

Mathematical Theory Of Space-Time With Subluminal and Superluminal Coexistence

Chun-Xuan Jiang

China Aerospace Science And Technology Corporation

P. O. Box 142-206, Beijing 100854, P. R. China

j136211668701@163.com

Abstract: Using space-time ring we establish the mathematical theory of space-time with subluminal and superluminal coexistence(SASC) which is the foundations of physics and cosmology.Using two methods we deduce the new gravitational formula. Tardyonic rotating motion produces the centrifugal force ,but tachyonic rotating motion produces the centripetal force, that is gravity. Using it we establish the expansion theory of the universe and suggest the new universe model. New gravitational formula changes all that. Theory of everything has the two forces: (1)the subluminal force (electromagnetism and weak force) and (2) superluminal force(gravity and strong force).

[Chun-Xuan Jiang. **Mathematical Theory Of Space-Time With Subluminal and Superluminal Coexistence.** *Researcher* 2025;17(9):13-23]. ISSN 1553-9865 (print); ISSN 2163-8950 (online). <http://www.sciencepub.net/researcher>. 03. doi:[10.7537/marsrsj170925.03](https://doi.org/10.7537/marsrsj170925.03)

Keywords: new gravitational formula; expansion theory of universe.

PACS:04.90.+e,98.80.-k.

1. Mathematical Theory of Space-Time With SASC

Throughout history, the notion of space and time has undergone a number of dramatic transformation, thanks to figures ranging from Aristotle, Leibniz and Newton to Gauss, Poincare and Einstein. In the present understanding of nature, space and time form a single entity called space-time. In 1975 Jiang has established the mathematical theory of space-time with SASC. This theory plays a key role for the entire field of physics to unlock the deepest mysteries of the universe. But in relativity the complex space-time is mistake.

Neither Newton nor any of his followers was ever able to give a convincing explanation of the origin of the gravitational force.In this paper we prove that the origin of the gravitational force is tachyonic rotating motion produces the centripetal force.In the Universe there are two matters: (1) observable subluminal matter called tardyon(locality) and (2) unobservable superluminal matter called tachyon(non-locality) which coexist in motion. Tachyon can be converted into tardyon, and *vice versa*. Tardyonic rotating motion produces the centrifugal force, but tachyonic rotating motion produces the centripetal force, that is gravity. Using tardyonic and tachyonic coexistence principle we deduce the new gravitational formula,

For establishing the mathematical theory of space-time with SASC. we first define space-time ring [1,2, 7-10]

$$Z = \begin{pmatrix} ct & x \\ x & ct \end{pmatrix} = ct + jx, \quad (1)$$

where x and t are the tardyonic space and time coordinates, c is light velocity in vacuum, $j = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$.

(1) can be written as Euler form

$$Z = ct_0 e^{j\theta} = ct_0 (\text{ch } \theta + j \text{sh } \theta), \quad (2)$$

where ct_0 is the tardyonic invariance, θ tardyonic hyperbolic angle.

From (1) and (2) we have

$$ct = ct_0 \text{ch } \theta, \quad x = ct_0 \text{sh } \theta \quad (3)$$

$$ct_0 = \sqrt{(ct)^2 - x^2}. \quad (4)$$

From (3) we have

$$\theta = \text{th}^{-1} \frac{x}{ct} = \text{th}^{-1} \frac{u}{c}. \quad (5)$$

where $c \geq u$ is the tardyonic velocity.

Using the morphism $j: z \rightarrow jz$, we have

$$jz = \bar{x} + j\bar{t} = \bar{x}_0 e^{j\bar{\theta}} = \bar{x}_0 (\text{ch } \bar{\theta} + j \text{sh } \bar{\theta}), \quad (6)$$

where \bar{x} and \bar{t} are the tachyonic space and time coordinates, \bar{x}_0 is tachyonic invariance, $\bar{\theta}$ tachyonic hyperbolic angle.

From (6) we have

$$\bar{x} = \bar{x}_0 \text{ch } \bar{\theta}, \quad \bar{t} = \bar{x}_0 \text{sh } \bar{\theta}. \quad (7)$$

$$\bar{x}_0 = \sqrt{(\bar{x})^2 - (\bar{t})^2}. \quad (8)$$

From (7) we have

$$\bar{\theta} = \text{th}^{-1} \frac{\bar{t}}{\bar{x}} = \text{th}^{-1} \frac{c}{\bar{u}}. \quad (9)$$

where $\bar{u} \geq c$ is the tachyonic velocity.

