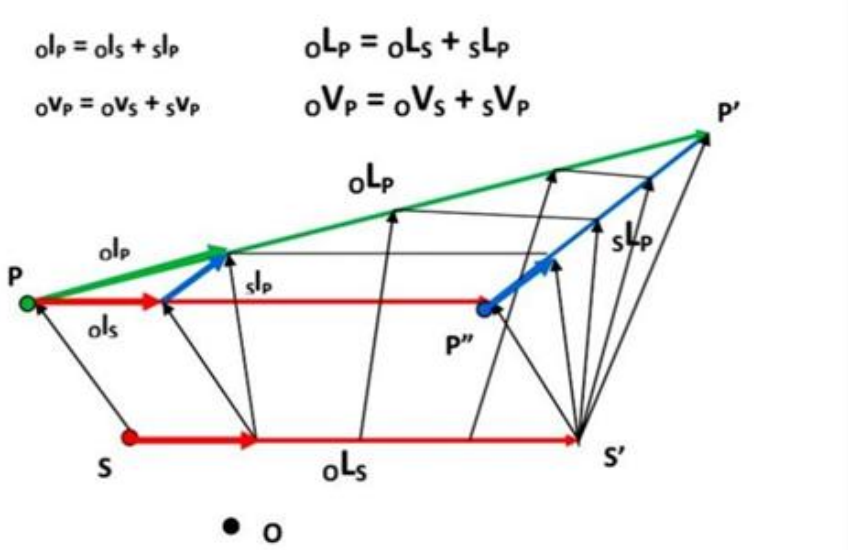

Fig. 3 Equation of Relative Velocities ${}_{O}\mathbf{V}_{P} = {}_{O}\mathbf{V}_{S} + {}_{S}\mathbf{V}_{P}$ at any instant time or for constant velocities at any time. Where O is reference object, S and P are two moving objects, ${}_{O}\mathbf{V}_{P}$ is the velocity of P observed at O, ${}_{O}\mathbf{V}_{S}$ is the velocity of S observed at O and ${}_{S}\mathbf{V}_{P}$ is the velocity of P observed at S.

XI. Light Speeds Observed At Different Reference Points

Fig. 4 shows a schematic diagram of the Visions of Light of an emitted photon observed at the light origin, ground and light source in Absolute Space System at light origin (designated reference point). Because of the motions of earth and the light source with respect to the light origin, ground and light source are drifted away from the light origin respectively. Based on Principle of Vision (relative positions and directions between two objects maintain unchanged no matter of reference point) and Theory of Vision (transformation of vision of object to different reference points). The Visions of Light can be represented by the following straight lines: **AP**–the Vision of Light observed at light origin (black line), **BP**–the Vision of Light observed at ground (red line) and **CP**–the Vision of Light observed at the light source (green line) respectively. They are all ended at the same final position (point **P**) of the emitted photon.

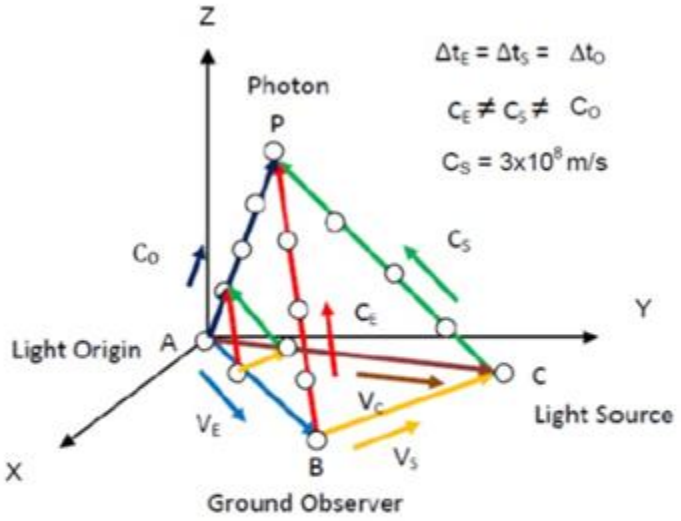

Fig. 4 Visions of Light of an emitted photon observed at the light origin (black line), ground (red line) and light source (green line) in Absolute Space System.

In case all motions are at constant speeds, after a time interval Δt (assuming at the same gravitational field), the light speed observed at point A, B and C can be represented as follows:

AP (Vision of Light observed at light origin) is the vector summation of **CP** (Vision of Light observed at the light source) and **AC** (moving path of the light source observed at the light origin). Also, $\mathbf{C_O}$ (light speed observed at light origin) is the vector summation of $\mathbf{C_S}$ (light speed observed at the light source) and $\mathbf{V_C}$ (moving speed of the light source observed at the light origin).

$\mathbf{AP} = \mathbf{CP} + \mathbf{AC}$

$\mathbf{C_O} = \mathbf{C_S} + \mathbf{V_C}$

AP (Vision of Light observed at light origin) is the vector summation of **BP** (Vision of Light observed at ground) and **AB** (moving path of earth observed at the light origin). Also, $\mathbf{C_O}$ (light speed observed at light origin) is the vector summation of $\mathbf{C_E}$ (light speed observed at ground) and $\mathbf{V_E}$ (moving speed of ground observed at the light origin).

$\mathbf{AP} = \mathbf{BP} + \mathbf{AB}$

$\mathbf{C_O} = \mathbf{C_E} + \mathbf{V_E}$

BP (Vision of Light observed at ground) is the vector summation of **CP** (Vision of Light observed at the light source) and **BC** (moving path of the light source observed at ground). Also, $\mathbf{C_E}$ (light speed observed at ground) is the vector summation of $\mathbf{C_S}$ (light speed observed at the light source) and $\mathbf{V_S}$ (moving speed of the light source observed at ground).

$\mathbf{BP} = \mathbf{CP} + \mathbf{BC}$

$\mathbf{C_E} = \mathbf{C_S} + \mathbf{V_S}$

Because of the constant repulsive string forces generated between photon and the adjacent Wu's Pairs on the surface of the light source in the photon two stage emission process, a constant light speed $\mathbf{C_S}$ (Absolute Light Speed $3x10^8$ m/s dependent on the gravitational field at the light source) in the photon ejection direction can always be observed at the light source regardless of the frequency of the photon and the moving speeds of the light source away from the reference points such as that observed either at the light origin or at the ground ($\mathbf{V_C}$ or $\mathbf{V_S}$).

When a photon observed at different observation points (reference points) such as light origin Point A, ground observer Point B and light source Point C, because of the same event, at the same gravitational field, the traveling times of the photon are the same ($\Delta t_E = \Delta t_S = \Delta t_O$), but the Visions of Light are different (**AP** ≠ **BP** ≠ **CP**). Since light speed is measured as the Vision of Light divided by the photon traveling time observed at the observation point (reference point), therefore the light speeds are different ($\mathbf{C_E} \neq \mathbf{C_S} \neq \mathbf{C_O}$) at different observation positions (reference points). These oppose to Einstein's Special Relativity in which he claimed that light speed is always constant no matter the light sources and observers (reference points).

As a result, all the light speeds observed in Fig. 23 including $\mathbf{C_O = C_S + V_C}$, $\mathbf{C_O = C_E + V_E}$ and $\mathbf{C_E = C_S + V_S}$ agree with Equation of Relative Velocity. Also $\mathbf{C_O = C_S + V_C}$ obeys exactly to Equation of Light Speed.

XII. Photon Inertia Transformation

Photon just like electron or any other particle, while emitted from the light source (parent object), it travels at a constant speed observed at light origin which is a vector summation of two speeds: (1) Ejection Speed which is the speed observed at the light source at time of emission (Absolute Light Speed $3x10^8$ m/s, where m/s is dependent on the local gravitational field and aging of the universe) caused by the constant ejection force (string force) between two Wu's Pairs no matter of frequency and light source, and (2) Inertia Speed which is the speed of light source observed at light origin at time of emission. This process is called "Photon Inertia Transformation"[1].

In contrast, Phonon (quantum of sound) is not a particle emitted from the vibrator (sound source). Instead, it is a surge of energy wave that is generated in the sound medium by the vibrator, carrying and transmitting energy radically in the sound medium at a nature speed of the sound medium no matter of the vibrator (sound source). This process is called "Non-inertia Transformation".

XIII. Absolute Light Speed And Inertia Light Speed

At photon Ejection Stage, because of the repulsive string forces between photon and the adjacent Wu's Pairs on the surface of the light source, regardless of the frequency, a photon emitted from light source under both thermal and subatomic equilibriums, as a corresponding identical object or event, observed at light source at the time of emission, should always have a constant light speed 3×10^8 m/s in vacuum, where m/s is dependent on the local gravitational field and aging of the universe (revised from [1][3]). This initial light speed observed at the light source at time of emission is called Absolute Light Speed.

Under both thermal and subatomic equilibriums, Absolute Light Speed is dependent on Wu Unit Length which is a function of gravitational field and aging of the universe. Therefore, Absolute Light Speed is also dependent on gravitational field and aging of the universe. According to Wu's Spacetime Shrinkage Theory, at massive gravitational field and early aging of the universe, Absolute Light Speed is slower while Wu Unit Length is bigger.

Absolute Light Speed doesn't change with temperature. When temperature increases, more electrons move to the higher quantum energy states, while the microstructure and macrostructure are expanded (thermal expansion), but Wu Unit Length and Wu Unit Time of the same quantum energy states remain unchanged. In contrast, Wu Unit Length can be influenced by particle bombardments such as static graviton flux, dynamic graviton flux and plasma bombardment, as is the Absolute Light Speed. Furthermore, photons with different angular momentum may also have different Absolute Light Speeds.

At the Separation Stage of photon emission process, according to classical Newtonian physics, photon also carries the inertia of the parent object (light source). Therefore, at the time of emission, photon travels not only at the Absolute Light Speed (3×10^8 m/s dependent on the gravitational field and aging of the universe at the light source) in the trajectory direction observed at the light source, but also with a speed and direction as that of the light source observed at light origin (or at the reference point). This initial speed of light source observed at light origin at the time of emission is called Inertia Light Speed.

XIV. Equation Of Light Speed

According to Equation of Relative Velocity [2], light speed observed at a reference point $\mathbf{{}_OC_P}$ is the vector summation of the speed of light source observed at the reference point $\mathbf{{}_OV_S}$ and Light Speed observed at light source $\mathbf{{}_SC_P}$.

$$\mathbf{{}_OC_P = {}_OV_S + {}_SC_P}$$

This equation is true at any instant time. In case two of the three velocities are constant then the third one is also constant and the above equation should also be true at all times.

Therefore, Equation of Light Speed [1][3] can be represented by a vector summation as follows:

$$\mathbf{C' = C + V}$$

Where **C'** is the light speed observed at reference point, **C** is the light speed observed at light source and **V** is the speed of light source observed at reference point.

Equation of Light Speed is true at any instant time. In case any two of the three speeds **C'**, **C** and **V** are constant, then the third one is also constant and Equation of Light Speed is true at all times.

At the time of light emission, light speed observed at light source is frequency independent constant called Absolute Light Speed ($\mathbf{C} = 3x10^8$ m/s, where m/s is dependent on the local gravitational field and aging of the universe), which is the initial light speed observed at light source. On the other hand, the speed of light source observed at light origin is Inertia Light Speed which is the initial speed of light source observed at light

origin. Therefore, at the time of emission, the light speed observed at light origin is the vector summation of Absolute Light Speed and Inertia Light Speed. In fact, the light speed observed at light origin is always constant as the vector summation of Absolute Light Speed and Inertia Light Speed. This is named "Light Origin Constant Light Speed Theory". In addition, at the time of light emission, light speed observed at a reference point is the vector summation of Absolute Light Speed and the speed of light source observed at the reference point (different from Inertia Light Speed observed at light origin).

