Equation of Light Speed

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[Abstract]
*Equation of Light Speed **C' = C + V** is proposed as a general law in physics. In which, Normal Light Speed **C'** – the light speed observed at the reference point (observer) is a vector summation of Absolute Light Speed **C** – the light speed observed at light source (3×10^8 m/s) and Inertia Light Speed **V** – the speed of light source observed at the reference point. Absolute Light Speed is dependent on the local gravitational field. Inertia Light Speed is dependent on the relative motion between light source and reference point. As a result, Gravitational Redshift and Deflection of Light are caused by the changes of Absolute Light Speed due to massive gravitational field. Acceleration Doppler Effect and Even Horizon are formed because of the variations of Inertia Light Speed between the light source and the reference point. Furthermore, applying a detailed analysis on Michelson Morley Experiment with Equation of Light Speed, not only that Aether doesn't exist, but also light speed can't be constant.*

I. Introduction

Einstein's Special Relativity is based on a postulation that the light speed in vacuum is constant no matter the light sources and observers. In other words, light speed observed at any reference point is the same as that observed at the moving light sources. Is it true? Scientists have debated this for the whole last millennium since it was first proposed by Einstein in 1905. Is there any experimental evidence can prove this assumption? None so far we are aware of. Simply because that light speed is much faster than the speed of light source. It is nearly impossible to carry out a precision experiment to measure light speed on a light source moving at a comparable speed. Since there is no solid proof yet that light speed is constant, therefore it is fair to ask what if light speed is not constant, and even if there is a formula that can be used to calculate light speed like Newton's Law of Universal Gravitation. To answer those questions, we have first to know what exactly the meaning of "Speed of Light" is and how to measure it. Then, we have to find out if a light carrier such as Aether exists and what are those existing evidences to prove that light speed is not constant. It is the purpose of this paper to answer those questions and find the "Equation of Light Speed".

II. Emission of Photon

When a photon emitted from light source, it undergoes a two stage process: separation stage and ejection stage [1].

A. Separation Stage

According to Yangton and Yington Theory, to unlock a photon from the surface of the light source, it requires thermal energy (kinetic energy) to overcome the string energy caused by the string force between two adjacent Wu's Pairs.

In addition, based on Whirlpool Theory [2], a spinning particle separated from its parent spinning system should have a kinetic energy E that is proportional to the particle mass m and the spin frequency ν.

$$E = \kappa m \nu$$

Photon is a free Wu's Pair with mass m_{yy}

$$E = \kappa m_{yy} \nu$$

Where κ is whirlpool constant and m_{yy} is the mass of photon (or Wu's Pair).
Given

$$h = \kappa m_{yy}$$

Therefore,

$$E = h\nu$$

Where h is Planck constant.

B. Ejection Stage

After separation from the parent object, photon is ejected toward the normal (axial) direction of Yangton and Yington circulation orbit by the repulsive string forces generated between the two Yangton particles, also between two Yington particles, where one from the emitting photon and the other one from Wu's Pair on the surface of the parent object. Because of the constant repulsive string forces, regardless of the frequency, a photon escaped from its parent object (light source) should always have a constant speed 3×10^8 m/s.

III. Inertia Transformation versus Non-inertia Transformation

Photon just like electron or any other particle, as it is emitted from the parent object (light source), it travels at two speeds (1) Ejection Speed (Absolute Light Speed) which is subject to the ejection force and direction, and (2) Inertia Speed (Inertia Light Speed) which is subject to the speed and direction of parent object (light source). This is called "Inertia Transformation" [3].

In contrast, Phonon is not a particle emitted from the vibrator (sound source). Instead, it is the particle of the media (air or water) which carries the transmitted energy from the vibrator (sound source) and radiates at the nature speed of the media in all directions. This is called "Non-inertia Transformation".

IV. Speed of Light

Before discussion of Speed of Light, we need to know what the real meaning of "Speed of Light" is and how to correctly measure it.

A. Vision of Object

An object is measured (or observed) at a reference point (system) means that the position and time (coordination) of the object related to the reference point (system) is measured by a unit length and a unit time at the reference point (system). "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" [3] is a group of consecutive coordination of an object measured at a fixed reference point (system) in a period of time.

B. Principle of Vision

The relative positions and directions between two objects at a fixed time shall be the same no matter of the reference points (systems). In other words, one object observed by the other object at a fixed time shall have the same distance and direction (coordination) no matter the observation of the two objects at any reference point (system). This phenomenon is named "Principle of Vision" [3]. As a consequence, Absolute Space System is irrelevant and any reference point (system) can be used for the observation of Vision of Object.

