Think of the Relationship Between Time and Space Again

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ABSTRACT

In this paper, the author puts forward a mathematical model, this model can give a clear relationship between time and space . The authors put forward from the objective reality, the new ideas and mathematical formula, let people know along the correct road of law reflects reality. [Report and Opinion .2009;(3): 58-63].(ISSN:1553-9873)

Key words: light spherical , wave-front , instantaneous space-time , transmission time

1. INTRODUCTION

Time this concept has been Newtonian in Philosophic Naturalis Principle Mathematical in. Time clock is used for measuring “real” time of a kind of instrument (timing is used to measure time clock of an instrument.). Authors assume two reference frame , *S* and *S* ′, in reference frame *S* (except the source point) have arbitrary spatial point light *P*, when the movement of the reference frame *S* ′coincides with static system *S* completely moments, point *P* to launch a flash . In each of the origin of the observer and timing starts, each frame of reference in different time to receive a pulse respectively. The author after careful consideration, and try to establish a new relationship between time and space.

2. RELATIONSHIP BETWEEN TIME AND SPACE

In the past has put forward the theory of the light- speed invariance, the speed and not say invariability of the photon with any reference point . It refers to the meaning itself : From the point light shining a pulse, the flash to spread around the geometry is a sphere. The spherical surface in the vacuum diffusion speed remain unchanged. We obtained the spherical equation that each reference frame.

2.1 Using Algebraic Equations is Obtained

As Fig.1 shown , authors assume two reference frame , *S* and *S* ′, along the *X* -axial movement speed reference frame *S* ′for *V* , moves from point *J* to *A* and presently coincides with the reference frame *S* completely . At this moment , from the light-source point *P* shining a pulse, in their respective reference frame origin at the observer timing starts, the flash to spread around the geometry is a sphere. Point *P* is always the center of spherical array, ball spherical surface(or wave-front)spread to the source of reference frame *S*, point *O* . Timer values *t* for reading. The space location in reference frame *S* point *P* for (*x*, *y*, *z*), instant space-time as (*x*, *y*, *z*, *t*). In time *T* = 0 to *T* = *t* , pulse propagation distance is the radius of the ball[1]. According to the Pythagorean theorem, we obtain spherical equation in the reference frame *S* :

$$x^2 + y^2 + z^2 = (ct)^2 \quad , \tag{1}$$

Move along the *X* -axis reference frame *S* ′, spherical surface continued to spread in, the ball on the pursuit of diffusion in face of reference frame *S* ′observer. At this moment, in reference frame *S* ′to read the clock is *t* ′, the space location in reference frame *S* ′ point *P* for (*x* ′、*y* ′、*z* ′) , instant space-time as (*x* ′、*y* ′、*z* ′、*t* ′) . Figure 1 in analysis, obviously , $t' > t$. Light spherical diffusion speed relative to the center from point of origin for finding C .

Due to the point P is fixed in the reference frame S , it is relative to the movement of reference frame S' vary with time. So , instant space-time as (x'、y'、z'、t') .

In time $T = 0$ to $T = t'$, pulse propagation distance is the radius of the ball. According to the Pythagorean theorem，we obtain spherical equation in the reference frame S':

$$x'^2 + y'^2 + z'^2 = (ct')^2 \quad , \tag{2}$$

The x'-shaft and X axle load , reference frame S' along the X-axis movement, around the X- axis rotation does not. That is , $y' /\!/ y$, $z' /\!/ z$. $y' = y$, $z' = z$, $x' = x - vt'$. Will formula (1) and (2) joint solution formula we have :

$$y^2 + z^2 = (ct)^2 - x^2 \quad , \qquad (x')^2 + [(ct)^2 - x^2] - (ct')^2 = 0 \quad ;$$

$$(x - vt')^2 + [(ct)^2 - x^2] - (ct')^2 = 0 \quad , \quad (c^2 - v^2)(t')^2 + 2vxt' - (ct)^2 = 0 \quad .$$

Decomposition of the unary quadratic equations

$$(1 - v^2/c^2)t'^2 + (2vx/c^2)t' - t^2 = 0 \quad . \tag{3}$$

In order to facilitate the process with ($V/C = \beta$) .