In case the speed of light source observed at light origin is constant (equal to Inertia Light Speed), since the light speed observed at light origin is always constant, then according to Equation of Relative Velocity, the light speed observed at light source is also constant (equal to Absolute Light Speed). Furthermore, In case both the light speed and the speed of light source are constant observed at the reference point, then the light speed observed at light source is also constant (equal to Absolute Light Speed) (revised from [4]).

Equation of Light Speed is the "Law of Light" which indicates directly that "Light Speed Is Not Constant". In other words, it shows that Einstein's postulation "Light Speed is always constant no matter of light source and observation" is not true and Special Relativity is false. In addition, Equation of Light Speed can be applied to explain many physical phenomena such as Cosmological Redshift, Hubble's Law, Spacetime Reverse Expansion (Universe Expansion), Gravitational Redshift and Deflection of Light which are affected by Absolute Light Speed and Wavelength dependent on the local gravitational field and aging of the universe. It can also be applied to interpret Axial Redshift, Transverse Redshift, Acceleration Redshift and Event Horizon, which are influenced by Inertia Light Speed and direction due to the relative motions between light source and reference point. As a consequence, these phenomena can also be considered as the nature proofs to Equation of Light Speed, as well as that "Light Speed Is Not Constant" [5].

XV. Gravity Effect On Absolute Light Speed

Under both thermal and subatomic equilibriums, photon is a corresponding identical object. According to Principle of Parallelism, Absolute Light Speed $C = 3x10^8$ m/s (the initial light speed observed at light source at the time of photon emission) as the property of a corresponding identical photon has a fixed number $3x10^8$ and a group of unit quantities (m/s) which is dependent on Wu Unit Length subject to gravitational field and aging of the universe. More specifically, based on Gravity Affected Wu's Spacetime Shrinkage Theory, Wu's Spacetime Transformation, Principle of Parallelism and Wu's Spacetime Equation, at massive gravitational field, Absolute Light Speed is slower while m/s is smaller and Wu Unit Length is bigger resulting from particle bombardment by static graviton flux and dynamic graviton flux. As a result, Absolute Light Speed is dependent on gravitational field and aging of the universe.

Since all the string forces between two adjacent Wu's Pairs in an object or event are the same under both thermal and subatomic equilibriums, no matter of photon frequency (circulation frequency of Wu's Pair), therefore all the photon ejection forces (string forces) are also the same, no matter of photon frequency, as is Absolute Light Speed. In other words, Absolute Light Speed is independent of photon frequency.

When temperature increases, the microstructure and macrostructure of the object expand (thermal expansion), but string force between two adjacent Wu's Pairs remains unchanged, as is the ejection force and also Absolute Light Speed. In other words, Absolute Light Speed is independent of temperature.

Furthermore, light speed (Absolute Light Speed) can be derived from Maxwell Equations and correlate to permittivity ε_0 and permeability μ_0 by equation $C = 1/(\varepsilon_0\mu_0)^{1/2}$. Some physicists mistakenly believe that ε_0 and μ_0 are absolute physical constants (which don't change with anything at all), therefore light speed (Absolute Light Speed) also must be an absolute physical constant. In fact, both $\varepsilon_0 = 8.85x10^{-12}$ Farad/meter and $\mu_0 = 4\pi\times10^{-7}$ H/m are properties of a corresponding identical object which have a fixed number and a group of unit quantities that is dependent on gravitational field and aging of the universe, as is Absolute Light Speed.

As a result, because that Absolute Light Speed C contains a number ($3x10^8$) and a group of unit quantities (m/s) dependent on gravitational field and aging of the universe, also Absolute Light Speed is independent of photon frequency and temperature, like ε_0 and μ_0, Absolute Light Speed can be considered as a gravity dependent physical constant.

XVI. Galilean Transformation Versus Lorentz Transformation

Galilean Transformation [6] is used to transform between the coordinates of two reference frames which differ only by constant relative motion (**V** = constant) within the constructs of Newtonian physics.

Based on Equation of Relative Velocity, the relative speeds between the moving object and two reference points can be correlated to each other at any instant time or at constant speeds as follows:

$$\mathbf{{}_{O}V_{P} = {}_{O'}V_{P} + {}_{O}V_{O'}}$$

Where **O** is the resting reference point, **O'** is the moving reference point and **P** is the moving object. Also, $\mathbf{{}_{O}V_{P}}$ is the speed of object **P** observed at resting reference point **O** and $\mathbf{{}_{O'}V_{P}}$ is the speed of object **P**

observed at moving reference point **O'** and $_{O}\mathbf{V}_{O'}$ is the speed of the moving reference point **O'** observed at resting reference point **O**.

Under Galilean Transformation, because the speed of moving reference point **O'** observed at resting reference point **O** is constant, therefore

$$_{O}\mathbf{V}_{P} = {}_{O'}\mathbf{V}_{P} + \mathbf{V}$$

Where **V** is a constant.

As a result, under Galilean Transformation where $_{O}\mathbf{V}_{O'}$ the speed of moving reference point observed at resting reference point is constant ($_{O}\mathbf{V}_{O'} = \mathbf{V}$), then (1) at any instant time, $_{O}\mathbf{V}_{P}$ (the speed of object **P** observed at resting reference point **O**) is the vector summation of $_{O'}\mathbf{V}_{P}$ (the speed of object **P** observed at moving reference point **O'**) and **V** (the speed of the moving reference point **O'** observed at resting reference point **O**), and (2) if $_{O}\mathbf{V}_{P}$ is constant, then $_{O'}\mathbf{V}_{P}$ must be constant, and also $_{O}\mathbf{V}_{P} = {}_{O'}\mathbf{V}_{P} + \mathbf{V}$.

In photon emission process, assuming O is light origin, O' is light source and P is photon, according to Equation of Light Speed, then at any instant time,

$$_{O}\mathbf{V}_{P} = {}_{O'}\mathbf{V}_{P} + {}_{O}\mathbf{V}_{O'}$$

Where $_{O}\mathbf{V}_{P}$ is the light speed observed at light origin which is always constant according to Light Origin Theory, $_{O'}\mathbf{V}_{P}$ is the light speed observed at light source and $_{O}\mathbf{V}_{O'}$ is the light source speed observed at light origin.

In case the above photon emission process fulfills Galilean Transformation, which means $_{O}\mathbf{V}_{O'}$ is constant, then the light speed observed at light source $_{O'}\mathbf{V}_{P}$ is also constant and which is equal to Absolute Light Speed (the initial light speed observed at light source at time of emission).

Lorentz transformations [7], on the other hand, are a six-parameter family of linear transformations from a coordinate frame in Spacetime to another frame that moves at a constant velocity (V = constant) relative to the former. The respective inverse transformation is then parameterized by the negative of this velocity. In compliance with Einstein's Special Relativity, Lorentz Transformation is also based on the postulation that light speed is constant (C' = C) in both frames which results in velocity time dilation and a conflict as Twin Paradox.

XVII. Various Light Speeds In Space

Light Speeds Dependent on Reference Points

The speed of light is calculated by the Vision of Light observed at a reference point divided by the traveling time of light. Since different Visions of Light of a photon can be observed by different observers (reference points) at different moving speeds and directions, it is obvious that different light speeds in space can be observed by moving observers (reference points) other than those at the light source. As shown in Fig. 23, in addition to the Absolute Light Speed C_S (3×10^8 m/s) observed at the light source, Inertia Light Speeds C_E and C_O can also be observed at ground and light origin respectively. This opposes to Einstein's Special Relativity, in which it is claimed that light speed in vacuum (space) is always constant, no matter the light sources and observers (reference points).

Furthermore, if an observer (reference point) is moving at the Absolute Light Speed in the same direction of the light beam (photon), then the light speed observed by the moving observer (reference point) is nearly zero and the photon is practically frozen observed by the observer (reference point) [1].

Because,

$$\mathbf{V} = -\mathbf{C}$$

Therefore,

$$\mathbf{C'} = \mathbf{C} + \mathbf{V}$$

$$\mathbf{C'} = \mathbf{0}$$

This also opposes to Einstein's Special Relativity, in which Einstein claimed that if he was running with a photon at light speed, he could still see the photon moving away from him at the light speed. It is totally impossible, unless he was running stationary with the light source [35].

Because,

$$\mathbf{V} = \mathbf{0}$$

Therefore,

$$\mathbf{C'} = \mathbf{C} + \mathbf{V}$$

$$\mathbf{C'} = \mathbf{C}$$

Constant Vision and Light Speed Observed in Stationary System

For any two points R and Q in a stationary system, because they are at rest to each other ($_{R}\mathbf{V}_{Q} = 0$), therefore any vision of object observed at reference point R is the same as that observed at reference point Q in the same time period. Consequently, the position (at an instance of time) and vision (in a period of time) of an object remain unchanged observed at R or Q, or any point in the stationary system.

Furthermore, according to Equation of Relative Velocity [2], for any three reference points P, Q and R at any instant time,

$$_{R}\mathbf{V}_{P} = {}_{R}\mathbf{V}_{Q} + {}_{Q}\mathbf{V}_{P}$$

Because reference points R and Q are at rest in a stationary system $_{R}\mathbf{V}_{Q} = \mathbf{0}$, therefore

$$_{R}\mathbf{V}_{P} = {}_{Q}\mathbf{V}_{P}$$

At any instant time, the speed of reference point P observed at reference point R is equal to that observed at reference point Q. In other words, at any instant time, the position and speed of an object (point) remain unchanged observed at any reference point in a stationary system.

Assuming P is a photon, R and Q are any two reference points in a stationary system, and then at any instant time, the light speed observed at reference point R is equal to that observed at reference point Q. In other words, at any instant time, photon position and light speed remain unchanged observed at any reference point in a stationary system.

In both Laser Gyroscope and Fiber Gyroscope, because light source and detector (reference point) are both at rest to each other ($_{O}\mathbf{V}_{S} = \mathbf{0}$), therefore the light speed observed at light source is the same as that observed at detector ($_{O}\mathbf{V}_{P} = {}_{S}\mathbf{V}_{P}$). Since the light speed observed at the light source is Absolute Light Speed dependent on gravitational field and aging of the universe no matter of frequency and direction, therefore, the light speed observed at the detector at the same gravitational field and aging of the universe is also Absolute Light Speed no matter of frequency and direction. However, the light traveling paths (vision of light) are different between clockwise and counter clockwise rotations. Therefore, interference can be observed and the rotation angle of the gyroscope can be calculated.

Light Speeds Observed on Earth

According to Equation of Light Speed, $\mathbf{C}_{E}$ (light speed observed at ground) is the vector summation of $\mathbf{C}_{S}$ (light speed observed at the light source) and $\mathbf{V}_{S}$ (moving speed of the light source observed at ground). Because light source is at rest to ground ($\mathbf{V}_{S} = \mathbf{0}$), therefore light speed observed by the ground observer (reference point) is always equal to Absolute Light Speed ($\mathbf{C}_{E} = \mathbf{C}_{S}$ = Absolute Light Speed).

