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Einstein's Spacetime and Einstein's Field Equations Versus Wu's Spacetime and Wu's Spacetime Field Equations

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Abstract: *Wu's Spacetime is a four dimensional system based on Wu's Unit Length l_{yy} and Wu's Unit Time t_{yy} which are related to each other by Wu's Spacetime Theory $t_{yy} = \gamma l_{yy}^{3/2}$. Einstein's Spacetime is a special Wu's Spacetime based on earth. According to Yangton and Yington Theory, Wu's Unit Length l_{yy} on a massive star is much bigger than l_{yy0} on earth. Because $a \propto C^{-4} \propto l_{yy}^{2}$, the Amount of Normal Unit Acceleration "a" measured on the star is much bigger than "a_0"measured on earth. In other words, for a massive star, Wu's Spacetime Field Equation measured on the star has much deeper slope (curvature) than that of Einstein's Field Equation measured on earth. Furthermore, because of the large Wu's Unit Length l_{yy} caused by the huge gravitational force, a hollow structure in the center of a black hole is expected. Also because of the Photon Inertia Transformation and the large acceleration in the center of a black hole based on Wu's Spacetime Field Equations, it is predicted that photon can be trapped inside the event horizon of a black hole.*

Keywords: *Theory of Correspondence, Field Equation, Einstein's Field Equation, Cosmological Constant, Spacetime, Yangton and Yington, Wu's Pairs, Wu's Spacetime Theory, Wu's Spacetime Field Equation, Black Hole.*

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I. Introduction

Yangton and Yington Theory [1] is a hypothetical theory based on Yangton and Yington circulating particle pairs (Wu's Pairs) with a build-in inter-attractive force (Force of Creation) that is proposed as the fundamental building blocks of the universe. The theory explains the formation of all subatomic particles and the correlations between space, time, energy and matter. Einstein's Spacetime and Field Equations are ones of the most difficult topics in modern physics. It is the purpose of this paper trying to understand Einstein's Spacetime and Field Equations by Yangton and Yington Theory.

II. Spacetime

1. Definition of Spacetime

In the universe, the position of an object can be defined by a four dimensional system [x, y, z, t](l_1, t_1) at a reference point. In which [x, y, z] are the coordinates of the object on a three perpendicular axes measured by a unit length l_1 at the reference point (Cartesian coordinate system) and [t] is the time duration measured by a unit time t_1. In MKS system, a Normal Unit Length "meter" and a Normal Unit Time "second" are used for the measurements. They are independent to each other.

2. Wu's Spacetime

Wu's Spacetime [x, y, z, t](l_{yy}, t_{yy}) [2] is a special four dimensional system that is defined by Wu's Unit Length l_{yy} (the size of Wu's Pairs) and Wu's Unit Time t_{yy} (the period of Wu's Pairs) of a local reference point of the same gravitational field and the aging of the universe. Both Wu's Unit Length and Wu's Unit Time are dependent on the gravitational field and the aging of the universe. Also, they are correlated to each other by Wu's Spacetime Theory ($t_{yy} \propto l_{yy}^{3/2}$) [2].

3. Einstein's Spacetime

Einstein's Spacetime [x, y, z, t](l_{yy0}, t_{yy0}) is the Wu's Sapcetime on earth. Both the Wu's Unit Length l_{yy0} and Wu's Unit Time t_{yy0} of Einstein's Spacetime are constants.

4. Wu's Spacetime Versus Einstein's Spacetime

In Wu's Spacetime, the coordinates of an object and event are measured by Wu's Unit Length l_{yy} and Wu's Unit Time t_{yy} at a local reference point. In contrast, in Einstein's Spacetime, the coordinates of an object and event are measured by l_{yy0} and t_{yy0} on earth, which are dependent on Wu's Unit Length l_{yy} and Wu's Unit Time t_{yy} of the object and event related to its corresponding gravitational field and aging of the universe.

Wu's Spacetime is often used to describe a local homogeneous world with the same Wu's Unit Length l_{yy} and Wu's Unit Time t_{yy} under a constant gravitational force and aging of the universe. Einstein's Spacetime, on the other hand, is used for the observation of the remote cosmological universe.