C. Theory of Vision

Based on Principle of Vision, a vision of object, in spite of being observed directly at a reference point (system), can be transformed from an existing vision of object observed at the third reference point (system) by maintaining the same correlations between the object and the reference point (system) in each time frame observed at the third reference point (system). The new vision of object can be produced by superimposing the image observed in each time frame at the third reference point (system) by overlapping the reference point (system) observed in each time frame at the third reference point (system) perfectly on top of each others, while maintaining the same relative position and direction between the object and the reference point (system). This is named "Theory of Vision" [3].

Two schematic diagrams are illustrated here to explain the construction process of vision of object from one reference point (system) to another reference point (system):

Fig. 1 shows the vision of an object observed at reference point O. Object t_1, Object t_2 and Object t_3 represent the positions and directions of the object; and Observer t_1, Observer t_2 and Observer t_3 represent the positions and directions of the observer, which are observed 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 at reference point O during the time period from t_1 to t_3.
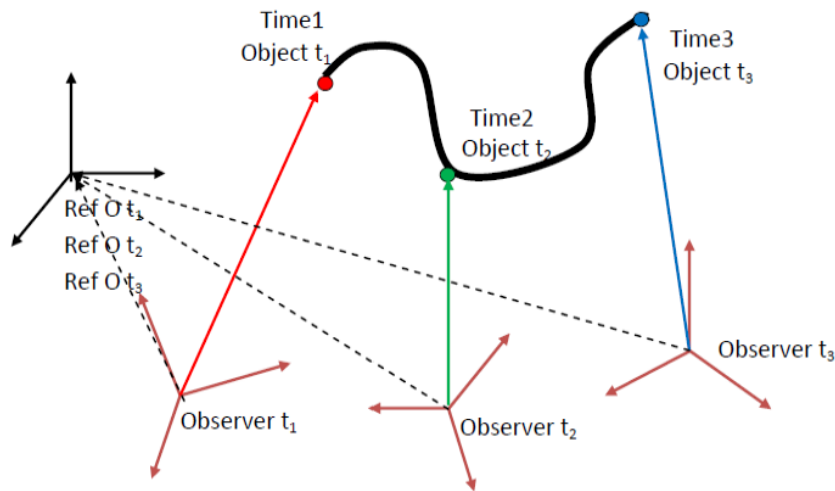
Fig. 1   Vision of an object observed at a reference point.

Fig. 2 shows the vision of object constructed at the final position of the observer (Observer t_3 in Fig. 1). In which, Observer t_1, Observer t_2 and Observer t_3 and their coordination systems are completely matched and overlapped on top of Observer t_3. 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. Thus a curve from Object t_1 to Object t_2 and Object t_3 representing the vision of object observed by the observer (the new reference point (system)) during the time period from t_1 to t_3 can be constructed.
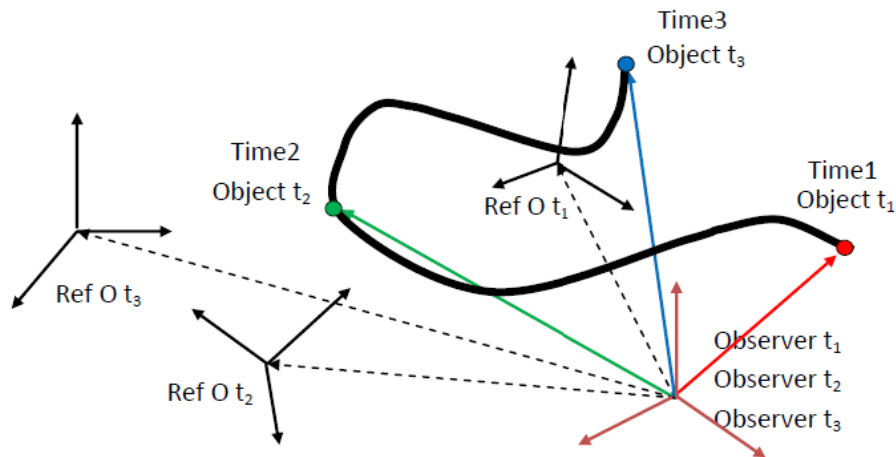

Fig. 2   Vision of an object observed at an observation point constructed from a reference point.

Furthermore, according to Principle of Vision, in which one object observed by the other object at a fixed time shall have the same distance and direction (coordination) no matter the observation of the two objects at any reference point (system), the positions and directions of the object and observer observed at any reference point (system) at each time frame can also be used to construct the vision of object observed by the observer.

D.   Vision of Light
Like vision of object, "Vision of Light" [3] is the image of a photon observed 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 spite of observed directly at a reference point (system), Vision of Light can be constructed by superimposing the images of the photon and the reference point (system) observed at the third reference point (system) such as that of the light origin in the Absolute Space System. The reference point (system) of each time frame is overlapped on that of the final time frame. Also, the relative

positions and directions between the photon and the reference point (system) are maintained as that observed at the third reference point (system).