Limit of Light Speed

Because Wu's Pairs are the finest building blocks of all matters in the universe, when a Wu's Pair separates from the surface of a substance (string structures) to form a free photon, it can be accelerated by the repulsive string forces between the two Yangton particles and also the two Yington particles (one from the emitting photon and the other one from the adjacent Wu's Pair) on the surface of the parent substance, to reach an extremely high speed $3x10^8$ m/s (dependent on the local gravitational field and aging of the universe). Therefore, it is suggested that the Absolute Light Speed $3x10^8$ m/s (dependent on the gravitational field and aging of the universe at the light source) is the highest speed any object can move in the universe. However, in theory, there should be no limit. The speed of an object is all dependent on the driving force and its acceleration.

XVIII. Michelson – Morley Experiment

In the 18th century, physicists believed that Aether was the carrier of light (electromagnetic waves) in space. Michelson – Morley Experiment [8] was designed to prove the existence of Aether by detecting the difference of light speeds through the optical interference caused by the motion of Aether.

Fig. 5 illustrates the Michelson – Morley Experiment. Where AP and all the red lines are the Vision of Light observed at the light origin in Absolute Space System. BP and all the black lines are the Vision of Light observed at the light source in which light travels at a constant Absolute Light Speed ($3x10^8$ m/s on earth). V_E is the speed of light source drifted away from light origin observed at the light origin. When photons reach the semi-transparent mirror (point P) through Vision of Light BP observed at the light source, they split into two perpendicular light beams. These two beams are bounced back from the two end mirrors placed at equal distances from the center of the semi-transparent mirror, then they are recombined at the semi-transparent mirror and finally received by the detector.

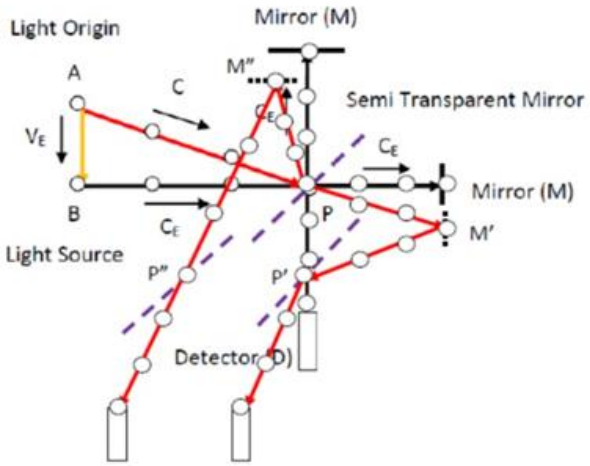

Fig. 5 Michelson – Morley Experiment with the Visions of Light observed at the light source (black line) and light origin (red line)

There are two ways to observe the experiment, from either the light origin or the light source. The result should be exactly the same. Here we try to observe the experiment from the light origin (reference point) in Absolute Space System which is more complicated than that from the light source.

According to Equation of Light Speed, light speed $\mathbf{C_o}$ observed at the light origin is the vector summation of the light speed observed at light source (on earth) $\mathbf{C_E}$ and the speed of light source drifted away from light origin observed at the light origin $\mathbf{V_E}$.

$\mathbf{C_o = C_E + V_E}$

Also, the light speed observed at light source (on earth) $\mathbf{C_E}$ is the vector summation of the light speed observed at Aether **C** (3×10^8 m/s (on earth)) and the speed of Aether observed at light source (on earth) $\mathbf{V_A}$.

$\mathbf{C_E = C + V_A}$

When photon hits the mirrors (semi-transparent and two end mirrors), the direction of $\mathbf{C_E}$ changes, and the values of $\mathbf{C_O}$ are different in different directions with respect to $\mathbf{V_E}$:

$C_O = (C_E^2 + V_E^2)^{1/2}$ (when $\mathbf{C_E}$ is perpendicular to $\mathbf{V_E}$)
$C_O' = C_E - V_E$ (when $\mathbf{C_E}$ and $\mathbf{V_E}$ are in opposite directions)
$C_O'' = C_E + V_E$ (when $\mathbf{C_E}$ and $\mathbf{V_E}$ are in the same direction)

If Aether doesn't exist
Then $V_A = 0$ and $C_E = C$.

Also, when observed at ground, the photon traveling time in the path of PM (Vision of Light observed at ground) is Δt.

$\Delta t = PM/C_E = PM/C$

When observed at light origin, the total time needed for photon to travel in the paths of PM" and M"P" (Both PM" and M"P" are parallel to PM. They are tilled here just for easy explanation) should be the same as that of PM' and M'P'. Where PM", M"P", PM' and M'P' are Vision of Light observed at light origin at different stages.

Because

$\Delta t"_1 = PM"/(C_E - V_E) = (C_E\Delta t - V_E\Delta t)/(C_E - V_E) = \Delta t$
$\Delta t"_2 = M"P"/(C_E + V_E) = (C_E\Delta t + V_E\Delta t)/(C_E + V_E) = \Delta t$
$\Delta t'_1 = PM'/(C_E^2 + V_E^2)^{1/2} = ((C_E\Delta t)^2+(V_E\Delta t)^2)^{1/2}/(C_E^2 + V_E^2)^{1/2} = \Delta t$
$\Delta t'_2 = M'P'/(C_E^2 + V_E^2)^{1/2} = ((C_E\Delta t)^2+(V_E\Delta t)^2)^{1/2}/(C_E^2 + V_E^2)^{1/2} = \Delta t$

Therefore,

$\Delta t"_1 + \Delta t"_2 = \Delta t'_1 + \Delta t'_2 = 2\Delta t$

Where PM", M"P", PM' and M'P' are paths of light (vision of light), also $\Delta t"_1$, $\Delta t"_2$, $\Delta t'_1$and $\Delta t'_2$ are light traveling time observed at light origin.

As a result, in case Aether doesn't exist ($V_A = 0$), when observed at light origin, since light speed C_0 is dependent on $\mathbf{C_E}$ based on Equation of Light Speed ($\mathbf{C_o = C_E + V_E}$), then the same traveling time of the two split light beams could be observed, such that no optical interference should be expected.

In contrast, in case Aether doesn't exist ($V_A = 0$), when observed at light origin, if light speed is constant $C_0 = C_E$, then

$\Delta t"_1 = PM"/C_E = (C_E\Delta t - V_E\Delta t)/C_E$
$\Delta t"_2 = M"P"/C_E = (C_E\Delta t + V_E\Delta t)/C_E$
$\Delta t'_1 = PM'/C_E = ((C_E\Delta t)^2+(V_E\Delta t)^2)^{1/2}/C_E$
$\Delta t'_2 = M'P'/C_E = ((C_E\Delta t)^2+(V_E\Delta t)^2)^{1/2}/C_E$
Therefore,
$\Delta t"_1 + \Delta t"_2 \neq \Delta t'_1 + \Delta t'_2$

As a result, if Aether doesn't exist ($V_A = 0$) and light speed is constant ($\mathbf{C_o = C_E}$) no matter of the relative motion between light origin and light source (in other words, it doesn't obey Equation of Light Speed), then different traveling times of the two split light beams can be observed at light origin, such that optical interference could be expected.

However, this is not the case as it is observed at light source. If Aether doesn't exist and light speed observed at light source is simply the Absolute Light Speed ($3x10^8$ m/s, where m/s is dependent on the local gravitational field and aging of the universe) which is constant at the same gravitational field and aging of the universe. Because of the same traveling distance and light speed (Absolute Light Speed), there is no difference between the traveling times of the two split light beams observed at light source, therefore no optical interference could be found as it is observed at light source (also observed on earth, because light source and earth are stationary to each other).

Obviously, it is a conflict between that having optical interference observed at light origin and that having no optical interference observed at light source, both under the same event with the same assumptions that Aether doesn't exist and light speed is constant. To avoid this problem, light speeds must be different observed at different locations such as light source and light origin. As a consequence, Einstein's postulation of special relativity that "Light speed is always constant, no matter of light source and observer" must be false (Revised from [3]).

If Aether does exist

Michelson – Morley believed that because of the Aether flow ($V_A > 0$), photon traveling time in the paths of PM" and M"P" should be different from that of PM' and M'P', such that optical interference should be observed at light origin (as is at ground).

According to Equation of Light Speed, light speed observed at light source (on earth) $\mathbf{C_E}$ is the vector summation of the light speed observed at Aether $\mathbf{C}$ (3×10^8 m/s (on earth)) and the speed of Aether observed at light source (on earth) $\mathbf{V_A}$.

$\mathbf{C_E = C + V_A}$

Because the traveling time of light between two points is the same no matter of the observation positions, also the traveling time can be easily measured at light source (reference point) than that at the light origin, therefore,

When observed at light source, the traveling time of light between the center semi-transparent mirror and up mirror are $\Delta t"_1$ and $\Delta t"_2$
$\Delta t"_1 = PM/(C + V_A)$
$\Delta t"_2 = MP/(C - V_A)$
$PM = MP$
$\Delta t"_1 + \Delta t"_2 = 2PM/C\ (1/(C^2-V_A^2))$
$\Delta t"_1 + \Delta t"_2 > 2PM/C$
$\Delta t"_1 + \Delta t"_2 > 2\Delta t$

Also, the traveling time of light between the center semi-transparent mirror and right side mirror are $\Delta t'_1$ and $\Delta t'_2$
$\Delta t'_1 = PM/C = \Delta t$
$\Delta t'_2 = MP/C = \Delta t$
$\Delta t'_1 + \Delta t'_2 = 2\Delta t$
Therefore,
$\Delta t"_1 + \Delta t"_2 > \Delta t'_1 + \Delta t'_2$

Where PM and MP are paths of light (Vision of Light), also $\Delta t"_1$, $\Delta t"_2$, $\Delta t'_1$and $\Delta t'_2$ are the light traveling time observed at light source under the influence of Aether.

In addition, the difference of traveling times between the two split light beams can cause phase delay and result in interference which is subject to the path of light PM dependent on the position at the semi-transparent mirror.
$(\Delta t"_1 + \Delta t"_2) - (\Delta t'_1 + \Delta t'_2) = 2PM/C\ ((1/(C^2-V_A^2) - 1)$

As a result, in case Aether does exist ($V_A > 0$), and light speed is constant observed at light source (Absolute Light Speed), then different traveling time of the two split light beams can be observed at light source, such that optical interference should be expected.

Since no optical interference was ever found in the experiment, Michelson and Morley concluded that Aether doesn't exist in the universe. In fact, Michelson – Morley Experiment has proved: (1) Aether doesn't exist (2) Light Speed is not constant and (3) Photon Inertia Transformation and Equation of Light Speed must be true [3].

Furthermore, in comparison to Rene Steinhauer's Lecher Line Experiment, because that the same amount of dynamic graviton fluxes are generated by moving photons in different directions on a horizontal plane on earth, therefore the light speeds remain unchanged, such that no interference caused by dynamic graviton flux can be found in Michelson and Morley Experiment [9].

XIX. Doppler Effect

The frequency of a wave-like signal such as sound or light is dependent on the relative movement of the sender (such as star) and the receiver (such as earth). This phenomenon is known as the "Doppler Effect" [10]. Conventionally, it is understood that when a source of light is moving toward the observer (reference point), each successive photon is emitted from a position closer to the previous one. In other words, the wavelength between two subsequent photons is smaller, which causes an increase in the frequency and a shift in the wavelength to the blue end of the spectrum. This is commonly known as "Blue Shift". Conversely, if the source of light is moving away from the observer (reference point), each photon is emitted from a position farther from the previous photon, resulting in long wavelengths between the two subsequent photons. This causes a reduction in the frequency and a shift in wavelength towards the red end of the spectrum, which is known as "Redshift" (Fig. 6).

