Modified General Theory of Relativity

--The neutrino travel speed bigger than 'c', but slower than real light velocity

Xuan Xie

Department of Chemistry, Xiamen University; address: Xiada-Xicun 11－1405, Xiamen, P.R.C; telephone: 011+0086-05922518553. e-mail: xiexuan1999@Yahoo.com.cn

Abstract : Recently *Nature* announces: neutrino travelled faster than light. Out of which arise astonishment and disbelieve drastically. We believe that the data of the experiment is reasonable, and so is trusty. But the conclusion is the result of mistake. Because: (1) the neutrino speed is: 'c+6km/s'; (2) by Schwarzschild solution, the light speed is c(1-2GM/rc^2), and so at the surface of the earth is 'c-42km/s';(3) here We show, the light speed is 'c*sqrt(1+2GM/rc^2)', and so at the surface of the earth is 'c+21km/s'.There for, the neutrino speed 'c+6km/s' is faster than the 'c', and so really it is the 'super c speed'. But at the same gravitation potential well, the real light speed 'c+21km/s' is also faster than the neutrino speed 'c+6km/s' ,and so the neutrino speed isn't the 'super velocity of light'. This result of this experiment testified authoritatively that: (1) General theory of relativity is the result of three disfigurements! (2)Our theory of time-space & gravitation is tally with the facts. (3) Neutrinos have rest mass, and so its velocity must slower than light speed.

[Xuan Xie. **Modified General Theory of Relativity.** Nat Sci 2012;10(6):83-90]. (ISSN: 1545-0740). http://www.sciencepub.net.12

Keywords: Eötvös experiment; Michelson-Morley experiment; Einstein's gravitational field equation; Schwarzschild solution; *Extrinsic-ate Riemannian geometry;* complex 8-D Riemannian geometry.

1. Introduction

While the theory of relativity has been widely known, yet Einstein declared that the General Theory of Relativity (GR) has been really known only by 'two and half'. Such exceeding a contrast indicates sufficiently that GR is an extreme mystery beyond understood. To find out and eradicate the roots of the mystery so as to make GR consummated and understandable, which is the aim of this paper.

The coexistence of the experiment results of Eötvös' & Michelson-Morley's is the fundamental reality revealing the essential time-space characteristics of the gravitational field originated from huge mass point M (M-field), to which GR as a gravitational theory must exactly conform.

2. Criterion for M-field

The result of Eötvös experiment shows that: 'at any a fixed point in M-field, the gravitational accelerations of every free bodies including photons must be all mutually identical, all adhere to Newton's law of universal gravitation'. And so if it is measured by the flat metric of the ambient field (where M-field is statically embedded), the value of the light speeds in M-field must be of $c\sqrt{1+2GM/c^2r}$, which will infinitely increase when the r tend to zero — can be greatly larger than the c and absolutely unable to tend to zero or any a imaginary value (name this character for M1). M1 has also been attested by the super-c speed transmission of mutual actions in the supernova. Therefore, Einstein equivalence principle 'a gravitational field is equivalent to an acceleration field' as a premise of a genuine gravitational theory must naturally include M1 for its fundamental connotation.

On the other hand, the result of Michelson-Morley experiment carried out in M-field reveals that in any a point infinitesimal neighborhood, if it is measured by metric of M-field's own at the point, the value of light speeds will all be the c and the time-space spherical coordinate invariants will all be of $d\tau^2 = c^2dT^2 - dr^2 - r^2d\theta^2 - r^2\sin^2\theta d\varphi^2$ (named M2). M2 is perfectly in conformity with the principle of general covariance, 'to describe the physical laws, every general reference systems all are equivalent'.

It is necessary to emphasize what the coexistence of M1 and M2 (CMM) includes a crux-conclusion that *none of the singularity time-space points or areas* (where the values of light speeds are either zero or imaginary) *can exist in M-field* (The same conclusion, Black holes do not exist, has recently been reached by a physicist George Chapline at the Lawrence Livermore National Laboratory in California. But it is absolutely different both in basis and connotation from ours).