E. Speed of Light

   Speed of object is defined by the traveling distance of an object divided by the traveling time of the object measured at a reference point (system). Because the traveling distance of an object is measured based on the Vision of Object observed during a period of time at the reference point (system), therefore the speed of object is calculated by Vision of Object divided by the traveling time of the object. As a consequence, Speed of Light can also be calculated as the Vision of Light divided by the traveling time of the photon measured at the reference point (system).

   Fig. 3 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 (reference point). Because of the motions of earth (V_E) and the light source (V_C) with respect to the light origin, ground and light source are drifted away from the light origin respectively. Assuming all motions are at constant speeds, after a time interval Δt, 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 all end at the same final position (point **P**) of the emitted photon.

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, C_O (light speed observed at light origin) is the vector summation of C_S (light speed observed at the light source) and V_C (moving speed of the light source observed at the light origin).

$$\mathbf{AP} = \mathbf{CP} + \mathbf{AC}$$
$$\mathbf{C_O} = \mathbf{C_S} + \mathbf{V_C}$$

Similarly, **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, C_E (light speed observed at ground) is the vector summation of C_S (light speed observed at the light source) and V_S (moving speed of the light source observed at ground).

$$\mathbf{BP} = \mathbf{CP} + \mathbf{BC}$$
$$\mathbf{C_E} = \mathbf{C_S} + \mathbf{V_S}$$

According to Yangton and Yington Theory [4], because of the constant repulsive string forces generated between photon and the adjacent Wu's Pairs, the building blocks of the universe [5], on the surface of the light source in the photon two stage emission process, a constant light speed C_S (Absolute Light Speed $3x10^8$ m/s) [1] 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 (V_C or V_S).

When a photon observed at different observation points (reference points) such as that of light origin Point A, ground observer Point B and light source Point C, because of the same event, 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 ($\mathbf{AP} \neq \mathbf{BP} \neq \mathbf{CP}$). 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 ($C_E \neq C_S \neq C_O$) 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).
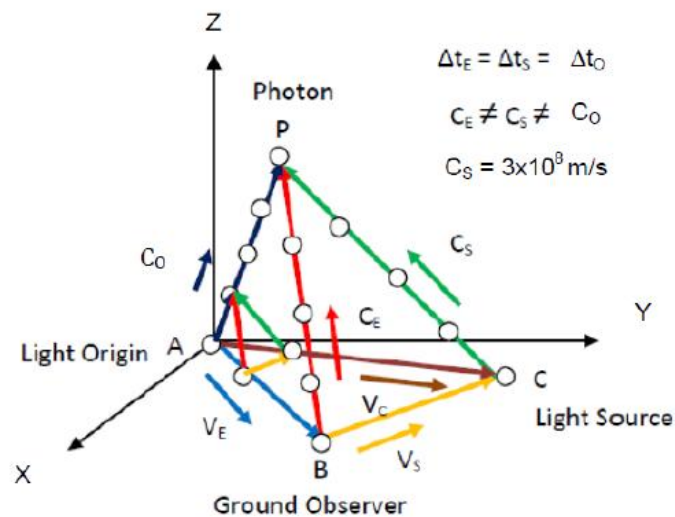
Fig. 3   Visions of Light of an emitted photon observed at the light origin (black line), ground (red line) and light source (green line) in Absolute Space System.

V. Equation of Light Speed

Light speed (Normal Light Speed) observed at a reference point **C'** is the vector summation of light speed observed at light source **C** (Absolute Light Speed 3 x 10^8 m/s) and the speed of light source observed at the reference point **V** (Inertia Light Speed)**.** This is known as Equation of Light Speed [3] which was first proposed with solid definitions by Edward Wu in 2017 [3] and can be represented as follows:

$$C' = C + V$$

In addition, Absolute Light Speed is dependent on the local gravitational field, no matter the light sources and observers. Also, Inertia Light Speed is dependent on the relative speed between the light source and the reference point.

VI. Galilean Transformation versus Lorentz Transformation

Galilean Transformation is used to transform between the coordinates of two reference frames which differ only by constant relative motion within the constructs of Newtonian physics. Equation of Light Speed is a special case of Galilean Transformation. Light speed observed at light source (Absolute Light Speed) is always constant, no matter the light sources and observers. In addition, Absolute light speed is dependent on the local gravitational field and aging of the universe. On the other hand, the speed of the light source observed at the reference point (Inertia Light Speed) can be either constant speed or accelerating speed.

Lorentz transformations, 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 relative to the former. The respective inverse transformation is then parameterized by the negative of this velocity. In appliance with Einstein's Special Relativity, Lorentz Transformation is also based on the postulation that light speed is constant.