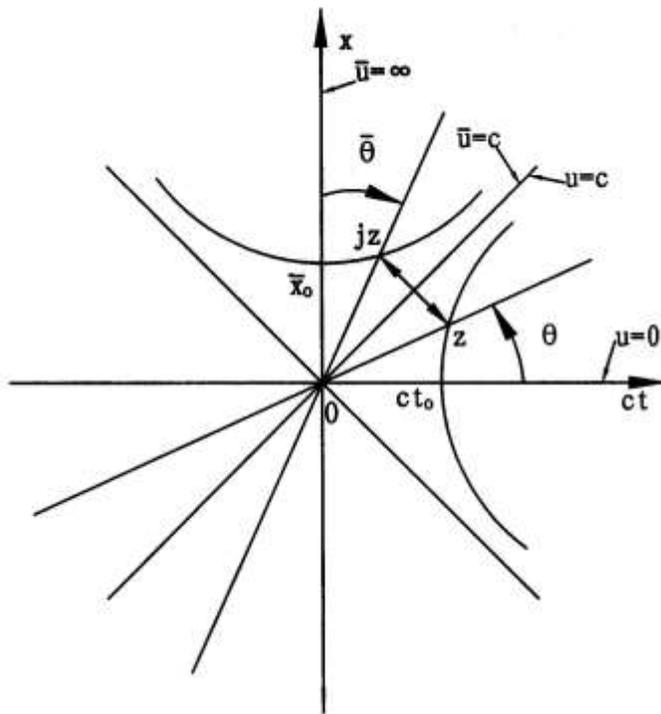


Fig. 1. Mathematical theory of space-time with SASC

Figure 1 shows the formulas (1)-(9). $j : z \rightarrow jz$ is that tardyon can be converted into tachyon, but $j : jz \rightarrow z$ is that tachyon can be converted into tardyon. $u = 0 \rightarrow u = c$ is the positive acceleration, but $\bar{u} = \infty \rightarrow \bar{u} = c$ is the negative acceleration, which coexist. At the ct-axis $u=0$ and $x=0$ we define the tardyonic rest time t . At the x – axis we define the tachyonic rest space

$$\bar{X}_0 = \lim_{\substack{\bar{u} \rightarrow \infty \\ t \rightarrow 0}} \bar{u}t = \text{constant} . \tag{10}$$

Since at rest the tachyonic rest time $t = 0$ and $\bar{u} = \infty$, we prove that tachyon is unobservable.

Fig.1 and (10) are mathematical theory of space-time with SASC, which are the foundations of physics and cosmology. Using it we prove that dark matter, dark energy, gravitational waves, the equivalence principle, quantum entanglements, quantum computers and black holes are mistake theories. From Fig.1 we deduce new gravitational formula.

2.New Gravitational Formula:
$$\bar{F} = -\frac{mc^2}{R} \text{ without dark matter}$$

Assume $\theta = \bar{\theta}$, from (5) and (9) we it follows SASC[1-4,7-10]

$$u\bar{u} = c^2 . \tag{11}$$

Using the analytical method we deduce the new gravitational formula. Differentiating (11) by the time, we get

$$\frac{d\bar{u}}{dt} = -\left(\frac{c}{u}\right)^2 \frac{du}{dt}. \quad (12)$$

$\frac{du}{dt}$ and $\frac{d\bar{u}}{dt}$ can coexist in motion, but their directions are opposite.

We study the tardyonic and tachyonic rotating motions. In 1673 Huygens discovered that the tardyonic rotation produces centripetal acceleration

$$\frac{du}{dt} = \frac{u^2}{R}, \quad (13)$$

where R is rotating radius.

Substituting (13) into (12) we have the tachyonic centrifugal acceleration

$$\frac{d\bar{u}}{dt} = -\frac{c^2}{R}. \quad (14)$$

(13) and (14) have the same form. From (13) we get the tardyonic centrifugal force

$$F = \frac{Mu^2}{R}, \quad (15)$$

where M is the inertial mass.

From (14) we get the tachyonic centripetal force, that is gravity

$$\bar{F} = -\frac{mc^2}{R}, \quad (16)$$

where m is the gravitational mass converted into by tachyonic mass \bar{m} .

(15) and (16) have the same form. (16) is the new gravitational formula.

Using the geometrical method we deduce the new gravitational formula..

Figure 2 shows that the rotation ω of body A emits tachyon mass \bar{m} , which forms the tachyon and gravitation field and gives the body B revolutions u and \bar{u} .