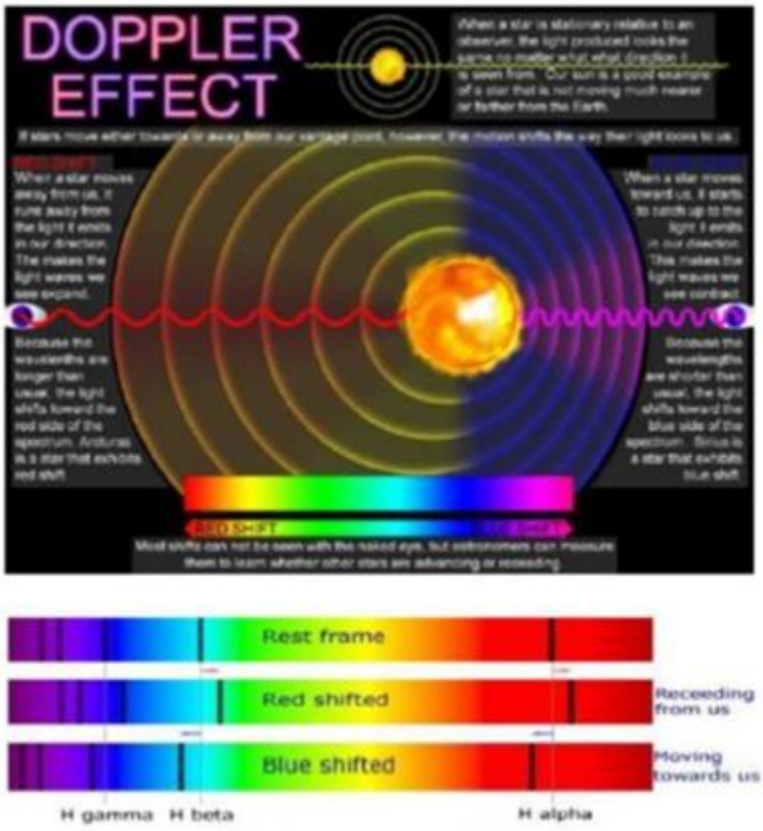

Fig. 6 Doppler Effect and Blueshift & Redshift phenomena.

Like most scientists including Einstein, I first thought that the Blueshift, Redshift and the Doppler Effect could only exist in the Non-Inertia Transformation process [11] as that of sound propagation. I therefore believe that a photon emitted from a light source travels in space at a constant Absolute Light Speed 3×10^8 m/s can also be observed at its origin in Absolute Space System, without any influence from its light source, as noted in my previous publication [11]. This, however, is in conflict with my logical thinking. It is hard to believe that a ball-like particle thrown out of the window of a train will not follow the train. The concept that

photon emission is a Non-Inertia Transformation has bothered me for quite some time until I developed the Acceleration Doppler Effect based on Photon Inertia Transformation to solve the problem.

The Doppler Effect can be proved easily in the Non-Inertia Transformation Process with the signal source traveling at a constant speed [11] either towards or away from the observer as that of sound propagation. However, photon emission from the light source is an Inertia Transformation Process (Fig. 23) [12]. According to Equation of Light Speed [3], Normal Light Speed (also wavelength and frequency) observed at the reference point can change with: (1) Absolute Light Speed which is dependent on the local gravitational field and aging of the universe, and (2) Inertia Light Speed which is dependent on the relative speed and direction between light source and reference point. On one hand, the change of Absolute Light Speed can either cause Cosmological Redshift and hold Hubble's Law due to aging of the universe, or produce Gravitational Redshift due to gravitational field. On the other hand, the variation of Inertia Light Speed can result in Doppler Shifts including Axial Doppler Shift, Acceleration Doppler Shift and Transverse Doppler Shift. Acceleration Doppler Shift can also be used to derive and interpret Cosmological Redshift and Hubble's Law, however, where the acceleration energy coming from remains a mystery.

XX. Doppler Shifts

Fig. 7 is a schematic drawing of linear Doppler Shifts (Axial and Acceleration Doppler Shifts) observed at light origin (reference point) in Absolute Space System. Because the star is far away from earth, both earth and light origin are nearly stationary to each other, therefore the positions of all objects observed at light origin at any instance of time is totally identical to that observed on earth in the same Absolute Space System.

As shown in Fig. 7, light source (star) can either move toward or away from the observer on earth. Assuming it takes time t for the photon to travel from light origin to earth. S is the distance between the light source and the light origin at time t, V_o is the speed of the light source (star) at the beginning, V_t is the speed of the light source (star) at time t, and a is the constant acceleration of the light source (star). P is the distance between light origin and earth, C is the light speed observed at light source at beginning (Absolute Light Speed), C' is the light speed observed at the light origin or earth at beginning, and D is the distance between the light source (star) and the photon at time t. Also λ_1 is the wavelength, ν_1 is the frequency and C_1 is the light speed of the photon observed on earth. With the above notations, Blueshift and Redshift caused by Doppler Effects can be derived as follows:

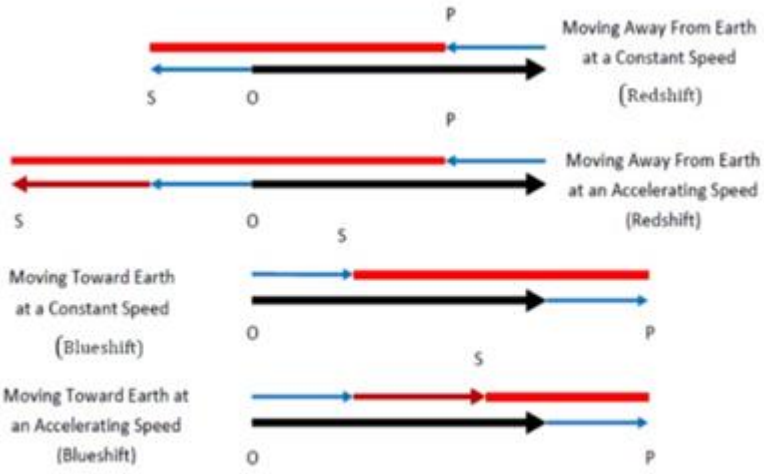

Fig. 7 Redshift and Blueshift caused by Axial Doppler and Acceleration Doppler Effects.

First, at time t, the distance vectors between light origin (reference point), light source (star) and photon can be correlated to each other by Equation of Relative Position as follows:

OS = **S** = Distance vector from light origin to light source (star) = Movement of light source (star) away from light origin.

SP = **D** = Distance vector from light source (star) to photon = Vision of light observed from light source (star).

OP = **P** = Distance vector from light origin to photon = Vision of light observed from light origin and ground = Distance vector from light origin to earth.

OP = **OS** + **SP**

Also,
$\mathbf{P} = \mathbf{S} + \mathbf{D}$
$\mathbf{D} = \mathbf{P} - \mathbf{S}$

In addition, according to Equation of Light Speed [3], when photon separate from the light source (star), the speed of photon observed at the light origin **C'** is equal to the vector summation of light speed observed at the light source (star) **C** (Absolute Light Speed $3x10^8$ m/s) and the speed of the light source (star) observed at the light origin $\mathbf{V_0}$.
$\mathbf{C'} = \mathbf{C} + \mathbf{V_0}$
Therefore,
$\mathbf{OP} = \mathbf{P} = \mathbf{C'}t = \mathbf{C}t + \mathbf{V_0}t = P\mathbf{s}$
$\mathbf{OS} = \mathbf{S} = \mathbf{V_0}t + \frac{1}{2}\,\mathbf{a}t^2 = S\mathbf{s}$
Also,
$\mathbf{D} = \mathbf{P} - \mathbf{S} = (P - S)\mathbf{s}$

Where t is the traveling time of photon from light origin to earth, a is the acceleration of light source (star), **s** is the unit vector towards earth, D is the distance between light source and earth (photon position at time t), S is the distance between light origin and light source and P is the distance between light origin and earth (photon position at time t).

Furthermore, the wavelength, light speed and frequency of the photon generated at the light source (star) and observed on earth (at rest to light origin the reference point) can be calculated as follows:
$\lambda_1 = D/\nu t$
$C_1 = P/t$
$\nu_1 = C_1/\lambda_1$

Where λ_1, C_1 and ν_1 are the wavelength, light speed and frequency of the photon generated at the light source (star) and observed on earth. λ, C (Absolute Light Speed) and ν are the wavelength, light speed and frequency of the photon generated and observed at the light source (star), which are the same as that generated and observed on earth assuming the same gravitational field and aging of the universe.

XXI. Axial Doppler Shift

When the light source (star) either moves toward or away from the observer (reference point) on earth at a constant speed ($V_o = V_t$ and $a = 0$), Blueshift and Redshift can be observed respectively. This is called "Axial Doppler Shift" ("Axial Doppler Effect") [13]. A detailed analysis is discussed as follows:

Blueshift
In case the light source (star) moves toward the observer (earth) at a constant speed,
$S = V_o t$
$P = Ct + V_o t$
$D = P - S = Ct$
Therefore,
$\lambda_1 = D/\nu t = Ct/\nu t = C/\nu$
$\lambda_1 = \lambda$
$C_1 = P/t = (Ct + V_o t)/t = C + V_o$
$C_1 > C$
$\nu_1 = C_1/\lambda_1 = (C + V_o)/\lambda$
$\nu_1 = (1 + V_o/C)\,\nu$
$\nu_1 > \nu$

When the light source (star) moves toward earth at a constant speed, the wavelength maintains unchanged, but both frequency and light speed become bigger, such that Blueshift can be observed on earth.

Redshift
In case the light source (star) moves away from earth at a constant speed,
$S = -V_o t$
$P = Ct - V_o t$
$D = P - S = Ct$
Therefore,
$\lambda_1 = D/\nu t = Ct/\nu t = C/\nu$
$\lambda_1 = \lambda$
$C_1 = P/t = (Ct - V_o t)/t = C - V_o$
$C_1 < C$
$\nu_1 = C_1/\lambda_1 = (C - V_o)/\lambda$

$\nu_1 = (1 - V_o/C)\ \nu$
$\nu_1 < \nu$

When the light source (star) moves away from earth at a constant speed, the wavelength maintains unchanged, but both frequency and light speed become smaller, such that Redshift can be observed on earth.

XXII. Acceleration Doppler Shift

When the light source (star) either moves toward or away from the observer on earth at a constant acceleration speed ($V_o \neq V_t$ and $a \neq 0$), Blueshift and Redshift can be observed respectively. This is called "Acceleration Doppler Shift" ("Acceleration Doppler Effect") [12]. A detailed analysis is discussed as follows:

Blueshift
In case the light source (star) moving toward the observer on earth at a constant acceleration speed,
$S = V_o t + \frac{1}{2} at^2$
$P = Ct + V_o t$
$D = P - S = Ct - \frac{1}{2} at^2$
Therefore,
$\lambda_1 = D/\nu t = (Ct - \frac{1}{2} at^2)/\nu t = (C - \frac{1}{2} at)/\nu$
$\lambda_1 < \lambda$
$C_1 = P/t = (Ct + V_o t)/t = C + V_o$
$C_1 > C$
$\nu_1 = C_1/\lambda_1$
$\nu_1 = ((C + V_o)/(C - \frac{1}{2} at))\ \nu$
$\nu_1 > \nu$

When the light source (star) moves toward earth at a constant acceleration speed, the wavelength becomes smaller, but both the frequency and light speed become bigger, such that Blueshift can be observed on earth.