Some physicists believe that light speed is constant because $C = 1/(\varepsilon_0 \mu_0)^{1/2}$ can be derived from Maxwell Equations, also ε_0 (permittivity) and μ_0 (permeability) are constants, therefore C is constant. However, this proof is misleading because even C (Absolute Light Speed) is constant, it can't be used to prove that C' (Normal Light Speed) is equal to C (Absolute Light Speed), as claimed by Einstein's Special Relativity and Lorentz Transformation. Therefore, Einstein's Special Relativity and Lorentz Transformation are both wrong, light speed is not constant indeed.

In contrast, according to Yangton and Yington Theory, C (Absolute Light Speed) is constant no matter of light source which matches very well with that $C = 1/(\varepsilon_0 \mu_0)^{1/2}$ derived from Maxwell Equations. Also, C is dependent on local gravitational field, as is that of e_0 and u_0, therefore, Yangton and Yington Theory is in compliance with Maxwell Equations.

VII. Absolute Light Speed

According to Yangton and Yington Theory, in two stage photon emission process, because of the constant repulsive string forces generated between photon and the adjacent Wu's Pairs on the surface of the light source, a constant "Absolute Light Speed" (3×10^8 m/s) in the photon ejection direction can always be observed at the light source regardless the speed of light source and the frequency of the photon (Fig. 4).
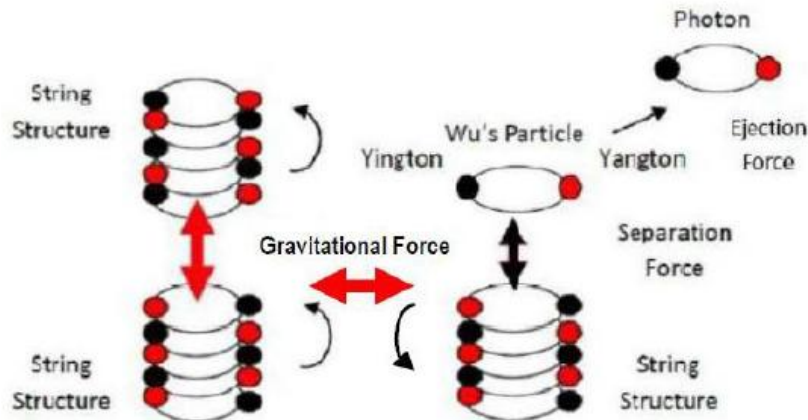
Fig. 4 Gravitational force between two gravitons (string structures) versus separation force between Wu's Pair and string structure

Space and Time are absolute nature quantities that don't change with anything at all. However, according to Yanton and Yington Theory, the dimension and duration of a corresponding identical object or event can change with local gravitational field due to the bombardment of the gravitons caused by gravitational field (Graviton Radiation and Contact Interaction) [6], also aging of the universe in compliance with CMB (Cosmic Microwave Background Radiation) [7].

Furthermore, according to Wu's Spacetime Shrinkage Theory [8], Wu's Unit Length l_{yy} (diameter) and Wu's Unit Time t_{yy} (period) of Wu's Pairs (building blocks of the universe) are bigger at large gravitational field (massive star) and early stage of the universe (early universe). Because of the intrinsic atomic and subatomic structures, the dimension ($L\infty\, l_{yy}$) and duration ($T\infty\, l_{yy}^{3/2}$) of a corresponding identical object or event are bigger, while the velocity ($V \infty\, l_{yy}^{-1/2}$) and acceleration ($A\infty\, l_{yy}^{-2}$) of the corresponding identical object or event are smaller at large gravitational field and early stage of the universe [9].

As a consequence, photon as a corresponding identical object or event, the wavelength of light is bigger while the speed of light (Absolute Light Speed) is smaller at large gravitational field and early stage of the universe.

The wavelength of a photon emitted from a light source is dependent on the local gravitational field and aging of the universe. Because of the large wavelength, according to Wu's Spacetime Shrinkage Theory caused by the large gravitational field of the star and the early stage of the universe, Gravitational Redshift [10] and Cosmological Redshift [11] can be observed.

Also, the Absolute Light Speed observed at light source is dependent on the local gravitational field and aging of the universe. It is constant at a fixed local gravitational field and aging of the universe, such as 3x108 m/s, s light source and observers. When a photon passes by a massive star, because of the decrease of Absolute Light Speed caused by the large gravitational field of the star, according to Wu's Spacetime Shrinkage Theory, Deflection of Light [12] can be observed.