Take equation is root, we must :

$$t' = \frac{\sqrt{(1-\beta^2)t^2 + \beta^2 x^2/c^2} - \beta x/c}{1-\beta^2} \quad . \tag{4}$$

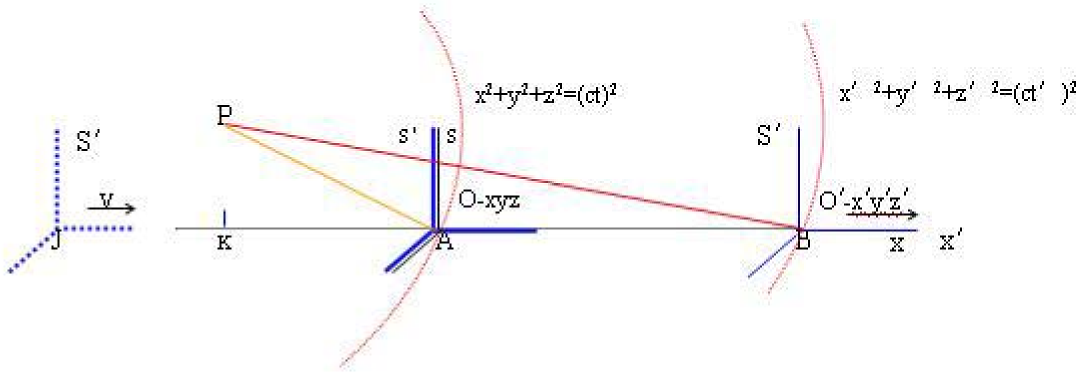


Fig.1 The reference frame S spherical equation is Eq.(1). The reference frame S' spherical equation is Eq.(2).

2.2 Derived Using the Geometric Equations

The x'-shaft and X axle load [2], and y'-axis parallel axis with y , z'-axis parallel axis with z . Therefore , point P on reference frame , S and S', $y' = y$, $z' = z$. In the equation (1), t say flash signal transmission time value , from point P to O . In the equation (2), t' say flash signal transmission time value , from point P to O' . Obviously, in Fig.1, $t' > t$. Is the signal propagation delay effect [3].

In another way, the same results. When the movement of the reference frame S' coincides with static system S moment. Completely. A flash point P, light balls for reference frame S' in pursuit of the movement. Figure 1 of a right triangle: a right triangle ΔPKO in $\Delta PKO'$ plane.

$$\overline{pk}^2 + \overline{ko}^2 = \overline{po}^2 , \quad \text{(a)} \qquad \overline{pk}^2 + \overline{ko'}^2 = \overline{po'}^2 . \quad \text{(b)}$$

Type (b) minus (a) is $\overline{po'}^2 - \overline{po}^2 = \overline{ko'}^2 - \overline{ko}^2$. $\overline{ko'} = |x - vt'|$, $\overline{ko} = -x$, $\overline{po'} = \overline{ct'}$ and $\overline{po} = \overline{ct}$ generation of the sorting get $(x - vt')^2 + [(ct)^2 - x^2] = (ct')^2$. In order to get on the same after the equation $(x - vt')^2 + [(ct)^2 - x^2] = (ct')^2$. In Fig.1, if the negative direction along the X axis reference frame S' movement, results with the same formula (3).

From the perspective of geometry discuss the advantages of: Along the X- axis movement, reference frame S' around the X axis rotation may, don't assume $y'=y$, $z'=z$, that is $y' \neq y$, $z' \neq z$. If the variable is along the X axis reference frame S' movement, known as reference frame S' speed changing with time, the function that can use the definite integral to answer [4].

3. DISCUSS AND REVIEW

Light source point P is a hypothesis in the y- axis, by equation (4) that same time dilation and Einstein formula. Light source point P is a hypothesis in the X axis, assume the light source is on the X axis, two kinds of circumstances, is in the positive direction of the X axis and the opposition upward, we have a series of formulas.

3.1 Light Source Point *P* In *y - z* Plane

Use the formula (3) and Fig.1 analysis: will be light source point P moves to $(y - z)$ plane, in the formula (3), x = 0, we obtain :

$$t' = \frac{t \cdot \sqrt{1-\beta^2}}{1-\beta^2} = \frac{t \cdot \sqrt{1-\beta^2}}{\sqrt{1-\beta^2} \cdot \sqrt{1-\beta^2}} = \frac{t}{\sqrt{1-\beta^2}} . \quad (5)$$

This formula is similar with Einstein type.