Being the objective fact showed by the most fundamental practice on M-field & conforming perfectly to GR-basic hypotheses, CMM shows the metamorphism of M-field relative to Euclidean field in time-space metric, the innate physical specificity of M-field. Therefore, conforming to CMM is the essential

criterion for that a field is an M-field and that a theory on M-field is truth.

Einstein's gravitational field equation (EGFE) is absolutely distinct from CMM in nature. EGFE, embodying Einstein's ten years exhausted research & enlightened mainly by CMM a perfect peak of his great scientific originations, is neither the immediate result of the practice nor the logical inevitability, but actually a logical possibility & hypothesis only. Therefore, its correctness will be verified only if the close solution coincident with the objective fact revealed by fundamental practice on gravitational field.

EGFE $G^{ij}+\alpha P^{ij}=0$ is seemingly simple, but actually the simultaneous equation set including ten second-order non-homogeneous partial differential equations of ten functions *[1]*. Such extremely complicated an equation set is impossibility to get general close solution. So then the close solution on point-source field as a typical representative is provided with the function of universal and profound arbitration.

Consequently, the rightness of EGFE is affirmed only if its close solution on point-source field is completely in conformity with CMM.

3. Key blunder of GR

Unluckily, the Schwarzschild solution(SS) $d\tau^2=c^2\left(1-2GM/c^2r\right)dT^2-dr^2/\left(1-2GM/c^2r\right)-r^2d\theta^2-r^2\sin^2\theta d\varphi^2$, previously regarded as the unique close solution for point-source field, not only is inconformity with CMM but also is interpreted fabulously & infinitely. For example, if $d\tau=0$ (means the motion of photons) & $d\theta=d\varphi=0$, would get $dr/dT=\pm c\left(1-2GM/c^2r\right)$. This result shows as follows: the velocity of radial-inward photons in SS-field not only doesn't become faster and faster, like the speed of any radial-inward free body including photons in M-field according to M1, but slower and slower, until become of zero at the Schwarzschild singularity-sphere (i.e. $r_0=2GM/c^2$) & of imaginary-value inside the sphere. It is thus clear that SS-field isn't M-field. GR mistakes SS-field for M-field, which causes inevitably GR itself sinking into the century embarrass – there are a myriad of GR scholars, but there are only the "two and half" who 'really known GR' (judged by Einstein).

Why can such clear a blunder exist for almost a century without having been found and corrected? There are three major reasons for it as follows.

(1) Scientific epistemology is in disorder:

The sole criterion for the truth of a theory is the fundamental practice --- neither any a priori sage-view nor those so-called 'high-order effect confirmation' of against the basic practice. Because of ignorant of the criterion, faced with above essential inconformity, they do not go all out to find up the roots in order to eradicate it, but place the fluke on the 'second-order effect demonstrations' despite that they are essentially poles-apart. This is same absurd in the highest degree as what to compare \$(10^{10}+0.35) with \$0.35 the conclusion is that they are identity to an accuracy of 10^{-12} 'demonstrated' by what they have 'same \$0.35' such a 'second-order effect'.

(2) Intrinsic metric of Riemannian geometry has not been extrinsic-ate:

The *metrical metamorphism* of M-field is the intrinsic essential characteristic of M-field, which:

(Ⅰ) is the specificity of M-field relative to the *ambient flat-metric field* (AFF) that M-field is statically embedded in;

(Ⅱ) only in the extrinsic procedure of mutual observation contrasting with the flat-metric of AFF, can be understood and described;

(Ⅲ) has *Uniquely and invariantly the same essential objective specificity Connotation under Whatever time-space coordinate Transformation* (*UCWT*).

The origination of defining the metrical corresponding-match between M-field and its AFF in order to endow the metrical metamorphism of M-field with *UCWT*, which is called '*extrinsic-ate* the metrical metamorphism of M-field', and the corresponding ambient flat-metric is called 'the *extrinsic-matching metric* of M-field' in this paper.