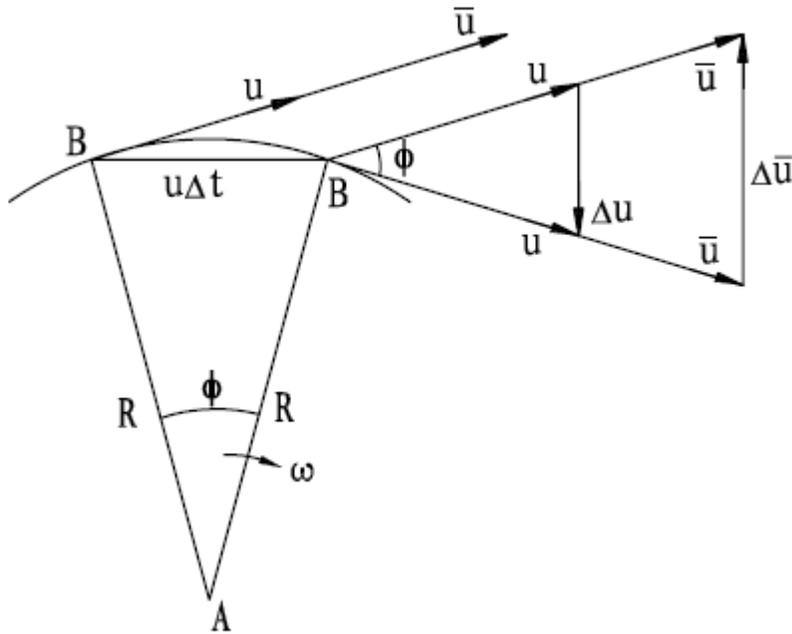


Fig.2. On body B the $\frac{du}{dt}$ and $\frac{d\bar{u}}{dt}$ coexistence [2]

From Fig. 2 .it follows

$$\frac{u\Delta t}{R} = \frac{\Delta u}{u} \quad (17)$$

From (17) it follows the tardyon centripetal acceleration on the body B [2-4],

$$\frac{du}{dt} = \lim_{\substack{\Delta u \rightarrow 0 \\ \Delta t \rightarrow 0}} \frac{\Delta u}{\Delta t} = \frac{u^2}{R} \quad (18)$$

From Fig. 2. it follows

$$\frac{u\Delta t}{R} = -\frac{\Delta \bar{u}}{\bar{u}} \quad (19)$$

From (19) and (11) it follows the tachyon centrifugal acceleration on the body B [2-4],

$$\frac{d\bar{u}}{dt} = \lim_{\substack{\Delta \bar{u} \rightarrow 0 \\ \Delta t \rightarrow 0}} \frac{\Delta \bar{u}}{\Delta t} = -\frac{u\bar{u}}{R} = -\frac{c^2}{R} \quad (20)$$

On body B the $\frac{du}{dt}$ and $\frac{d\bar{u}}{dt}$ coexistence.

From (18) it follows the tardyon centrifugal force on body B [2-4],

$$F = \frac{M_B u^2}{R} \quad (21)$$

where M_B is body B inertial mass.

From (20) it follows the tachyon centripetal force on body B , that is gravity [2-4,7-10],

$$\bar{F} = -\frac{mc^2}{R}, \tag{22}$$

where m is the gravitation mass converted into by tachyon mass \bar{m} which is unobservable, but m is observable.

(22) is the new gravitational formula. In 1976[2] this simple thought made a deep impression on me. It impelled me to establish the new gravitational theory. On body B the F and \bar{F} coexistence.

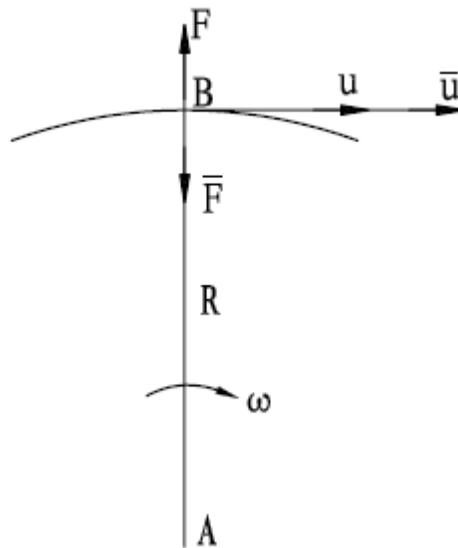


Fig.3. On body B the F and \bar{F} coexistence and the new Universe model

From Fig. 3, it follows

$$F + \bar{F} = 0. \tag{23}$$

From (21), (22) and (23) it follows

$$\frac{m}{M_B} = \frac{u^2}{c^2}. \tag{24}$$

Body B increases mass m and centrifugal force is greater than gravitation force, then body B expands outward.