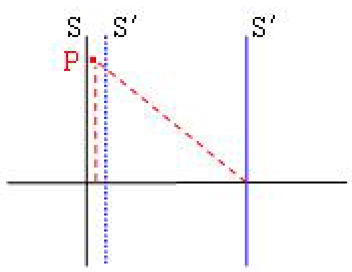


Fig.2 Light source point P in y - z plane, Y and z at the same time is not zero.

3.2 Light Source Point In the *X*- axis

Will light source point *P* moves to the *X*- axis, that is in Fig.1 *X*- axis of negative direction ,

$x<0$, $x\neq 0$, $y=0$, $z=0$, then we have: $ct=-x$, $t=-x/c$

Substitute these values into formula (4) obtained :

$$t'=\frac{\sqrt{x^2/c^2}-\beta\cdot x/c}{1-\beta^2}=\frac{\pm x/c-vx/c^2}{1-\beta^2}$$,

(6)

If the light source point *P* is moving to the *X*-axis direction, $(x>0)$ ，

$$t_1'=\frac{\frac{x}{c}(1-\frac{v}{c})}{(1-\beta)(1+\beta)}=\frac{x}{c+v}$$.

(7)

Point *P* on the *X* axis of the opposition ， $(x<0)$

$$t_2'=\frac{-\frac{x}{c}(1+\frac{v}{c})}{(1-\beta)(1+\beta)}=\frac{-x}{c-v}$$.

(8)

3.3 The Relationship Between Moving Photonic and Reference Frame

Assuming the *X* axis symmetric point *O* on two point light source of P_1 and P_2 , as Fig.3 shown . When the movement of the reference frame *S* ′coincides with static systems *S* completely moments, two point light also issued flash light , reference frame *S* ′to two point light source of P_1 and P_2 , clock with t_1 ′respectively t_2 ′. According to the formula (7) and (8) available ：

Reference frame *S* ′movement toward the light source point : $c+V=x/t'_1$.

That is ： $U_1'=c+V=x/t_1'$.

(9)

Reference frame *S* ′movement away from light point : $c-V=-x/t_2'$.

That is ： $U_2'=c-V=-x/t_2'$.

(10)

Analysis the formula (9) and (10) . Source: *P* is in reference frame *S* ′on the movement direction, that said, inertial systems *S* ′is along the photon trajectory line movement . Therefore , the photons movement speed by Galileo transformation (relative reference frame *S* ′) . From the formula (9) and (10), movement speed of reference frame *S* ′for any value .

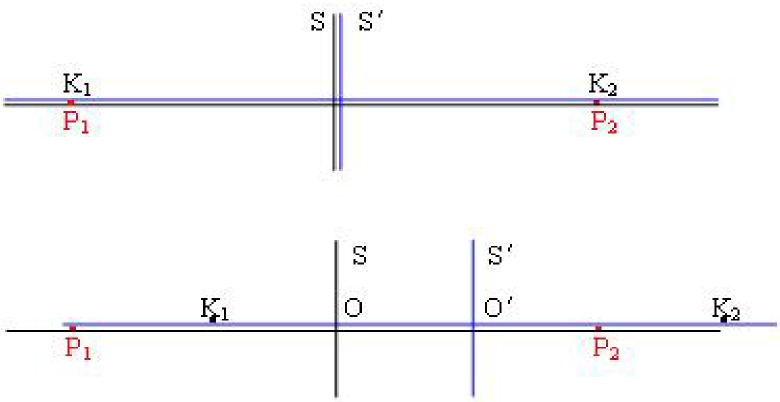


Fig.3 Along the *X*- axis movement reference frame *S* ′, light source point is fixed on the *X* -axis.