Riemannian geometry taking full responsibility to mathematically describe gravitational field especially M-field, is an intrinsic-only geometry having innately no extrinsic-ate with its own intrinsic metric. Thusly, corresponding to any a coordinate transformation a fixed Riemannian field is seemingly endowed with a new different character, and so certainly results in that the feature of SS-field is exceedingly muddled and expounded infinitely, ambiguously & puzzlingly. And this labyrinth built on the congenital deficiency of Riemannian geometry has been mistaken for infinite miraculous and profound proper power, which brought about what innumerable GR scholars have lost in it and what the people revealing above real situation should contrary be criticized to be not aware of GR & Riemannian geometry.

Therefore, extrinsic-ate Riemannian geometry to complete its function in mathematically describing gravitational field especially M-field is imperative and significant.

(3)Imperfection of the physical time-space view:

There are four instead of merely one that the close solutions of $G^{ij}+\alpha P^{ij}=0$ on the point-source field, which all are spherically symmetric & will transform into flat-metric at infinity. Among them only the solution-2 conforms perfectly to CMM and so is the *Real Gravitational Physical Solution* (RGPS).

But the solution-2 is the one on the section of the real-time & imaginary-space of M-field. Therefore, only after recognizing what the physical time-space owns not only real-components 4-D but also 4-D imaginary-components can solution-2 be found. As similar to solving the teasers of the quantum picture and quantum philosophy *[2-4]*, to solve the problems of the gravitational theory must also rely on the theory of complex 8-D time-space.

Stephen Hawking cosmography is put up on the basis of taking SS-field for M-field, and so his Schwarzschild singular time-space black hole isn't the gravitational time-space. But his result-view about imaginary-time must be an objective reality, is much coincident with ours. What is the imaginary time-space? Its exact connotation is what only after the 4-D imaginary time-space is set up, may M-field rightly be described by EGFE & the teasers of the quantum picture and quantum philosophy be solved, which shows that the imaginary time-space is inevitable physical reality; but such a reality is unable to be immediately observed, so is named as the 'imaginary'.

4. Extrinsic-ate Riemannian geometry

Extrinsic-ate Riemannian geometry can vnlrpfalgp be realized by originating following two axiomatic definitions and clarifying thoroughly their legitimacy, agreeing with what none of the flat-metric coordinate system can exist in Riemannian space.

Firstly, taking a complete orthonormal vectors as the basis and the source point of M-field as the zero set up an orthonormalization coordinate system of AFF, then the intrinsic metric of M-field, named as the '*eigen metric*' of M-field, must be defined as RGPS (expressed in this coordinate) of $G^{ij}+\alpha P^{ij}=0$ on M-field (named E1). It is essential to emphasize that this definition is sheer legitimate: in this orthonormalization coordinate system, the field provided with the orthonormalizational flat-metric is AFF (in AFF M-field is embedded statically and solitarily) but not M-field itself; *as to M-field own*, the metric is the nontrivial solution of $G^{ij}+\alpha P^{ij}=0$ on M-field, which undoubtedly isn't the orthonormalization flat-metric.

The flat-metric of AFF is endowed to the M-field as its orthonormalized *'extrinsic-matching metric'*.

Secondly, is it legitimate or not legitimate to transform the every point *eigen metric* of M-field into the orthonormalizational flat-metric? The answer is bisected:

(Ⅰ) If the transformation is a nonsingular one covering the whole or any finite area of M-field, the answer is no! Because of that none of such a transformation can exist, or otherwise M-field must be a Euclidian field instead of a Riemannian field.

(Ⅱ) But if the transformation is that the every fixed point *eigen metric* of M-field is all solitarily transformed into the solitary orthonormalizational flat-metric for each fixed alone point, named as the '*point flat-metric*' of M-field, which originated to measure in each point respective infinitesimal neighborhood, then it:

(ⅰ) not only is legitimate — such respectively at every point a solitary transformation is actually all the orthonormalization of curvilinear coordinates in Euclidian space, and so can be unconditionally achieved;

(ⅱ) but also is indispensable for mathematically describing the principle of general covariance — only after this transformation originated, can M2 be mathematically derived.