According to Yangton and Yington Theory, big gravitational force can induce large Wu's Unit Length l_{yy} with large coordinate, so as to cause the expansion of the coordination matrix (Fig. I). Because the coordination matrix represents the distribution of matter, and the expansion of the coordination matrix results in the depletion of matter from center to form a hollow structure, therefore, a black hole can be predicted by Wu's Spacetime Theories.

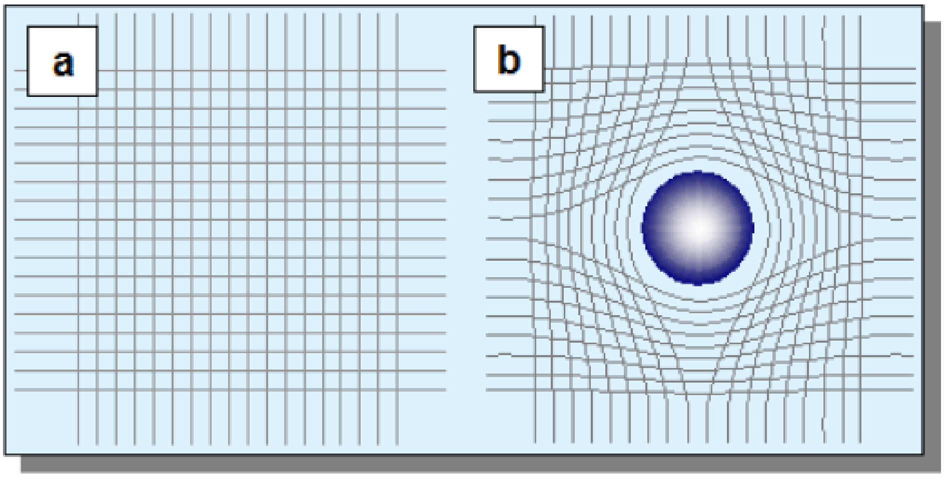

Fig. I (a) A coordination matrix in Einstein's Spacetime with homogeneous gravity (b) The same coordination matrix in Einstein's Spacetime with a massive core in the center.

III. Wu's Spacetime Theory

The period (t_{yy}) and the size (l_{yy}) of the circulation orbit of Wu's Pairs are related to each other as follows:
Because,
$V^2r = K = \text{constant}$
And,
$T = 2\pi r/V$
$T^2 = 4\pi^2r^2/V^2 = 4\pi^2r^3/V^2r = 4k_1\pi^2r^3$
$T = k_2r^{3/2}$
Where k_1 and k_2 are constants.
"Wu's Spacetime Theory" [41] is represented as follows:

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

Where t_{yy} is the circulation period (T) of Wu's Pairs called "Wu's Unit Time", l_{yy} is the size of the circulation orbit (2r) of Wu's Pairs called "Wu's Unit Length", and γ is Wu's Spacetime constant.

IV. Acceleration and Wu's Spacetime

Because of "Wu's Spacetime Theory",
$t_{yy} = \gamma l_{yy}^{3/2}$
Therefore,
$l_{yy}/t_{yy}^2 = \gamma^{-2} l_{yy}^{-2}$
For an accelerating object,
$A = a\,(l_s/t_s^2) = a\,(m/n^2)(l_{yy}/t_{yy}^2)$

Therefore,

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

Where A is the acceleration, a is the Amount of Normal Unit Acceleration, γ is the Wu's Spacetime constant, m is the constant of the Normal Unit Length, n is the constant of the Normal Unit Time and l_{yy} is Wu's Unit Length.
For a corresponding identical acceleration, the Amount of Normal Unit Acceleration "a" is a constant, therefore,

$$A \infty l_{yy}^{-2}$$

As a result, for a corresponding identical acceleration at high gravitational field or in ancient universe, because the size (l_{yy}) of Wu's Pair is bigger, therefore the acceleration is slower.