4. UNDER THE LIGHT OF THE RELATIONSHIP BETWEEN TIME AND SPACE MOVEMENT

In a little light in reference frame , relative to their source of photon speed isotropic for *C* . As Fig.4 shown , source: *P* is spherical of center, but the relative to their reference frame outside the inertial system is anisotropic . When along the *X*-axis movement systems S_a and stillness reference frame *S* completely coincidence moments, send a flash point *P* . In their respective reference frame origin at the observer timing starts, when the inertia light point *P* speed is *V* ($O<V<C$) movement to point *E* , ball spherical surface (or wave-form) spread to the source of reference frame S_a point O_a , timer values t_a for reading . The space location in reference frame *S* point *P* for [(X_a+Vt_a) , y_a , z_a] , instant space-time as [(X_a+Vt_a) , y_a , z_a , t_a]. From point *A* to *B* distance is *V* ta . According to the Pythagorean theorem，we obtain spherical surface equation in the reference frame S_a :

$$x_a{}^2+y_a{}^2+z_a{}^2=(ct_a)^2 \quad , \quad (11)$$

Light spherical continued to spread , in the moment *t* , spherical surface diffuse to point *A* battle. Inertial system point *P* with static reference frame *S* point *G* of superposition ,at the time *t* , in the reference frame *S* point *P* space-time is the center of the ball in . According to the Pythagorean theorem，we obtain：

$$(x_a+vt)^2+y^2+z^2=(ct)^2 \quad , \quad (12)$$

Suppose y_a∥y, z_a∥z , $y_a=y$, $z_a=z$ and $\beta=v/c$ combined the formula (11) with the formula (12) to form a simultaneous equations and to solve this equations. We obtained , the one-element quadratic equation of an unknown number *t* :

$$(1-v^2/c^2)t^2-(2vx_a/c^2)t-t_a{}^2=0 \quad . \quad (13)$$

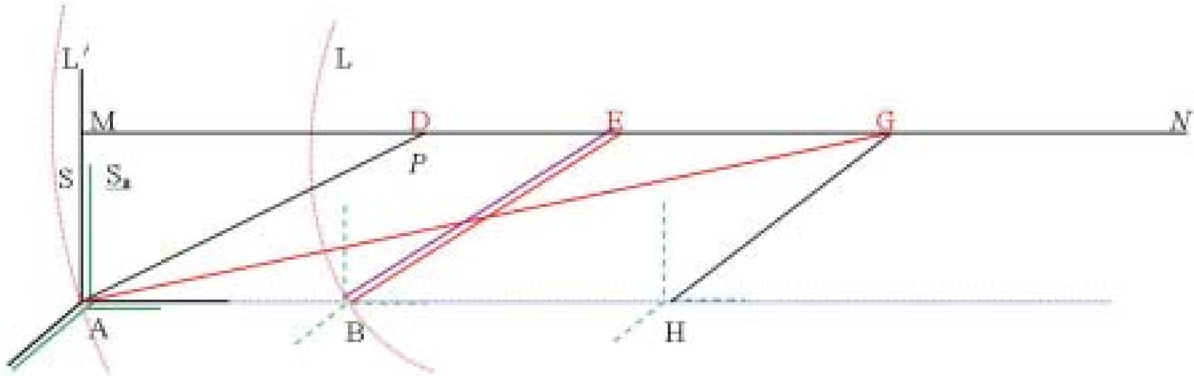
We chose the positive root of such a quadratic equation as follows:

$$t = \frac{\sqrt{(1-\beta^2)t_a{}^2 + \beta^2 x_a{}^2 / c^2} + \beta x_a / c}{1-\beta^2}$$.

(14)

If we like this "**discussion and reviews**" analytical formula (14), will get the same result with . In Fig.4 , if the negative direction along the *X* axis reference frame *S*a movement, results with the same formula (13).

If the variable is along the *X* axis reference frame *S*a movement , known as reference frame *S*a speed changing with time, the function that can use the definite integral to answer [4,5].



$(x_a + Vt)^2 + y^2 + z^2 = (ct)^2$ $\qquad$ $x_a{}^2 + y_a{}^2 + z_a{}^2 = (ct_a)^2$

Fig.4 The reference frame S_a spherical equation is Eq.(11). The reference frame *S* spherical equation is Eq.(12).

5. CONCLUSION

The speed of light spherical diffusion invariant ：In the vacuum, light spherical diffusion speed relative to the center from point of origin for finding *C* .

The change of photonic speed ：Inertial system is along the photon trajectory line movement , the speed of photon and inertial system state closely related . Therefore, the photons movement speed by Galileo transformation (relatively all inertial system) .

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4/15/2009