The coordinate differential matching with the *point flat-metric* in the time-space distance invariant is defined as '*extrinsic-matching eigen coordinate differential'* of M-field (name this paragraph for E2).

E1 & E2, respectively from macro-(whole metric field) & micro-(every point metric) aspect, originally defines the natural corresponding relationship & transformation of the basic characteristics between M-field and its AFF. Thus, Riemannian geometry is extrinsic-ate, and the root of misunderstanding, caused by that a fixed EGFE solution seemingly has infinite interpretation, is eradicated.

5. Acknowledging complex time-space view

5.1. There are four but not only one that the close solution of $G^{ij}+\alpha P^{ij}=0$ for a point source field. They are follows:

$$d\tau_{\mathrm{I}}^2=\frac{\xi^1+\beta}{\xi^1}d\xi^{4^2}-\frac{\xi^1}{\xi^1+\beta}d\xi^{1^2}-\xi^{1^2}d\xi^{2^2}-\xi^{1^2}\sin^2\xi^2 d\xi^{3^2}$$

$$d\tau_{\mathrm{II}}^2=\frac{\xi^1+\beta}{\xi^1}d\xi^{4^2}+\frac{\xi^1}{\xi^1+\beta}d\xi^{1^2}+\xi^{1^2}d\xi^{2^2}+\xi^{1^2}\sin^2\xi^2 d\xi^{3^2}$$

$$d\tau_{\mathrm{III}}^2 = -\frac{\xi^1+\beta}{\xi^1}d\xi^{4^2} - \frac{\xi^1}{\xi^1+\beta}d\xi^{1^2} - \xi^{1^2}d\xi^{2^2} - \xi^{1^2}\sin^2\xi^2 d\xi^{3^2}$$

$$d\tau_{IV}^2 = -\frac{\xi^1+\beta}{\xi^1}d\xi^{4^2} + \frac{\xi^1}{\xi^1+\beta}d\xi^{1^2} + \xi^{1^2}d\xi^{2^2} + \xi^{1^2}\sin^2\xi^2 d\xi^{3^2}$$

They can be merged into:

$$d\tau^2 = \pm[\frac{\xi^1+\beta}{\xi^1}d\xi^{4^2} \mp \frac{\xi^1}{\xi^1+\beta}d\xi^{1^2} \mp \xi^{1^2}d\xi^{2^2} \mp \xi^{1^2}\sin^2\xi^2 d\xi^{3^2}]$$

Now let us to corroborate it by way of substitution:

(1) Covariance metric g_{ij} and contravariance metric g^{ij}:

$$g_{ij} = \begin{pmatrix} \pm\left(\mp\frac{\xi^1}{\xi^1+\beta}\right) & & & 0 \\ & \pm\left(\mp\xi^{1^2}\right) & & \\ & & \pm\left(\mp\xi^{1^2}\sin^2\xi^2\right) & \\ 0 & & & \pm\left(\begin{smallmatrix}+\\+\end{smallmatrix}\frac{\xi^1+\beta}{\xi^1}\right) \end{pmatrix}$$

$$g^{ij} = \begin{pmatrix} \pm\left(\mp\frac{\xi^1+\beta}{\xi^1}\right) & & & 0 \\ & \pm\left(\mp\xi^{1^{-2}}\right) & & \\ & & \pm\left(\mp\xi^{1^{-2}}\sin^{-2}\xi^2\right) & \\ 0 & & & \pm\left(\begin{smallmatrix}+\\+\end{smallmatrix}\frac{\xi^1}{\xi^1+\beta}\right) \end{pmatrix}$$