Furthermore, subject to the unit quantities used for the measurement of an object or event, such as normal unit length (meter) and normal unit time (second), or Wu's Unit Length (l_{yy}) and Wu's Unit Time (t_{yy}), which are dependent on the local gravitational field and aging of the universe of the reference point, the amounts of unit quantities of the properties of the object or event can vary with each measurement, same as that of the wavelength and light speed. According to Wu's Spacetime Shrinkage Theory, a corresponding identical object or event on a massive star of large gravitational field has bigger length and duration, and smaller velocity and acceleration, because of the bigger Wu's Unit Length (l_{yy}) and Wu's Unit Time (t_{yy}). As it is observed on earth, because of the smaller Normal Unit Length (or Wu's Unit Length) and Normal Unit Time (or Wu's Unit Time) used for measurement on earth, the amounts of unit length and unit time are bigger, also the amounts of unit velocity and acceleration are smaller than that measured on the star [9]. Consequently, as a photon quenches

onto earth from a massive star, its wavelength is bigger and light speed (Absolute Light Speed) is smaller measured on earth (assuming star is stationary to earth and Inertia Light Speed is zero).

Yangton and Yington Theory agrees very well with General Relativity [13] that Dimension, Duration, Speed, Acceleration and Spacetime (derivative of potential energy) of an object or event are dependent on the local gravitational field (and aging of the universe – Einstein missed this effect in his theory). However, relativistic factor $1/(1-V^2/C^2)^{1/2}$ doesn't apply to Yangton and Yington Theory and there is no fixed formula for the correlation between Wu's Unit Length and the local gravitational field (or aging of the universe).

According to Particle Radiation and Contact Interaction Theory, all the properties of an object or event such as Dimension and Duration can be affected by the local gravitational field due to graviton bombardment. This should include the light speed and time dilation. A recent discovery claimed that "Aether" (an unknown particle surrounding earth) can cause time dilation [14]. However, according to Yangton and Yington Theory, this so called "Aether" could very well be the "Graviton", because only gravitational field generated by Graviton Radiation and Contact Interaction can change Wu's Unit Length and Wu's Unit Time which can cause time dilation.

Furthermore, based on Particle Radiation and Interaction Theory, bombardment caused by other particles such as plasma may also affect the Absolute Light Speed C [15]. However, it is only a special case. Gravitational field and aging of the universe are commonly existing in the whole universe, they are the dominating factors on Absolute Light Speed.

VIII.   Inertia Light Speed

Inertia Light Speed is the speed of light source observed by the reference point. It is one of the two major components of Equation of Light Speed. Because of the variations of the speed of light source with the reference point, Doppler Redshift can be observed based on Acceleration Doppler Effect and Even Horizon can also be realized by the competition between Absolute Light Speed and Inertia Light Speed at an accelerating light source.

A.   Acceleration Doppler Effect

The Doppler Effect can be proved easily in the Non-Inertia Transformation process with the signal source traveling at a constant speed either toward or away from the observer such as that of sound propagation. However, the photon emission from the light source is an Inertia Transformation process (Fig. 3), both Redshift and Blueshift occur only if the wavelength of light changes with the acceleration of the light source such as those found in spiral galaxies. This phenomenon is called "Acceleration Doppler Effect" [16].

Fig. 5 is an Absolute Space System at light origin (reference point). Because the star is far away from earth, both earth and light origin are literally stationary to each other, therefore earth can also be considered as a reference point for the same Absolute Space System. As a result, all the measurement observed on earth is the same as that observed at the light origin in the same Absolute Space System.

The light source (star) can either move toward or away from the observer on earth. Assuming it takes time t for a photon traveling from light origin to earth. 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) in time t. S is the distance of the light source (star) traveling from the light origin in time t. P is the distance of the photon traveling from the light origin to earth at time t, $V_o t$ is the distance of the photon dragged by the light source (star) in time t and D is the distance between the light source (star) and the photon when the photon reaches earth 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 light origin and earth. With the above notations, Zeroshift, Blueshift and Redshift phenomena can be studied based on Acceleration Doppler Effect (Fig. 5).

First, the distance vectors between light origin, light source (star) and photon can be correlated to each others 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.

$$\mathbf{OP} = \mathbf{OS} + \mathbf{SP}$$
$$\mathbf{P} = \mathbf{S} + \mathbf{D}$$
$$\mathbf{D} = \mathbf{P} - \mathbf{S}$$

Also, according to Equation of Light Speed, 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 3×10^8 m/s) and the speed of the light source (star) observed at the light origin **V₀**. Therefore,

$$\mathbf{C'} = \mathbf{C} + \mathbf{V_0}$$

And

$$OP = P = C't = Ct + V_0t = (Ct + V_0t)s = Ps$$
$$OS = S = V_0t + \tfrac{1}{2}\,at^2 = (V_0t + \tfrac{1}{2}\,at^2)s = Ss$$
$$D = P - S = (P - S)s$$