Redshift
In case the light source (star) moving away from the observer on earth at a constant acceleration speed,
$S = -(V_o t + \frac{1}{2} at^2)$
$P = Ct - V_o t$
$D = P - S = Ct + \frac{1}{2} at^2$
Therefore,
$\lambda_1 = D/\nu t = (Ct + \frac{1}{2} at^2)/\nu t = (C + \frac{1}{2} at)/\nu$
$\lambda_1 > \lambda$
$C_1 = P/t = (Ct - V_o t)/t = C - V_o$
$C_1 < C$
$\nu_1 = C_1/\lambda_1$
$\nu_1 = ((C - V_o)/(C + \frac{1}{2} at))\ \nu$
$\nu_1 < \nu$

When the light source (star) moves away from earth at a constant acceleration speed, the wavelength becomes bigger, but both the frequency and light speed become smaller, such that Redshift can be observed on earth.

XXIII. Equations Of Doppler Shifts

To better analyze Doppler Shifts, a general mathematical model named "Equations of Doppler Shifts" [14] as illustrated in Fig. 8 can be applied which includes following four equations:
Equation of Light Speed
$\mathbf{C' = V + C}$
Equation of position
$\mathbf{P = S + D}$
Vision of photon
$\mathbf{P = C't = Vt + Ct}$
Vision of light source
$\mathbf{S = Vt + \frac{1}{2} at^2}$

Where t is the traveling time of photon from light origin to earth, V is the speed and a is the acceleration of light source (star), **D** is the distance between light source and earth (photon position at time t), **S** is the distance between light origin and light source and **P** is the distance between light origin and earth (photon

position at time t). **C** is the Absolute Light Speed observed on light source and **C'** is the light speed observed on the reference point (light origin and earth).
As a result, the Doppler Shifts observed on earth can be calculated as follows:
Wavelength
$\lambda_1 = D/\nu t$
Light Speed
$C_1 = P/t$
Frequency
$\nu_1 = C_1/\lambda_1$

Where λ_1, C_1 and ν_1 are the wavelength, light speed and frequency of the photon generated at the light source (star) and observed on earth. Also λ, C and ν are the wavelength, light speed and frequency of the photon generated and observed at the light source (star), as is generated and observed on earth (assuming both are stationary and at the same gravitational field and aging of the universe).

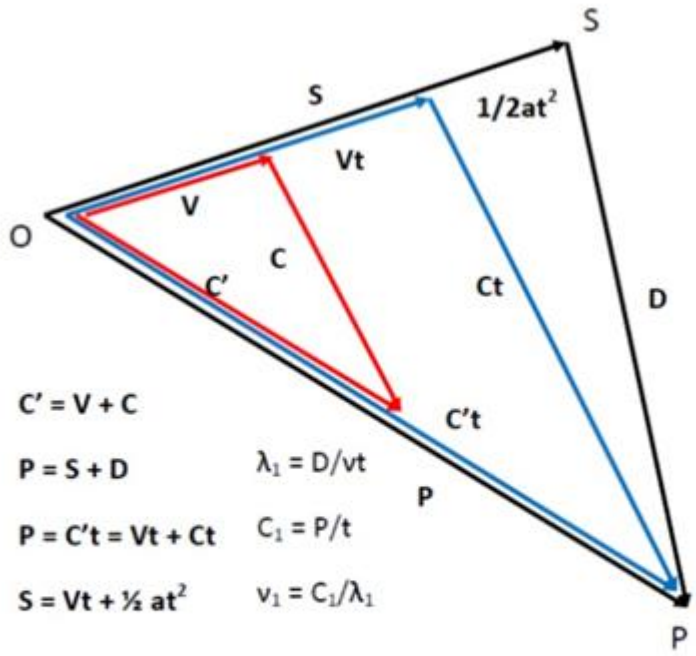

Fig. 8 Equation of Light Speed C' = V + C, Equation of position P = S + D, Vision of photon P = C't = Vt + Ct and Vision of light source S = Vt + ½ at^2. Their correlations to the wavelength $\lambda_1 = D/vt$, Light Speed $C_1 = P/t$ and Frequency $\nu_1 = C_1/\lambda_1$ of Doppler Shifts.

XXIV. Transverse Doppler Shift

When a star (light source) moves at a constant speed in the transverse direction, both Blueshift and Redshift can be observed. This is called "Transverse Doppler Shift" ("Transverse Doppler Effect") [15]. A detailed analysis is discussed as follows [16]:

Fig. 9 shows the positions of light origin, light source (star), photon and earth as photon travels from light origin to earth at different stages according to emission positions: beginning point (position 1), center point (position 2) and ending point (position 3) observed on earth (and at all stationary light origins).

In each stage, according to Equation of Light Speed, Light Speed **C'** observed at light origin is the vector summation of Absolute Light Speed **C** ($3x10^8$ m/s where m/s is dependent on the gravitational field and aging of the universe at the light source (star) observed at light source (star) and Inertia Light Speed **V** the speed of light source observed at light origin which is constant.

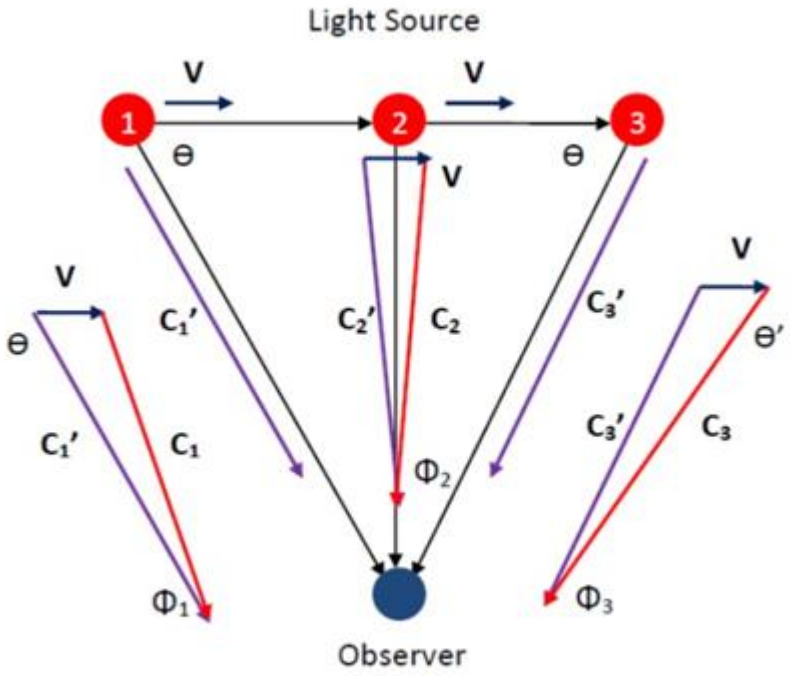

Fig. 9 Transverse Doppler Shift and Equation of Light Speed.

Position 1 – The beginning stage of Transverse Doppler Shift
Photon is emitted from position 1 and arrives on earth at time t_1.
The angle between **V** and $\mathbf{C_1'}$ is Θ, and the angle between $\mathbf{C_1'}$ and $\mathbf{C_1}$ is Φ_1 (extremely small, $\cos \Phi_1 = 1$).
Because
$\mathbf{C_1'} = \mathbf{C_1} + \mathbf{V}$
Therefore,
$C_1' = C_1 \cos \Phi_1 + V \cos \Theta$
Also,
$\cos \Phi_1 = 1$
Therefore,
$C_1' = C_1 + V \cos \Theta$
$C_1' > C_1$
Also, according to Equations of Doppler Shifts,
$D_1 = C_1 t_1$
$\lambda_1' = D_1/\nu_1 t_1 = C_1 t_1/\nu_1 t_1 = \lambda_1$
Therefore,
$\lambda_1' = \lambda_1$
And
$\nu_1' = C_1'/\lambda_1' = (C_1 + V \cos \Theta)/\lambda_1$
Therefore,
$\nu_1' > \nu_1$

Where C_1 is the Absolute Light Speed observed at light source at position 1, which is $3x10^8$ m/s (m/s is dependent on the gravitational field and aging of the universe at the light source (star)). λ_1 is the wavelength and ν_1 is the frequency observed at light source (star) at position 1. C_1' is the light speed observed at light origin at position 1, which is the same as that observed on earth (because light origin and earth are stationary to each other), λ_1' is the wave length and ν_1' is the frequency of the light emitted from the light origin at position 1 observed on earth.

Assuming both the light source (star) and earth have the same gravitational field and aging of the universe, and then Absolute Light Speed, wavelength and frequency are the same at both light source (star) and earth. As a result, ν_1' the frequency of the photon emitted from light source (star) observed on earth at beginning stage (position 1) of Transverse Doppler Shift is bigger than ν_1 the frequency of the photon emitted and observed on earth. Therefore, at beginning stage (position 1) of Transverse Doppler Shift, blue shift can be observed on earth.

Position 2 – The middle stage of Transverse Doppler Shift
Photon is emitted from position 2 and arrives on earth at time t_2.
The angle between **V** and $\mathbf{C_2'}$ is 90^0, and the angle between $\mathbf{C_2'}$ and $\mathbf{C_2}$ is Φ_2 (extremely small, $\text{Cos}\ \Phi_2 = 1$).
Because
$\mathbf{C_2'} = \mathbf{C_2} + \mathbf{V}$
Therefore,
$C_2' = C_2 \text{ Cos } \Phi_2 + V \text{ Cos } 90^0$
Also,
$\text{Cos } \Phi_2 = 1$
$\text{Cos } 90^0 = 0$
Therefore,
$C_2' = C_2$
Also, according to Equations of Doppler Shifts,
$D_2 = C_2 t_2$
$\lambda_2' = D_2/\nu_2 t_2 = C_2 t_2/\nu_2 t_2 = \lambda_2$
Therefore,
$\lambda_2' = \lambda_2$
And
$\nu_2' = C_2'/\lambda_2' = C_2/\lambda_2 = \nu_2$
Therefore,
$\nu_2' = \nu_2$

Because ν_1 the frequency of the photon generated from the light source (star) at position 2 observed on earth is equal to ν the frequency of the photon generated and observed at the light source (star), same as that of the photon generated and observed on earth, therefore, zero shift can be observed at position 2 on earth.

Where C_2 is the Absolute Light Speed observed at light source at position 2, which is $3\text{x}10^8$ m/s (m/s is dependent on the gravitational field and aging of the universe at the light source (star)). λ_2 is the wavelength and ν_2 is the frequency observed at light source (star) at position 2. C_2' is the light speed observed at light origin at position 2, which is the same as that observed on earth (because light origin and earth are stationary to each other), λ_2' is the wave length and ν_2' is the frequency of the light emitted from the light origin at position 2 observed on earth.

Assuming both the light source (star) and earth have the same gravitational field and aging of the universe, and then Absolute Light Speed, wavelength and frequency are the same at both light source (star) and earth. As a result, ν_2' the frequency of the photon emitted from light source (star) observed on earth at middle stage (position 2) of Transverse Doppler Shift is equal to ν_2 the frequency of the photon emitted and observed on earth. Therefore, at middle stage (position 2) of Transverse Doppler Shift, zero shift can be observed on earth.