(2) Covariance metric partial derivatives $g_{ij,k} \equiv \frac{\partial g_{ij}}{\partial \xi^k}$, of which non-zero independent components are following five:

$$g_{11,1} = \pm[\mp\frac{\beta}{(\xi^1+\beta)^2}]; \quad g_{22,1} = \pm(\mp 2\xi^1); \quad g_{33,1} = \pm(\mp 2\xi^1\sin^2\xi^2)$$

$$g_{33,2} = \pm(\mp 2\xi^{1^2}\sin\xi^2\cos\xi^2); \quad g_{44,1} = \pm(\begin{smallmatrix}-\\-\end{smallmatrix}\frac{\beta}{\xi^{1^2}})$$

(3) Affine connection components $\begin{Bmatrix} i \\ jk \end{Bmatrix} \equiv \frac{1}{2}g^{im}(g_{mj,k} + g_{mk,j} - g_{jk,m})$, of which non-zero independent components are following nine:

$$\begin{Bmatrix} 1 \\ 11 \end{Bmatrix} = \frac{\beta}{2\xi^1(\xi^1+\beta)}; \quad \begin{Bmatrix} 1 \\ 22 \end{Bmatrix} = -(\xi^1+\beta); \quad \begin{Bmatrix} 1 \\ 33 \end{Bmatrix} = -(\xi^1+\beta)\sin^2\xi^2;$$

$$\begin{Bmatrix} 1 \\ 44 \end{Bmatrix} = \begin{smallmatrix}+\\+\end{smallmatrix}[\mp\frac{\beta(\xi^1+\beta)}{2\xi^{1^3}}]; \quad \begin{Bmatrix} 2 \\ 12 \end{Bmatrix} = \frac{1}{\xi^1}; \quad \begin{Bmatrix} 2 \\ 33 \end{Bmatrix} = -\sin\xi^2\cos\xi^2$$

$$\begin{Bmatrix} 3 \\ 13 \end{Bmatrix} = \frac{1}{\xi^1}; \quad \begin{Bmatrix} 3 \\ 23 \end{Bmatrix} = ctg\xi^2; \quad \begin{Bmatrix} 4 \\ 14 \end{Bmatrix} = -\frac{\beta}{2\xi^1(\xi^1+\beta)}.$$

(4) Curvature tensor $R_{ijk}{}^{m} \equiv \left\{ \begin{matrix} m \\ ki \end{matrix} \right\}_{,j} - \left\{ \begin{matrix} m \\ kj \end{matrix} \right\}_{,i} - \left\{ \begin{matrix} m \\ li \end{matrix} \right\} \left\{ \begin{matrix} l \\ kj \end{matrix} \right\} + \left\{ \begin{matrix} m \\ lj \end{matrix} \right\} \left\{ \begin{matrix} l \\ ki \end{matrix} \right\}$, of which non-zero independent components are following six:

$$R_{121.}{}^{2} = \frac{\beta}{2\xi^{1}{}^{2}(\xi^{1}+\beta)}; \quad R_{131.}{}^{3} = \frac{\beta}{2\xi^{1}{}^{2}(\xi^{1}+\beta)}; \quad R_{141.}{}^{4} = -\frac{\beta}{\xi^{1}{}^{2}(\xi^{1}+\beta)};$$

$$R_{232.}{}^{3} = -\frac{\beta}{\xi^{1}}; \quad R_{242.}{}^{4} = \frac{\beta}{2\xi^{1}}; \quad R_{343.}{}^{4} = \frac{\beta}{2\xi^{1}}\sin^{2}\xi^{2}。$$

(5) Substituting following each formula with above results:

$$R_{ij} = R_{mij.}{}^{m} = 0; \quad R \equiv g^{ij}R_{ij} = 0; \quad R^{ij} \equiv g^{im}g^{jn}R_{mn} = 0;$$

$G^{ij} \equiv R^{ij} - \frac{1}{2}g^{ij}R = 0$; In the point source field, the stress-energy tensor is all zero everywhere except the field source point. So get $G^{ij} + \alpha P^{ij} = 0$.