Where C' is the light speed observed at the light origin, C is the Absolute Light Speed observed at the light source (star), V_0 is the initial moving speed of light source (star) observed at the light origin and t is time, s is the positive unit vector toward earth.
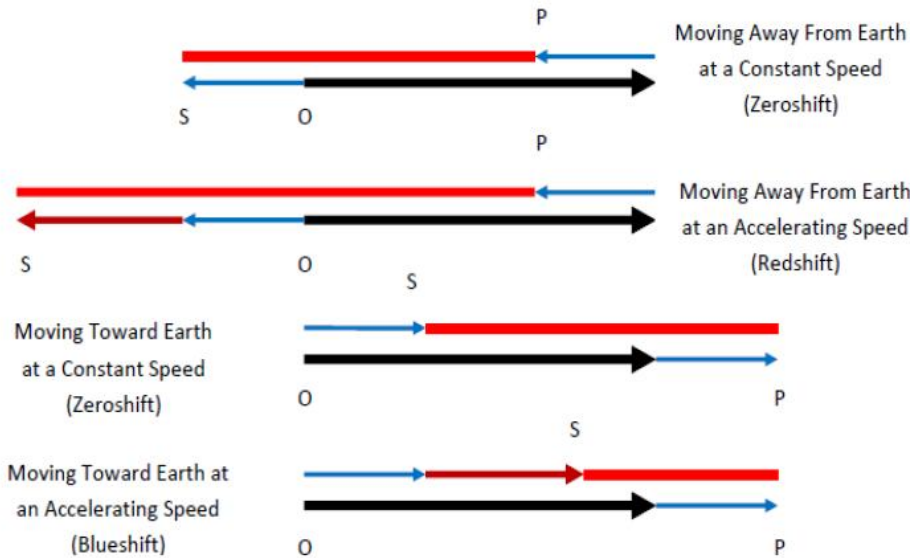

Fig. 5 Zeroshift, Redshift and Blueshift caused by Acceleration Doppler Effect.

1. Zeroshift
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 $a = 0$), Zeroshift can be observed.
    (a) In case the light source (star) moves away from earth (reference point),
$S = - V_ot$
$P = Ct - V_ot$
$D = P - S = Ct$
Therefore,
$\lambda_1 = D/vt = Ct/vt = C/v = \lambda$
$C_1 = P/t = (Ct - V_ot)/t = C - V_o < C$
$v_1 = C_1/\lambda_1 = (C - V_o)/\lambda < v$
When the light source (star) moves away from earth (reference point) at a constant speed, the wavelength maintains unchanged, but both frequency and light speed become smaller. Zeroshift can thus be observed. However, because the color of light is dominated by frequency instead of wavelength, therefore this case can also be considered as Redshift.
    (b) In case the light source (star) moves toward the observer (reference point) on earth,
$S = V_ot$
$P = Ct + V_ot$
$D = P - S = Ct$
Therefore,
$\lambda_1 = D/vt = Ct/vt = C/v = \lambda$
$C_1 = P/t = (Ct + V_ot)/t = C + V_o > C$
$v_1 = C_1/\lambda_1 = (C + V_o)/\lambda > v$
When the light source (star) moves toward earth (reference point) at a constant speed, the wavelength maintains unchanged, but both frequency and light speed become bigger. Zeroshift can thus be observed. However, because the color of light is dominated by frequency instead of wavelength, therefore this case can also be considered as Blueshift.

2. Blueshift

In case the light source (star) moving toward the observer (reference point) 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,

$\lambda_1 = D/vt = (Ct - \frac{1}{2} at^2)/vt = (C - \frac{1}{2} at)/v < \lambda$

$C_1 = P/t = (Ct + V_o t)/t = C + V_o > C$

$v_1 = C_1/\lambda_1 = (C + V_o)/((C - \frac{1}{2} at)/v) > v$

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

3. Redshift

In case the light source (star) moving away from the observer (reference point) 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,

$\lambda_1 = D/vt = (Ct + \frac{1}{2} at^2)/vt = (C + \frac{1}{2} at)/v > \lambda$

$C_1 = P/t = (Ct - V_o t)/t = C - V_o < C$

$v_1 = C_1/\lambda_1 = (C - V_o)/((C + \frac{1}{2} at)/v) < v$

When the light source (star) moves away from earth (reference point) at constant acceleration speed, the wavelength becomes bigger, both the frequency and light speed become smaller, and thus Redshift can be observed.

B. Even Horizen

As illustrated in Fig. 6, when a light source accelerating toward the center of a black hole, because of the Photon Inertia Transformation, the photon emitted from the light source bears two competing opposite speeds: (1) outward Absolute Light Speed (**C**) and (2) inward Inertia Light Speed (**V**).

According to Equation of Light Speed,

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

At Event Horizon,

$|\textbf{C}| = |\textbf{V}|$, therefore $\textbf{C'} = \textbf{0}$.

Inside Event Horizon,

$|\textbf{C}| < |\textbf{V}|$, therefore **C'** follows **V** and goes inwards.