V. Einstein's Field Equations

The Einstein field equations (EFE) may be written in the form:

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

where Rμν is the Ricci curvature tensor, R is the scalar curvature, gμν is the metric tensor, Λ is the cosmological constant, G is Newton's gravitational constant, c is the speed of light in vacuum (a constant), and Tμν is the stress–energy tensor.

The Einstein field equations comprise the set of 10 equations in Albert Einstein's general theory of relativity that describe the fundamental interaction of gravitation as a result of spacetime being curved by mass and energy. First published by Einstein [3] in 1915 as a tensor equation, the EFE relate local spacetime curvature (expressed by the Einstein tensor) with the local energy and momentum within that spacetime (expressed by the stress–energy tensor).

To avoid the universe from collapsing, Einstein added the cosmological constant into the formula to balance the attraction force caused by the gravity. However, after Hubble showed us that the universe is expanding, this term was not longer necessary, because the universe is not static. Einstein later felt that the inclusion of this term was the biggest blunder of his career.

Similar to the way that electromagnetic fields are determined using charges and currents via Maxwell's equations, the EFE are used to determine the spacetime geometry resulting from the presence of mass–energy and linear momentum, that is, they determine the metric tensor of spacetime for a given arrangement of stress–energy in the spacetime. The relationship between the metric tensor and the Einstein tensor allows the EFE to be written as a set of non-linear partial differential equations when used in this way. The solutions of the EFE are the components of the metric tensor. The inertial trajectories of particles and radiation (geodesics) in the resulting geometry are then calculated using the geodesic equation.

As well as obeying local energy–momentum conservation, the EFE reduce to Newton's law of gravitation where the gravitational field is weak and velocities are much less than the speed of light [4].

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

VI. Wu's Spacetime Field Equations

Because of Newton's Second Law of Motion and Newton's Law of Universal Gravitation,
$F = M_0 A$
$F = G\ M_0\ M/R^2$
Therefore,

$$A = GM/R^2$$

Where A is the acceleration, M_0 is Wu's Unit Mass (a single Wu's Pair), M is the mass of the object and R is the distance from the object. This is called "Field Equation".

According to Yangton and Yington Theory,

Because

$A = a\ m\ n^{-2}\ \gamma^{-2}\ l_{yy}^{-2}$
Also,
$C \propto l_{yy}^{-1/2}$
$C^{-4} \propto l_{yy}^{2}$
Therefore,

$$a = -\ \sigma\ \gamma^2\ l_{yy}^2\ G\ M/R^2$$

$$a = -\ \delta\ \gamma^2\ C^{-4}\ G\ M/R^2$$

These are named "Wu's Spacetime Field Equations" [5]. Where a is the Amount of Normal Unit Acceleration, σ and δ are constants, γ is Wu's Spacetime constant, G is the gravitational constant, C is the Absolute Light Speed ($C \propto l_{yy}^{-1/2}$) [5], and l_{yy} is Wu's Unit Length. The negative sign shows that the acceleration is toward the center of the spherical mass (or black hole) [6].

Wu's Spacetime Field Equations represent a group of contours in Spacetime having curvatures associated with the Amount of Normal Unit Acceleration "a", which not only reflects the distribution of energy and momentum of matter but also depends on Wu's Unit Length l_{yy}. Because the Absolute Light Speed C is a function of Wu's Unit Length l_{yy}, and it can be measured by redshift, the Absolute Light Speed C can be used in Wu's Spacetime Field Equations to reflect the influence of Wu's Pairs.

When an object moves toward the center of the spherical mass (or black hole), gravitational force is getting bigger, so as the Wu's Unit Length l_{yy}. Meantime the Absolute Light Speed C is getting smaller ($C \propto l_{yy}^{-1/2}$) and C^{-4} is getting bigger which can enhance the acceleration and enlarge the curvature ($a \propto C^{-4}$), so that a deep Spacetime continuum can be formed (Fig. D).