Using Fig.3 we establish the new universe model. The universe has no beginning and no end. The universe is infinite.

- (1) If Body A is earth center, then body B is the moon;
- (2) If Body A is the sun center, then body B is the Earth;
- (3) If Body A is Galactic center, then body B is stars in the milky way;

(4)

(5) If Body A is the universe center, then body B is the stars in the universe.

In Fig.3 on body B there is tardyonic centrifugal force and tachyonic centripetal force coexistence.

It is the universe foundations. All matter has unobservable tachyons to produce gravity. We should establish new cosmological theory and new particle physics theory.

From (22) it follows Newtonian gravitation formula. The m is proportional to body A mass M_A , in (24) m

is proportional to M_B , m is inversely proportional to the distance R between body A and body B. It follows

$$m = k \frac{M_A M_B}{R}, \quad (25)$$

where k is constant

Substituting (25) into (22) it follows the Newtonian gravitation formula [2-4,7-10]

$$\bar{F} = -G \frac{M_A M_B}{R^2}, \quad (26)$$

where $G = kc^2 = 6.673 \times 10^{-8} \text{ cm}^3 / \text{g} \cdot \text{sec}^2$ is gravitation constant.

Now we study the freely falling body. Tachyonic mass \bar{m} can be converted into gravitational mass m , which acts on the freely falling body and produces the gravitational force

$$\bar{F} = -\frac{mc^2}{R}, \quad (27)$$

where R is the Earth radius.

We have the equation of motion

$$\frac{mc^2}{R} = Mg, \quad (28)$$

where g is gravitational acceleration, M is inertial mass of freely falling body.

From (28) it follows the gravitational coefficient

$$\eta = \frac{m}{M} = \frac{Rg}{c^2} = 6.9 \times 10^{-10}. \quad (29)$$

Eötvös experiment $\eta \sim 5 \cdot 10^{-9}$ and Dicke experiment $\eta \sim 10^{-11}$. Since the gravitational mass m can be transformed into the rest mass in freely falling body, we prove that the freely falling bodies fall with the same acceleration and equivalence principle is mistake.

3. The expansion theory of the universe without dark energy

Using new gravitational formula we study the expansion theory of the Universe[7-10]. Figure 4 shows an expansion

model of the Universe. The rotation ω_1 of body A emits tachyonic mass which forms the tachyonic field. Tachyonic mass \bar{m} acts on body B , which produces its rotation ω_2 , revolution u and gravitational force

$$\bar{F}_1 = -\frac{mc^2}{R}, \tag{30}$$

where R denotes the distance between body A and body B , m is gravitational mass converted into by tachyonic mass \bar{m} which is unobservable but m is observable.

The rotation of the body B around body A produces the centrifugal force

$$F_1 = \frac{M_B u^2}{R}, \tag{31}$$

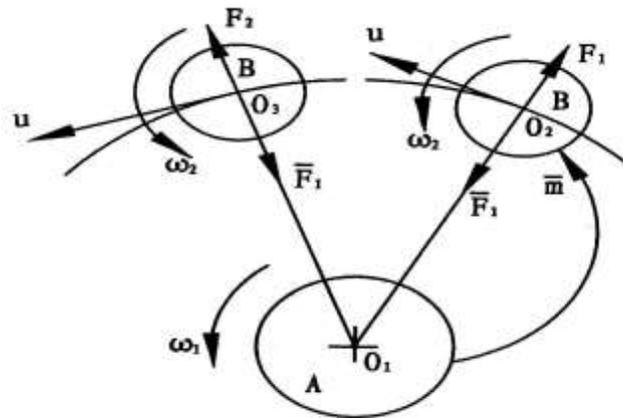


Fig. 4. A expansion model of the Universe

where M_B is the inertial mass of body B , u is the orbital velocity of body B .

At the O_2 point we have

$$F_1 + \bar{F}_1 = 0. \tag{32}$$

From (32) it follows that the coexistence of the gravitational force and centrifugal force.