Outside Event Horizon,

$|\textbf{C}| > |\textbf{V}|$, therefore **C'** follows **C** and goes outwards.

Where **C'** is the light speed observed on earth (reference point), **C** is the Absolute Light Speed observed at the light source and **V** is the speed of light source moves away from the light origin (Inertia Light Speed).

As a result, at the Event Horizon [17], the net speed of the photon is zero and the photon is in idle. Outside the Event Horizon (Ergosphere), the Absolute Light Speed is bigger than the Inertia Light Speed, the photon can move outwards and escape from the black hole. On the other hand, inside the Event Horizon, the Absolute light Speed is smaller than the Inertia Light Speed, the photon moves inwards and can never escape from the black hole (Fig. 6). As a result, the existence of a "Black Hole" can thus be predicted.
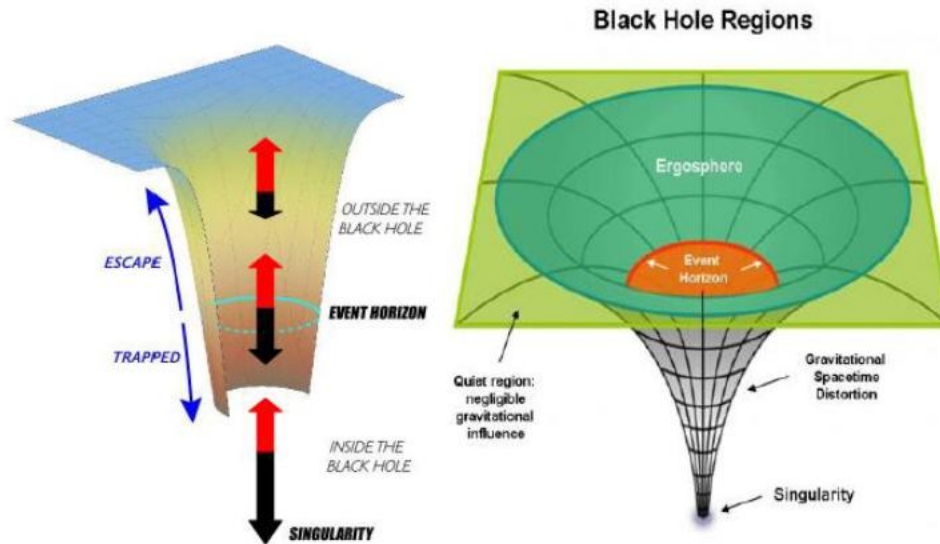
Black Hole Regions

Fig. 6 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.

In both Acceleration Doppler Effect and Event Horizon, light speeds observed on earth (reference point) are different subject to the relative directions and speeds between the star (light source) and earth (reference point). Therefore, Special Relativity cannot be true simply because that light speed is not constant.

IX. Aether – Michelson and Morley Experiment

In the 18th century, physicists believed that Aether was the carrier of light (electromagnetic waves) in space. Michelson – Morley Experiment [18] 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. 7 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 in which light travels obeying Equation of Light Speed. 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 (3×10^8 m/s). 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, then recombined at the semi-transparent mirror and finally received by the detector.
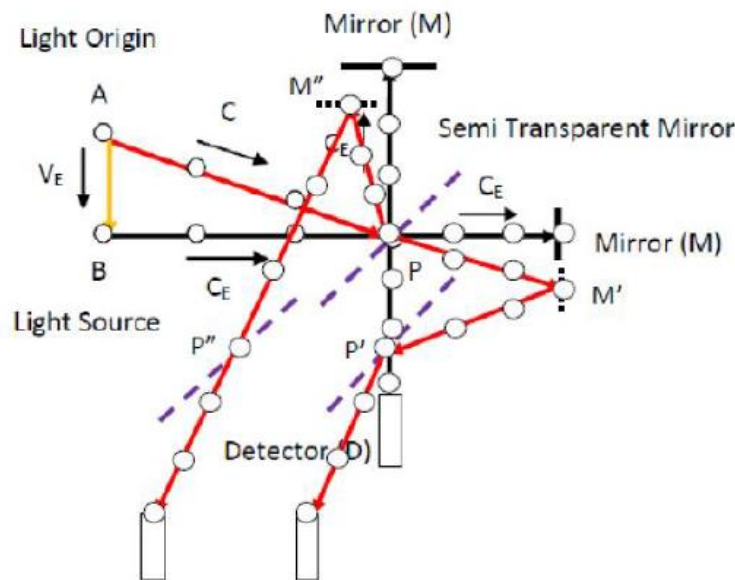
Fig. 7 Michelson – Morley Experiment with the Visions of Light observed at the light source (black line) and light origin (red line)

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 C_o observed at the light origin is a vector summation of Absolute Light Speed C_E (3×10^8 m/s) observed at the light source and the speed of light source V_E drift away from light origin observed at the light origin.

$$C_o = C_E + V_E$$

However, when photon hits the mirrors (semi-transparent and two end mirrors), the direction of C_E changes, and the value of C_O is different:

$C_O = (C_E^2 + V_E^2)^{1/2}$ (C_E is perpendicular to V_E)

$C_O' = C_E - V_E$ (C_E and V_E are in opposite directions)

$C_O'' = C_E + V_E$ (C_E and V_E are in the same direction)

     A. If Aether doesn't exist

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'.