For a photon emitted from an object accelerating towards the center of a black hole, because of the Photon Inertia Transformation, the outward absolute light speed is completing with the inward inertia light speed. As a result, at the event horizon, the net speed of the photon is zero (photon is in idle); and inside the event horizon, the net speed of the photon is negative (photon travels inwards). In other words, photon can be trapped and could never escape from an event horizon. Therefore, the existence of a black hole can be predicted.

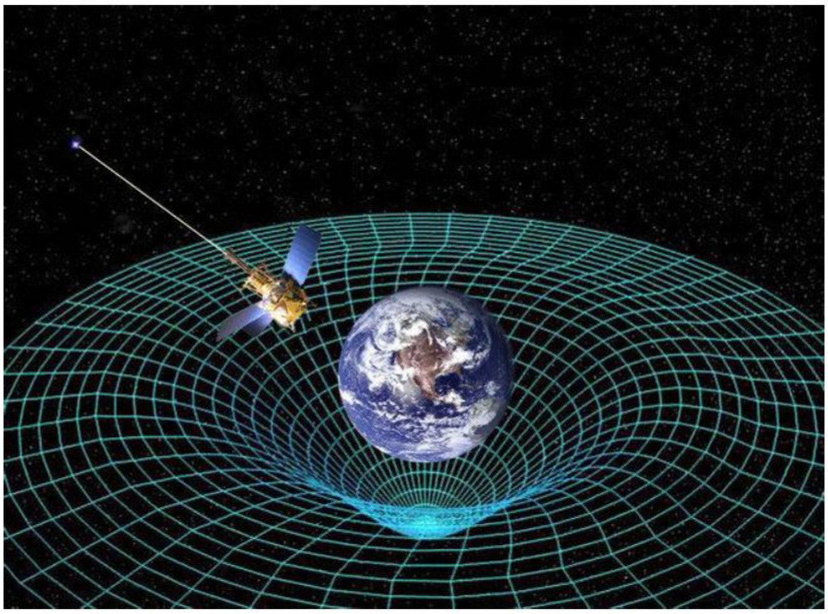

Fig. D. Earth and its surrounding spacetime continuum.

VII. Wu's Spacetime Field Equations Versus Einstein's Field Equations

Acceleration and Wu's Spacetime Field Equation [5] can be represented by Wu's Unit Length l_{yy}, Wu's Unit Time t_{yy} and the Absolute Light Speed (C) at the same location.

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

$$a = -\,\delta\, \gamma^{2}\, C^{-4}\, G\, M/R^{2}$$

Where "a" is the Amount of Normal Unit Acceleration (the curvature of Wu's Spacetime) measured at the same location, δ is a constant, γ is Wu's Spacetime constant and C is the local Absolue Light Speed ($C \propto l_{yy}^{-1/2}$ and l_{yy} is Wu's Unit Length at the same location).

The amount of Normal Unit Acceleration and Einstein's Field Equation can also be represented by Wu's Unit Length l_{yy0}, Wu's Unit Time t_{yy0} and the Absolute Light Speed C_0 on earth.

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

$$a_0 = -\,\delta\, \gamma^{2}\, C_0^{-4}\, G\, M/R^{2}$$

Where "a_0" is the Amount of Normal Unit Acceleration (the curvature of Einstein's Spacetime) measured on earth, δ is a constant, γ is Wu's Spacetime constant, C_0 is the Absolute Light Speed on earth ($3\text{x}10^8$ m/s) and l_{yy0} is Wu's Unit Length on earth.

According to Yangton and Yington Theory, Wu's Unit Length l_{yy} on a massive star is much bigger than l_{yy0} on earth. Because $a \propto C^{-4} \propto l_{yy}^{2}$, therefore the Amount of Normal Unit Acceleration "a" measured on the star is much bigger than "a_0"measured on earth. In other words, for a massive star, Wu's Spacetime Field Equation measured on the star has deeper slope (bigger curvature) than that of Einstein's Field Equation measured on earth (Fig. H).