Position 3 – The ending stage of Transverse Doppler Shift
Photon is emitted from position 3 and arrives on earth at time t_3.
The angle between **V** and $\mathbf{C_3'}$ is Θ, and the angle between $\mathbf{C_3'}$ and $\mathbf{C_3}$ is Φ_3 (extremely small, $\text{Cos}\ \Phi_3 = 1$).
Because
$\mathbf{C_3'} = \mathbf{C_3} + \mathbf{V}$
Therefore,
$C_3' = C_3 \text{ Cos } \Phi_3 - V \text{ Cos } \Theta$
Also,
$\text{Cos } \Phi_3 = 1$
Therefore,
$C_3' = C_3 - V \text{ Cos } \Theta$
$C_3' < C_3$
Also, according to Equations of Doppler Shifts,
$D_3 = C_3 t_3$
$\lambda_3' = D_3/\nu_3 t_3 = C_3 t_3/\nu_3 t_3 = \lambda_3$
Therefore,
$\lambda_3' = \lambda_3$
And
$\nu_3' = C_3'/\lambda_3' = (C_3 - V \text{ Cos } \Theta)/\lambda_3$
Therefore,
$\nu_3' < \nu_3$

Where C_3 is the Absolute Light Speed observed at light source at position 3, which is $3x10^8$ m/s (m/s is dependent on the gravitational field and aging of the universe at the light source (star)). λ_3 is the wavelength and ν_3 is the frequency observed at light source (star) at position 3. C_3' is the light speed observed at light origin at position 3, which is the same as that observed on earth (because light origin and earth are stationary to each other), λ_3' is the wave length and ν_3' is the frequency of the light emitted from the light origin at position 3 observed on earth.

Assuming both the light source (star) and earth have the same gravitational field and aging of the universe, and then Absolute Light Speed, wavelength and frequency are the same at both light source (star) and earth. As a result, ν_3' the frequency of the photon emitted from light source (star) observed on earth at ending stage (position 3) of Transverse Doppler Shift is smaller than ν_3 the frequency of the photon emitted and observed on earth. Therefore, at ending stage (position 3) of Transverse Doppler Shift, red shift can be observed on earth.

As a result, when a star is in transverse motion to earth, blue shift will be observed on earth at the beginning stage, then zero shift will show up in the middle stage, and red shift will come out at the ending stage. (This is the revision of my previous publication [16]).

XXV. Event Horizon

As illustrated in Fig. 10, a star (light source) can move in acceleration towards the center of a black hole due to the massive gravitational force generated by the block hole. While a photon emitted from the star (light source) moving in the opposite direction to that of the star (light source) towards the black hole, there is a position where the speed of star (light source) observed at light origin is equal to the light speed observed at the star (light source) except in the opposite direction. This critical position surrounding the black hole is named Event Horizon. Beyond Event Horizon, photons emitted from the star (light source) are trapped inside the black hole and can never escape from it. That is exactly why it is named Black Hole.

According to Equation of Light Speed, at time of emission and at any location, light speed observed at light origin **C'** is the vector summation of Light speed observed at light source (Absolute Light Speed **C** = $3x10^8$ m/s, where m/s is dependent on the local gravitational field and aging of the universe) and the speed of light source observed at light origin (Inertia Light Speed **V**). Therefore, at time of emission and at any location,

C' = **C** + **V**

At Event Horizon,

C = - **V**, therefore **C'** = **0**.

Inside Event Horizon,

|**C**| < |**V**|, therefore **C'** follows **V** and goes inwards.

Outside Event Horizon,

|**C**| > |**V**|, therefore **C'** follows **C** and goes outwards.

Where **C'** is the light speed observed at light origin (also on earth, because both light origin and earth are stationary to each other), **V** is the speed of light source observed at light origin (Inertia Light Speed), which moves in the direction towards the center of black hole, and **C** is the light speed observed at light source (Absolute Light Speed **C** = $3x10^8$ m/s, where m/s is dependent on the local gravitational field and aging of the universe), which moves in the direction away from black hole.

As a result, at the Event Horizon [17], the net speed of the photon observed on earth (also at light origin) is zero, such that the photon is in idle with earth. Outside the Event Horizon (Ergosphere), Absolute Light Speed is bigger than Inertia Light Speed observed on earth (also at light origin), therefore the photon moves outwards and can escape from the black hole. However, inside the Event Horizon, Absolute light Speed is smaller than Inertia Light Speed observed on earth (also at light origin), therefore the photon moves inwards and can never escape from the black hole [18].

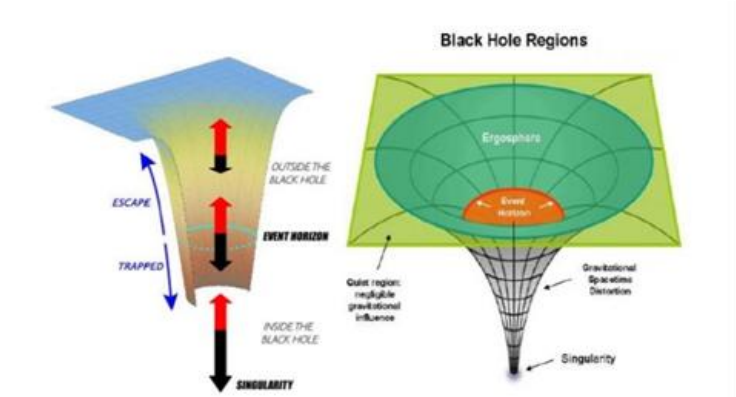

Fig. 10 The Black Hole Regions: (1) Ergosphere (C > V) (2) Event Horizon (C = V) and (3) Inside the Black Hole (C < V). C is light speed and V is the light source speed.

XXVI. Gravitational Redshift And Cosmological Redshift

In addition to Doppler Redshifts associated with Normal Light Speed observed at light origin (or reference point) caused by the relative motion between light source and light origin (or reference point), there are two other Redshifts associated with Absolute Light Speed caused by Photon Inertia Transformation observed at light source can be observed in the universe. Gravitational Redshift [19][20] is caused by the photon emitted from a star of massive gravitational field (massive star) and Cosmological Redshift [20][21] is caused by the photon emitted from a star several billion years ago (old star). Both photons have large wavelengths, small frequencies and slow light speeds (Absolute Light Speed) because of the large Wu Unit Lengths and Wu Unit Times on the massive stars due to massive graviton bombardment and that on the old stars due to the aging of attractive Force of Creation based on Wu's Spacetime Shrinkage Theory.

XXVII. Deflection Of Light And Gravitational Lensing

When a light beam passes through a massive star, its path is curved due to the gravitational field. This phenomenon is known as "Deflection of Light" [22]. According to general relativity, it is resulted from the curvature of spacetime. However, based on Wu's Spacetime Shrinkage Theory, it is caused by the large wavelength [23] and slow light speed (Absolute Light Speed) due to the bombardment of the gravitons in massive gravitational field. Just like the light beam passing through a transparent material such as water, the light is refracted because the reduction of the light speed. The massive star works like a telescope, the deflected light beams from a star (light origin) behind the massive star can be focused into several images such that a clear picture of the star can be observed and the distance of the star and the mass of the star can be calculated. This is called "Gravitational Lensing" [24].

XXVIII. Anisotropic Light Speed

Rene Steinhauer recently did an experiment on the wavelength of standing waves of the same radio frequency by Lecher Line [25], and has found out anisotropic difference on wavelength and light speed in various directions. This is a direct experimental proof to that "light speed is not constant".

As an object passes through a gravitational field that is vertical to the surface of earth, it interacts with various amounts of dynamic graviton fluxes subject to the direction and speed of the object. The strength of the interaction (graviton bombardment strength) can be represented by the dynamic gravitational field as follows:

$F_{gd} = 1kg\ (G/C)[(C - V\ Cos\Theta)^2 + (V\ Sin\Theta)^2]^{1/2}\ (m_1/r^2)$

Where F_{gd} is dynamic gravitational field, G is gravitational constant, V is the speed of the target object, C is Absolute Light Speed (static Graviton flux speed), Θ is the angle between the velocity of target object **V** and static graviton flux $\mathbf{V_s}$ (graviton flux observed at parent object), m_1 is the mass of parent object, r is the distance between two objects.

According to Wu's Spacetime Shrinkage Theory, dynamic gravitational field can change Wu Unit Length and Wu Unit Time of the subatomic particles in the object, and subsequently change all the properties of the object such as dimension, duration, velocity and acceleration, as well as wavelength, light speed (Absolute Light Speed) and Velocity Time Dilation.

Because of this reason, the standing radio electromagnetic wave (photon) in Rene Steinhauer experiment works as the target object traveling in different directions from that of the gravitational force that is vertical to the surface of earth (parent object), which can render different wavelength and light speed (Absolute Light Speed) observed on earth (stationary to light source) subject to the dynamic graviton field [9]. This

experiment gives a direct proof to that "light speed is not constant". It also gives an indirect proof to the existence of static and dynamic graviton fluxes based on Yangton and Yington Theory.

XXIX. Cosmological Redshift And Reverse Expansion Of The Universe

According to Aging Affected Wu's Spacetime Shrinkage Theory, the diameter of Wu's Pairs l_{yy} (Wu Unit Length) and the period of the Wu's Pairs t_{yy} (Wu Unit Time) on the present earth are smaller than that on the stars 5 billion years ago. Therefore, the photon emitted from a star a few billion years ago, has a larger wavelength (slower light speed and less frequency) than that on the present earth. These preserved ancient properties such as longer wavelength can be observed when the photon emitted from ancient star quenches onto earth. This is known as Cosmological Redshift.

Based on Principle of Parallelism, normal unit length (meter) and normal unit time (second) are smaller on the present earth than that in the past. Therefore, even the universe doesn't change, the distance between star and earth seams to grow bigger (expansion) with time, while measured by the shrinking normal unit length on the present earth. This is named "Universe Reverse Expansion Theory" (or "Earth Shrinkage Theory" (change name from Wu's Spacetime Reverse Expansion Theory" [26]).

XXX. Hubble's Law And Principle Of Parallelism

Although Hubble's Law can be used to explain the expansion of the universe that is derived successfully from Acceleration Doppler Effect [27], it is hard to believe that a star can move faster than light speed with an acceleration driven by a mysterious Dark Energy. Also, it is difficult to understand the intrinsic expansion that all stars are moving away from earth consistently at the same time. To avoid these problems, Universe Reverse Expansion Theory (also named Earth Shrinkage Theory and Wu's Spacetime Reverse Expansion Theory [20]) based on Wu's Spacetime Shrinkage Theory is proposed to interpret Hubble's Law and so-called universe expansion.

According to Aging Affected Wu's Spacetime Shrinkage Theory, as the universe gets older, both the circulation period (t_{yy}) and orbital diameter (l_{yy}) of Wu's Pairs become smaller. Consequently, a photon emitted from a star more than 5 billion years ago has larger wavelength than that on the present earth. This is the reason to cause Cosmological Redshift and Hubble's Law.

In derivation of Hubble's Law from Wu's Spacetime Shrinkage Theory, some mistakes were made in my previous publications [28][29][30][31]. With a careful analysis, a new approach [32] is presented as follows:

First, let's make some assumptions and give several definitions to the simulation model (Fig. 11):

1. The photons that causing Redshift comes from a star emitted 5 billion years ago.
2. The initial stage is the stage at 5 billion years ago on earth and the final stage is the stage at present time on earth. Also, earth as the reference point that all the measurements and observations are done on earth.
3. λ_i is the wave length of the photon generated from a light sources at initial stage on earth 5 billion years ago. Assuming both the star and earth have the same gravitational field, according to Wu's Spacetime Shrinkage Theory, the photon generated from the same light source on the star 5 billion years ago should have the same wavelength λ_i.
4. According to Principle of Parallelism [33], the correlations between the quantities of the properties of different corresponding identical objects or events maintain unchanged no matter the gravitational field and aging of the universe. For example, $L \propto l_{yy} \propto \lambda$, in which L is the normal unit length, l_{yy} is the Wu Unit Length and λ is the wavelength of different corresponding identical objects or events at the same gravitational field and aging of the universe.
5. Because of the far distance, it is considered that both the star and the earth are stationary to each other. Also, the distance X between them is fixed at all times.
6. The virtual motion of the star measured on earth is D_E, which is the distance from M_iL_f to M_fL_f, where M_i and M_f are the amounts of normal unit length measured by the unit length L_i at initial stage and L_f at final stage on earth respectively.
7. The average velocity of the star measured on earth is $V = (M_f - M_i) L_f/t$.
8. According to Wu's Spacetime Shrinkage Theory [20], wavelength is dependent on both the gravitational field and aging of the universe no matter of the light source [33]. Since the gravitational field doesn't change on earth, therefore Cosmological Redshift is only dependent on aging of the universe.