From (30)-(32) it follows the gravitational coefficient

$$\eta = \frac{m}{M_B} = \left(\frac{u}{c}\right)^2. \tag{33}$$

At the O_3 point the tachyonic mass \bar{m} can be converted into the rest mass m in body B , it follows

$$F_2 = \frac{M_B u^2}{R} + \frac{mu^2}{R}. \tag{34}$$

Since $F_2 + \bar{F}_1 > 0$, centrifugal force F_2 is greater than gravitational force \bar{F}_1 , then the body B expands outwards and its mass increases. This is an expansion mechanism of the Universe. From (31,32,34) we have

$$F_2 + \bar{F}_1 = \frac{mu^2}{R} = M_B g_e \tag{35}$$

From (35) we obtain the expansion acceleration

$$g_e = \frac{mu^2}{M_B R} \tag{36}$$

Substituting (33) in (36) we obtain

$$g_e = \frac{u^4}{c^2 R} \tag{37}$$

If body *A* is the Earth, then body *B* is the Moon; if body *A* is the Sun, then body *B* is the Earth; ... It can explain our expansion universe. In the universe there are no dark matter and no dark energy. This simple thought made a deep impression on me. It impelled me to establish a expansion theory of the universe .

If the body *A* is the Sun and body *B* is the planet. We calculate the gravitational coefficients η as shown in table 1.

Table 1: Values of the gravitational coefficients η

Planet	<i>u</i> (km/sec)	$\eta(10^{-10})$
Mercury	47.89	255.2
Venus	35.03	136.5
Earth	29.79	98.7
Mars	24.13	64.8
Jupiter	13.06	19.0
Saturn	9.64	10.3
Uranus	6.81	5.2
Neptune	5.43	3.3
Pluto	4.74	2.5

The gravitational field of the solar system is the origin of the planet mass. From it the planet acquire mass. In the universe there are no Higgs particles.The equivalence principle is mistake.

4. Conclusion

In summary. We deduce tardyonic and tachyonic coexistence principle. Using it we deduce the centrifugal formula and new gravitational formula We establish the expansion theory of the universe without dark energy. The new

gravitational formula is foundations of particle physics and cosmology. We prove that in the universe no dark matter, no dark energy, no gravitational waves and no quantum gravity. We prove that quantum mechanics and general relativity are mistake theories.

Where did we come from? Where are we going? What makes up the universe? These questions have occupied mankind for thousands of years. Over the course of history, our view of the world has been changed. Theologians and philosophers, physicists and astronomers have given us very different answers. Where did we come from? We answer this questions this way $\bar{m} \rightarrow m$, tachyons \rightarrow tardyons[1], that is tachyons can be converted into the electrons and positrons which are the basic building-blocks of the elementary particles[5-6]. In the universe there are no Higgs particles and no quarks. The standard model of particle physics is mistake. The tachyons are the origin of mass. Where are we going? We answer this question this way $m \rightarrow \bar{m}$, that is the tardyons produce tachyons[1]. The tardyons and tachyons make up the Universe.

Note. In 1976 Jiang found a gravitational formula[2] : $\bar{F} = -\bar{m}c^2/R$, where \bar{m} is the tachyonic mass. In

2004 Jiang studied the Universe expansion and found a new gravitational formula $\bar{F} = -mc^2/R$, where m is gravitational mass converted into by tachyonic mass \bar{m} [7].

Newtonian gravity formula is based on empirical evidence. He did not explain what is gravity? how it works? The equivalence principle is mistake theory. Therefore general relativity is mistake theory. Liu and Zhang pointed out that mathematical theory of space-time with SASC is mistake[11.12]

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Acknowledgments

The author thanks professor Walter Lewin for his mails.

(1)From: "Walter H.G. Lewin" <lewin@space.mit.edu>

Date: Sun, 10 Jun 2012 22:22:21-0400(EDT)

Publish this in a refereed journal and once it is accepted buy yourself a first class ticket to Stockholm to pick up Nobel prize for physics.

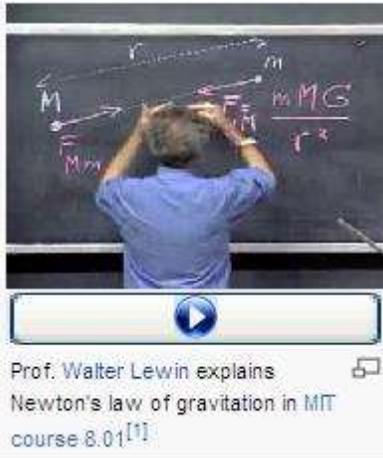
(2)From: "Walter H.G. Lewin" <lewin@space.mit.edu>

Date: Sun, 17 Jun 2012 06:19:37-0400(EDT)

Dear Jiang

Thank for your email.

I suggest you submit your theory to a refereed journal. If it is accepted, then buy yourself a plane ticket to Stockholm to pick up a Nobel prize. These are your ideas, not mine



8/21/2025