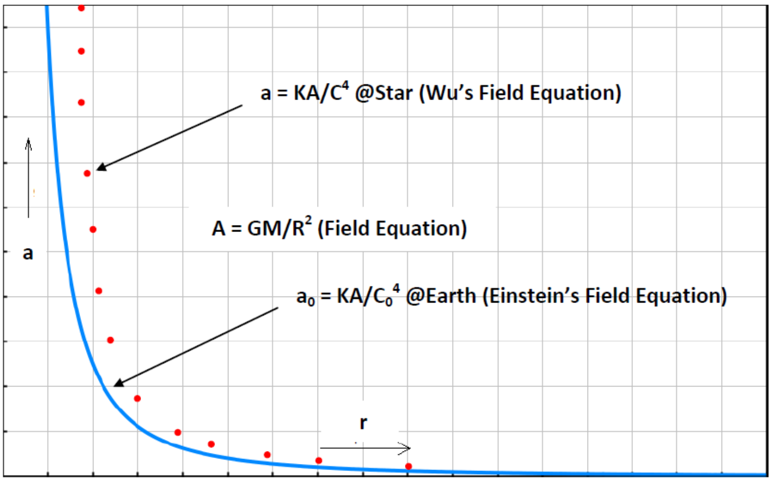

Fig. H Comparison between Einstein's Field Equation (blue solid line) and Wu's Field Equation (red dotted line).

As a result, Einstein's Field Equation is only a special case of Wu's Field Equation, which is observed by Wu's Unit Length l_{yy0} on earth, instead of that by Wu's Unit Length l_{yy} near the object.

VIII. Wu's Spacetime Field Equation and Concentration of Gravitons

According to Wu's Yangton and Yington Theory, both Wu's Unit Time (t_{yy}) and Wu's Unit Length (l_{yy}) are functions of the gravitational field (F_g). Because the gravitational field is a function of the concentration of Gravitons ($C_{Graviton}$), therefore, Spacetime [x, y, z, t] (t_{yy}, l_{yy}) can also be represented by the gravitational field [x, y, z, t] (F_g) and concentration of Gravitons [x, y, z, t] ($C_{Graviton}$) at a reference point in the universe.Similar to Wu's Spacetime Field Equation, a Spacetime Graviton Concentration Field Equation can be obtained as follows:
Because
$\Sigma(M/R^2) \propto (C_{Graviton})$
Therefore,

$$a = -\,\eta\, \gamma^{2}\, C^{-4}\, G\, (C_{Graviton})$$

This is named "Spacetime Graviton Concentration Field Equation". Where a is the Amount of Normal Unit Acceleration, η is a constant, γ is Wu's Spacetime constant, G is the gravitational constant, C is the speed of light which is a function of Wu's Unit Length l_{yy} (the diameter of Wu's Pairs) that is dependent on the gravitational field and the aging of the universe, and $C_{Graviton}$ is the concentration of Gravitons.

Spacetime Graviton Concentration Field Equation shows the relationship between the curvatures of Wu's Spacetime and the distribution of the concentration of Graviton. Therefore, it can be considered as the backbone of Quantum Field Theory.

IX. Conclusion

Wu's Spacetime is a four dimensional system based on Wu's Unit Length l_{yy} and Wu's Unit Time t_{yy} which are related to each other by Wu's Spacetime Theory $t_{yy} = \gamma l_{yy}^{3/2}$. Einstein's Spacetime is a special Wu's Spacetime based on earth. According to Yangton and Yington Theory, Wu's Unit Length l_{yy} on a massive star is much bigger than l_{yy0} on earth. Because $a \propto C^{-4} \propto l_{yy}^2$, the Amount of Normal Unit Acceleration "a" measured on the star is much bigger than "a_0"measured on earth. In other words, for a massive star, Wu's Spacetime Field Equation measured on the star has much deeper slope (curvature) than that of Einstein's Field Equation measured on earth. Furthermore, because of the large Wu's Unit Length l_{yy} caused by the huge gravitational force, a hollow structure in the center of a black hole is expected. Also because of the Photon Inertia Transformation and the large acceleration in the center of a black hole based on Wu's Spacetime Field Equations, it is predicted that photon can be trapped inside the event horizon of a black hole.

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