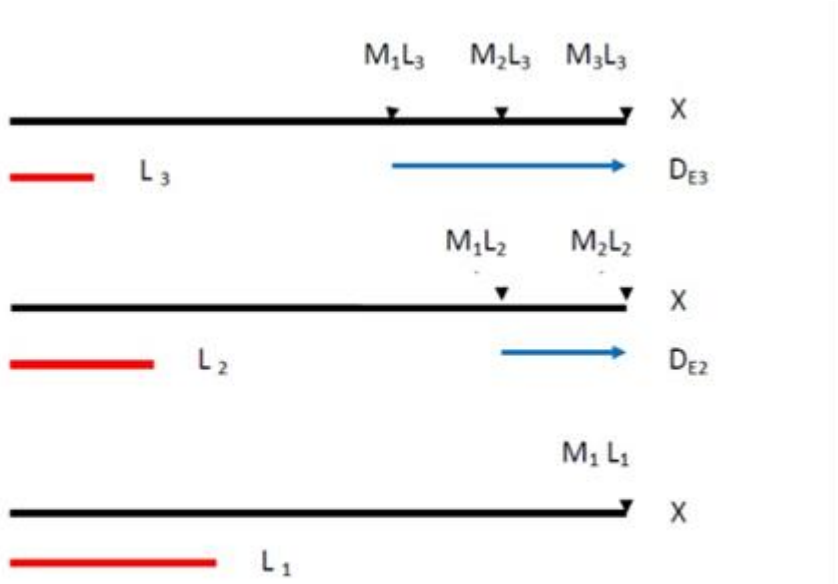

Fig. 11 The distance of a star measured by a shrinking ruler on earth.

Fig. 11 shows a schematic diagram of the virtual motion of the star measured on earth. In the initial stage (when photon is emitted from the star at 5 billion years ago), the actual distance X between the star and earth is measured by the multiplication of the normal unit length L_i and the amount of normal unit length M_i on earth. At the final stage (when the photon reaches earth), the actual distance of the star X becomes the multiplication of the normal unit length L_f and the amount of normal unit length M_f measured on earth. The actual distance of the star X stays the same, but the virtual moving distance of the star D_E is changing from initial distance M_iL_f to the final distance M_fL_f. Because M_fL_f is much bigger than M_iL_f, the virtual moving distance of the star at the final stage D_{Ef} is approximately equal to the actual distance X between the star and earth (Fig. 11).

Because

$D_E = ML - M_iL = X - M_iL$

$d(D_E) = d(X - M_iL)$

$dD_E = - M_i dL$

Also,

$X = ML$

$dM = X\, dL^{-1}$

Where X and M_i are constants associated to the star.

According to Principle of Parallelism [33], the correlations between the quantities of the properties of different corresponding identical objects or events at the same gravitational field and aging of the universe of a location and time maintain unchanged.

$L \propto l_{yy} \propto \lambda$

Where L is the normal unit length, l_{yy} is the Wu Unit Length and λ is the wavelength of different corresponding identical objects or events of the same gravitational field and aging of the universe at a location and time.

Therefore,

$dD_E = - k_1 M_i\, d\lambda$

$dM = k_2 X\, d\lambda^{-1}$

Where k_1 and k_2 are constants.

Apply integration to dD_E,

$D_{Ef} - D_{Ei} = k_1 M_i (\lambda_i - \lambda_f)$

Because

$D_{Ei} = 0$

Therefore,

$D_{Ef} = k_1 M_i (\lambda_i - \lambda_f)$

Where D_{Ef} is the virtual moving distance of the star, k_1 is a constant, λ_f is the wavelength of the photon emitted from the light source at the final stage on the present earth and λ_i is the wavelength of the photon

emitted from the same light source on earth (also on star) at the initial stage. M_i is the amount of normal unit length measured for distance X at the initial stage on earth.

Given

$D = D_{Ef}$

Therefore,

$D = k_1 M_i (\lambda_i - \lambda_f)$

Apply integration to dM,

$M_f - M_i = k_2 X (1/\lambda_f - 1/\lambda_i)$

Therefore,

$M_f - M_i = k_2 X (\lambda_i - \lambda_f)/\lambda_i \lambda_f$

Where M_f is the amount of normal unit length measured for distance X on earth at the final stage on the present earth, M_i is the amount of normal unit length measured for distance X at the initial stage on earth, k_1 and k_2 are constants, X is the actual distance between the star and earth, λ_f is the wavelength of the photon emitted from the light source at the final stage on the present earth and λ_i is the wavelength of the photon emitted from the light source at the initial stage on earth (also on star).

The average virtual moving speed V of the star can be represented by:

$V = (M_f - M_i) L_f/t$

Where V is the average virtual moving speed of the star, M_f is the amount of normal unit length at the final stage on the present earth, M_i is the amount of normal unit length measured for distance X at the initial stage on earth, L_f is the normal unit length at the final stage on the present earth, t is the visual moving time of the star from initial stage to the final stage.

Because

$M_f - M_i = k_2 X (\lambda_i - \lambda_f)/\lambda_i \lambda_f$

$D = k_1 M_i (\lambda_i - \lambda_f)$

$X = M_i L_i$

Therefore,

$V = (k_2/k_1) (L_f L_i/\lambda_i \lambda_f) D/t$

Where k_1 and k_2 are constants, L_f is the normal unit length at the final stage on the present earth and λ_f is the wavelength of the photon emitted from the light source at the final stage on the present earth, L_i is the normal unit length at the initial stage on earth and λ_i is the wavelength of the photon emitted from the light source at initial stage on earth, V is the virtual moving speed of the star, D is the vision of the star (visual traveling distance of the star), t is the visual traveling time of the star from the initial stage to the final stage.

According to Principle of Parallelism, L_f/λ_f is equal to L_i/λ_i. Also, because L_f/λ_f is a constant (no matter of the star and light source), also

Given

$k = (k_2/k_1) (L_f L_i/\lambda_i \lambda_f)$

Therefore,

$V = kD/t$

Given

$H_0 = k/t$

Therefore,

$V = H_0 D$

Where k is a constant, D is the virtual distance of the star which is approximately equal to X the actual distance between the star and earth, V is the virtual moving speed of the star and H_0 is Hubble Constant which is dependent on time.

Instead of Acceleration Doppler Effect [34], Hubble's Law [35] can also be mathematically derived from Wu's Aging Affected Spacetime Shrinkage Theory. The advantage of this new approach is that there is no need of external Dark Energy, and also intrinsic expansion can be reflected by reverse expansion. As a result, the universe isn't really expanding with acceleration. In fact, the universe remains almost unchanged after inflation. However, it looks like that it is growing bigger, simply because it is observed on the shrinking earth (reverse expansion). This is why this theory is named "Universe Reverse Expansion Theory" (also known as "Earth Shrinkage Theory"). Also, it gives an indirect proof to that length is larger, wavelength is bigger and light speed (Absolute Light Speed) is slower at the early time of the universe.

XXXI. Special Relativity And Constant Light Speed

According to Einstein's Special Relativity [36], it is postulated that the light speed in space is always constant, no matter the light sources and observers (reference points). As a consequence, time on a moving object runs slower than that is stationary to the observer (reference point). This phenomenon is known as "Velocity Time Dilation"[37].

In contrast, based on Equation of Light Speed, in addition to Absolute Light Speed (light speed observed at light source) which is dependent on the local gravitational field and aging of the universe, Normal Light Speed (light speed observed at the reference point) also changes with Inertia Light Speed (the relative moving speeds between the light source and reference point). Also, duration (time) of an event remains unchanged no matter of the relative speeds between the light source and the reference point (except gravitational field and aging of the universe). As a result, light speed is not constant, thus Einstein's Special Relativity is false, as is the Velocity Time Dilation (except Gravitation Time Dilation).

XXXII. Light Speed Is Not Constant – Proof Of Evidence

Despite the difficulties to make a precision measurement on light speed and time dilation, we can find the following existing evidences in the universe to prove either directly or indirectly to the facts that light speed is not constant (such that Velocity Time Dilation doesn't exist) and Equation of Light Speed is true.

Cosmological Redshift and Gravitational Redshift

Gravitational Redshift is caused by the photon emitted from a star of massive gravitational field (massive star) and Cosmological Redshift is caused by the photon emitted from a star several billion years ago (old star). Both photons have large wavelengths, small frequencies and slow light speeds (Absolute Light Speed) because of the large Wu Unit Lengths and Wu Unit Times on the massive stars due to massive graviton bombardment and that on the old stars due to the aging of attractive Force of Creation based on Wu's Spacetime Shrinkage Theory.

Deflection of Light

When a light beam passes through a massive star, its path is curved due to the gravitational field. This phenomenon is known as "Deflection of Light". According to Wu's Spacetime Shrinkage Theory, it is caused by the large wavelength and slow light speed (Absolute Light Speed) due to the bombardment of the gravitons in massive gravitational field.

Acceleration Doppler Effect

According to Acceleration Doppler Effect, in a spinning galaxy, Redshift can be observed while star (light source) is moving in acceleration away from earth (reference point); also Blueshift can be observed while star (light source) is moving in acceleration towards earth (reference point). In Redshift, wavelength gets bigger and frequency gets smaller while light speed (Normal Light Speed) observed on earth (or at light origin) becomes smaller ($C' = C - V_0$). In Blueshift, on the contrary, wavelength gets smaller and frequency gets bigger while light speed (Normal Light Speed) observed on earth (or at light origin) becomes bigger ($C' = C + V_0$). In both cases light speeds are not constant.

Doppler Shifts

Based on Equation of Light Speed and Equations of Doppler Shifts, Axial, Acceleration and Transverse Doppler Shifts can be mathematically derived and nicely explained by various Normal Light Speeds resulting from the relative motions between light source (star) and earth (or light origin as reference point).

Event Horizon

Black Hole and Event Horizon can be very well explained by Equation of Light Speed. As a star (light source) moves close to a black hole, because of the massive gravitational force of the black hole, the star (light source) is moving in acceleration towards the center of black hole. It is obvious that there exists a critical boundary named Event Horizon, beyond which the speed of the star (light source) observed on earth (or light origin as reference point) is equal or faster than the light speed (Absolute light speed) emitted from the star (light source) towards earth observed at the star (light source). Based on Equation of Light Speed, beyond Event Horizon, light speed (Normal Light Speed) towards earth becomes zero or even negative observed on earth. In other words, light is trapped inside the black hole and cannot be seen on earth. This is the reason why it is called "Black Hole".

Michelson – Morley Experiment

In Michelson – Morley Experiment, if Aether does exist, and light speed (Absolute Light Speed) is constant observed at light source, then different traveling time of the two split light beams can be observed at light source, such that optical interference should be expected. Since no optical interference was ever found in the experiment, Michelson and Morley concluded that Aether doesn't exist in the universe. In fact, Michelson – Morley Experiment has proved simultaneously that (1) Aether doesn't exist (2) Light Speed is not constant and (3) Photon Inertia Transformation and Equation of Light Speed must be true.