Because,

$\Delta t = PM/C_E$

$\Delta t''_1 = PM''/(C_E - V_E) = (C_E \Delta t - V_E \Delta t)/(C_E - V_E) = \Delta t$

$\Delta t''_2 = M''P''/(C_E + V_E) = (C_E \Delta t + V_E \Delta t)/(C_E + V_E) = \Delta t$

$\Delta t'_1 = PM'/(C_E^2 + V_E^2)^{1/2} = ((C_E \Delta t)^2 + (V_E \Delta t)^2)^{1/2}/(C_E^2 + V_E^2)^{1/2} = \Delta t$

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

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 lights (visions of lights), and $\Delta t''_1$, $\Delta t''_2$, $\Delta t'_1$ and $\Delta t'_2$ are respective photon traveling times observed at light origin.

As a result, in case Aether doesn't exist, based on Equation of Light Speed, the same traveling time of the two split light beams can be obtained, therefore no optical interference shall be expected.

In contrast, if Aether doesn't exist, while light speed is constant, 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, while light speed is constant without obeying Photon Inertia Transformation and Equation of Light Speed, then different traveling times of the two split light beams can be obtained, and optical interference shall be expected.

B. If Aether does exist

Michelson – Morley believed that because of the Aether flow (V_A), photon traveling time in the paths of PM" and M"P" should be different from that of PM' and M'P', such that an optical interference could be generated. Since the traveling time of an event is the same no matter the observation positions, also $V_E = 0$, the traveling time can be easily measured at light source (reference point) instead of that at the light origin. Therefore,

$\Delta t"_{A1} = PM"/(C_E + V_A)$

$\Delta t"_{A2} = M"P"/(C_E - V_A)$

$PM" = M"P" = PM$

$\Delta t"_{A1} + \Delta t"_{A2} = PM (2C_E/(C_E^2 - V_A^2))$

$\Delta t"_{A1} + \Delta t"_{A2} > 2PM/C_E$

$$\Delta t"_{A1} + \Delta t"_{A2} > 2\Delta t$$

Also,

$\Delta t'_{A1} = PM'/(C_E^2 + V_A^2)^{1/2} = ((C_E\Delta t)^2 + (V_A\Delta t)^2)^{1/2}/(C_E^2 + V_A^2)^{1/2} = \Delta t$

$\Delta t'_{A2} = M'P'/(C_E^2 + V_A^2)^{1/2} = ((C_E\Delta t)^2 + (V_A\Delta t)^2)^{1/2}/(C_E^2 + V_A^2)^{1/2} = \Delta t$

$$\Delta t'_{A1} + \Delta t'_{A2} = 2\Delta t$$

Therefore,

$$\Delta t"_{A1} + \Delta t"_{A2} > \Delta t'_{A1} + \Delta t'_{A2}$$

Where PM", M"P", PM' and M'P' are paths of lights (visions of lights), and $\Delta t"_{A1}$, $\Delta t"_{A2}$, $\Delta t'_{A1}$ and $\Delta t'_{A2}$ are respective photon traveling times observed at light source under the influence of Aether.

As a result, in case Aether does exist, based on Equation of Light Speed, different traveling times of the two split light beams can be obtained, therefore optical interference shall 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) Photon Inertia Transformation does exist (3) Light Speed is not constant and (4) Equation of Light Speed must be obeyed [19].

X. Conclusion

Equation of Light Speed **C' = C + V** is proposed as a general law in physics. In which, Normal Light Speed **C'** – the light speed observed at the reference point (observer) is a vector summation of Absolute Light Speed **C** – the light speed observed at light source (3×10^8 m/s) and Inertia Light Speed **V** – the speed of light source observed at the reference point. Absolute Light Speed is dependent on the local gravitational field. Inertia Light Speed is dependent on the relative motion between light source and reference point. As a result, Gravitational Redshift and Deflection of Light are caused by the changes of Absolute Light Speed due to massive gravitational field. Acceleration Doppler Effect and Even Horizon are formed because of the variations of Inertia Light Speed between the light source and the reference point. Furthermore, applying a detailed analysis on Michelson Morley Experiment with Equation of Light Speed, not only that Aether doesn't exist, but also light speed can't be constant.

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