Anisotropic Wavelength and Light Speed

Rene Steinhauer recently did an experiment on the wavelength of standing waves of the same radio frequency by Lecher Line, and has found out anisotropic difference on wavelength and light speed (Absolute Light Speed) in various directions. According to Acceleration Doppler Effect and Event Horizon, light speeds (Normal Light Speed) observed on earth (also light origin, both are stationary) are different subject to the relative directions and speeds between the star (light source) and earth (reference point). Even though, as the light source and earth (reference point) are stationary to each other, Rene Steinhauer experiment has proved that light speed (Absolute Light Speed) observed on earth (also light source, both are stationary) can still vary with the relative direction between the light beam and the dynamic graviton field. This is a direct experimental proof to that "light speed is not constant".

Hubble's Law

Hubble's Law can be mathematically derived from Wu's Aging Affected Spacetime Shrinkage Theory and Principle of Parallelism. The advantage of this approach is that there is no need of external Dark Energy, and also intrinsic expansion can be reflected by reverse expansion. As a result, the universe doesn't really expand, in fact, the universe looks bigger simply because that it is observed on the shrinking earth (reverse expansion). This gives an indirect proof to that length is larger, wavelength is bigger and light speed (Absolute Light Speed) is slower at the early time of the universe.

XXXIII. Length Measured By Same Time Observation

The length of an object is the distance between the two end points observed the same time onsite at each end point. In compliance with Principle of Vision, the length of an object remains unchanged no matter of the reference point (system).

However, the length of an object observed either by an optical sensor or human eyes can be different from that observed the same time onsite at each end point. Both optical sensor and human eyes can only detect and process the incoming photons at the "Same Arriving Time". In other words, due to the time delay caused by photon traveling process, the length of an object measured at the Same Arriving Time is not the true length of the object.

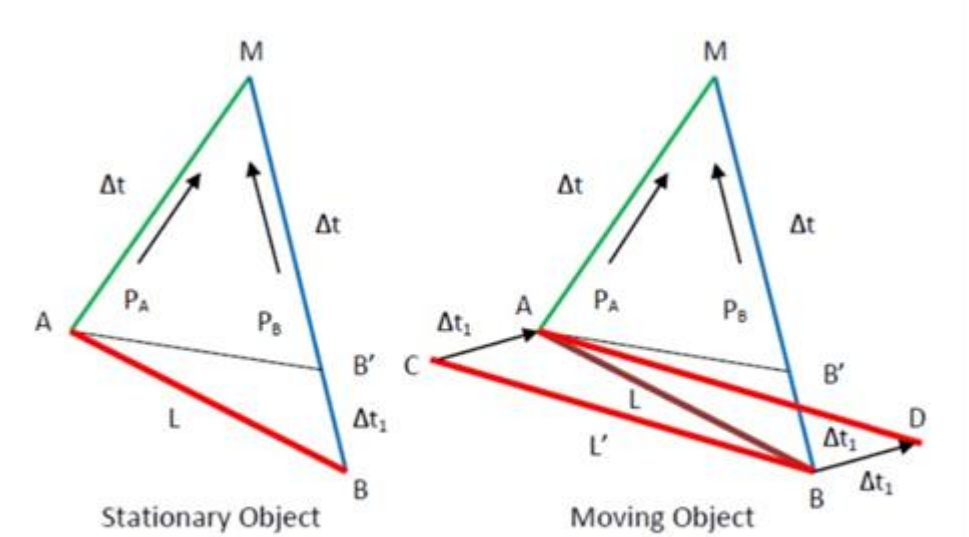

Fig. 12 The lengths of a stationary object and a moving object observed by optical sensor or human eye.

Fig. 12 explains the differences of the "Same Arriving Time" processes between the optical sensor (and human eyes) on a stationary object as well as that on a moving object [38]. In case of a stationary object, where Point M (reference point) is the position of the optical sensor or human eyes at time T, Point A is the position of the closer end of the object and Point B is the position of the farther end of the object. P_A is the photon emitted from Point A and P_B is the photon emitted from Point B. According to Photon Inertia Transformation, both photons travel at Absolute Light Speed C ($3x10^8$ m/s dependent on the local gravitational field) observed at Point A and Point B (light sources), also at Point M (reference point) which are stationary to each others. In addition, Δt is the photon traveling time from Point A to Point M, and $\Delta t + \Delta t_1$ is the photon

traveling time from Point B to Point M. All the traveling times are measured at Point M (or at any point in the stationary system. There is no time dilation if the system is at the same gravitational field and aging of the universe). As a result, photon P_A emitted from Point A at time T - Δt and photon P_B emitted from Point B at time T – ($\Delta t + \Delta t_1$) should meet together at Point M and received by the optical sensor or human eyes at the "Same Arriving Time" T. With the information of the position of Point A brought up by photon P_A and the information of the position of Point B brought up by photon P_B, the optical sensor or human eyes can thus process and determine the length of the object. Because Points A and Point B are stationary to the reference Point M (optical sensor or human eyes), also the optical information of Point A and Point B are consistent at all the times, therefore the length of the object observed (measured) at Point M by the optical sensor or human eyes at the Same Arriving Time should be the same as that observed (measured) at any reference point in the stationary system at same gravitational field and aging of the universe by the optical sensor or human eyes at any Same Arriving Time.

In case of a moving object, with a similar set up as that in the stationary system, except the object is moving with the closer end from Point C to Point A and farther end from Point B to Point D, the length of the object observed by the optical sensor or human eyes is different from that observed by other reference point. The closer end of the object moves from Point C at time T – ($\Delta t + \Delta t_1$) to Point A at time T – Δt during time Δt_1, while photon P_B traveling from the farther end Point B of the object at time T – ($\Delta t + \Delta t_1$) to Point B' at time T – Δt. Then photon P_A will be emitted from Point A to meet photon P_B at Point M and received by the optical sensor or human eyes at the Same Arriving Time T. Therefore, the length L (between Point A and Point B) of the object observed at Point M by the optical sensor or human eyes at the Same Arriving Time T is different from the length L' (between Point C and Point B) which is the actual length of the object.

As a result, because of the effect of Same Arriving Time, the actual length of an object can be observed (measured) at any reference point in a stationary system. However, different lengths of the object can be observed (measured) at the same reference point, subject to the relative motions between the object and the reference point.

XXXIV. Length Contraction

The length of an object measured by a human observer, along the direction of motion, is shorter than the length measured by the observer at rest with the object. This phenomenon is known as "Length Contraction" [39]. Because motion is relative, the reference point can be chosen either at the observer or on the object. For better illustration, here we use the object as the reference point in explanation of the phenomenon.

Since length contraction is described by physicists as a common experience observed by a high speed traveler (nowhere close to light speed), therefore, I propose that it is actually caused by human visual memory rather than the Velocity Time Dilation and related Relativism Theories that are derived from Einstein's Special Relativity at a speed close to light speed.

In the beginning, I am a little confused of the mechanism of Length Contraction. As a consequence, some mistakes were made in my previous publication [40]. A revised analysis that Length Contraction can be affected by human visual memory is discussed as follows:

Fig. 13 shows the effect of length contraction caused by human visual memory [38]. A human observer travels along a linear object from Point A (the closer end of the object) at an angle α and speed V, to Point M at a distance V/30 from Point A. Due to human visual memory (1/30 seconds), the human observer at Point M, can see in memory the photon emitted 1/30 seconds ago from the closer end of the object at Point A, and in real time the photon emitted from Point B sometime ago. Therefore, instead of the actual length L observed at rest on ground, the length of the object L' which is equal to the distance between Point M and Point B can be observed by the traveling human observer. In case observer at Point M having a distance less than L from Point B (the yellow area in Fig. 13), then L' is smaller than the actual length of the object L observed (measured) at rest on ground, such that Length Contraction can be realized [38].

In addition, with the same angle (α), human observer travels at higher speed ($V_1 > V_2$) can find the object having smaller length ($Ct_1 < Ct_2$). On the other hand, with the same speed (V_2), human observer travels at smaller angle ($\beta < \alpha$) will also find the object having smaller length ($Ct_3 < Ct_2$). In case human observer travels at an extremely slow speed ($V \rightarrow 0$), then the length of the object observed by the human observer remains almost unchanged to that observed at rest on ground.

Furthermore, in case observer at Point M having a distance larger than L from Point B (the pink area in Fig. 13), then L' is larger than the actual length of the object L observed (measured) at rest on ground, such that Length Expansion can be realized. Usually, Length Expansion can only be found by the human observer traveling at a large angle away from the object [38].

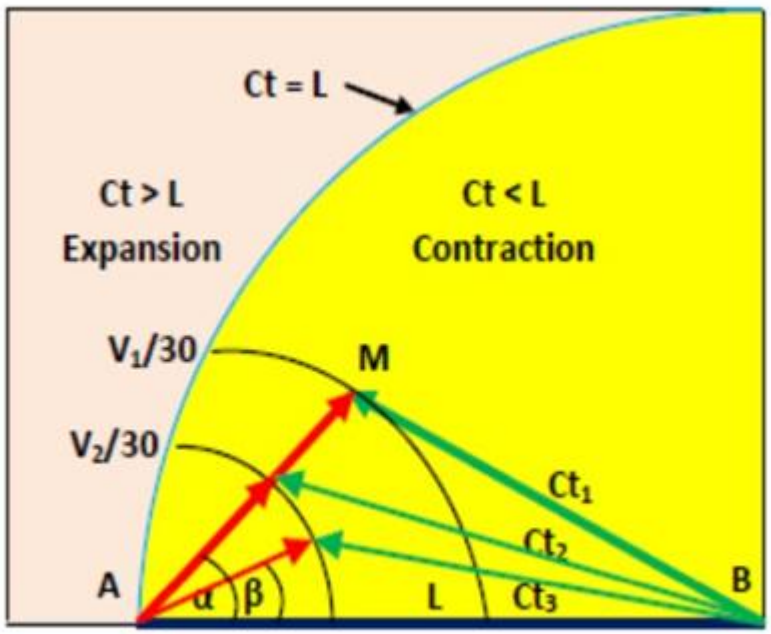

Fig. 13 Length contraction caused by human visual memory effect.

XXXV. Conclusion

A detailed study of light speed is presented based on Newtonian physics in which photon is treated as a particle having inertia properties in both photon generation and propagation processes. With a clear understanding of the definition of light speed and the reference of observation, on one hand, Wu's Spacetime Shrinkage Theory based on a hypothetical Yanton and Yington Theory can be applied successfully in interpretation of physical phenomena of photon associated with Absolute Light Speed observed at light source (also at stationary reference point), such as Cosmological Redshift, Gravitational Redshift, Light Deflection, Anisotropic light speed, as well as Hubble's Law and Expansion of the Universe. On the other hand, Equation of Light Speed and Equations of Doppler Shifts based on a logical analysis can also be implemented perfectly in explanation of physical phenomena of photon associated with Normal Light Speed observed at reference point, such as Axial Doppler Shift, Acceleration Doppler Shift and Transverse Doppler Shift, as well as Acceleration Doppler Effect and Event Horizon.

As a result, Normal Light Speed observed at the reference point is not constant, which can change with the relative motion between light source and reference point. Even though Absolute Light Speed observed at light source is constant, it is true only if at the same gravitational field and aging of the universe.

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