Please note that all the else three solutions can also be result from the solution-1 by linear mapping. But these linear transformations are all wrongful in physics: They should transfer real time-space into imaginary time-space and accompanying with the singularity physical mappings, and so they are all unconformable to modern physics. Therefore, by meaning of physics, the solutions are four but not the same one.

5.2. Determining RGPS of $G^{ij} + \alpha P^{ij} = 0$ for M-field

Which solution is RGPS of $G^{ij} + \alpha P^{ij} = 0$ for M-field among the four close solutions? The necessary and sufficient criterion is that having to closely agree with CMM.

According to E1, the ξ^{i} in the four close solutions are all the spherical coordinates of AFF. And so the time-space distance invariant in the complex 8-D time-space of AFF is *[2-4]*:

$$d\tau^{2} = dT^{2} - dr^{2} - r^{2}d\theta^{2} - r^{2}\sin^{2}\theta d\varphi^{2} + d(iT^{*})^{2} - d(ir^{*})^{2} - r^{*2}d(i\theta^{*})^{2} - r^{*2}\sin^{2}\theta^{*}d(i\varphi^{*})^{2}$$

$$= d(CT)^{2} - dr^{2} - r^{2}d\theta^{2} - r^{2}\sin^{2}\theta d\varphi^{2} - d(CT^{*})^{2} + dr^{*2} + r^{*2}d\theta^{*2} + r^{*2}\sin^{2}\theta^{*}\varphi^{*2} \quad \ldots (1)$$

In the formula (1), the coordinates bearing "*"are the coordinates of the 4-D imaginary-components of AFF, and r*=r.

Therefore, the four close solutions are respectively the section-solution of the real-time & real-space (section-1), the real-time & imaginary-space (section-2), the imaginary-time & real-space (section-3) and the imaginary-time & imaginary-space (section-4).

Now let us to inspect the four solutions for RGPS.

(Ⅰ) The solution-1 $d\tau_{\mathrm{I}}^{2} = \frac{r+\beta}{r}d(CT)^{2} - \frac{r}{r+\beta}dr^{2} - r^{2}d\theta^{2} - r^{2}\sin^{2}\theta d\varphi^{2}$ is in the section-1, determined by which the real time-space distance invariant is itself. While $d\tau = d\theta = d\varphi = 0$, then $dr/dT = \pm c(1+\beta/r)$, which means the radial light speed is $c(1+\beta/r)$. According to M1, the light speed in M-field must be $c\sqrt{1+2GM/c^{2}r}$. But giving whatever valuation to the β, $c(1+\beta/r)$ is absolutely impossible to be identical with $c\sqrt{1+2GM/c^{2}r}$. So the solution-1 is certainly not RGPS.

The SS is the result of the solution-1 under taking $\beta = -2GM/c^{2}$.

(Ⅱ) The solution-3 $d\tau_{\text{III}}^2 = -\frac{r+\beta}{r}d(CT^*)^2 - \frac{r}{r+\beta}dr^2 - r^2d\theta^2 - r^2\sin^2\theta d\varphi^2$ is in section-3, determined by which the real time-space distance invariant is $d\tau^2 = d(CT)^2 - \frac{r}{r+\beta}dr^2 - r^2d\theta^2 - r^2\sin^2\theta d\varphi^2$. As $d\tau = dr = d\varphi = 0$, then $rd\theta/dT = c$, which is also not the $c\sqrt{1+2GM/c^2r}$. So the solution-3 also contradicts M1.

(Ⅲ) Solution-4 $d\tau_{\text{IV}}^2 = -\frac{r^*+\beta}{r^*}d(CT^*)^2 + \frac{r^*}{r^*+\beta}dr^{*2} + r^{*2}d\theta^{*2} + r^{*2}\sin^2\theta^* d\varphi^{*2}$ is in the section-4, of which the real time-space is flat. It is natively excluded.

(Ⅳ) Finally, the solution-2 $d\tau_{\text{II}}^2 = \frac{r^*+\beta}{r^*}d(CT)^2 + \frac{r^*}{r^*+\beta}dr^{*2} + r^{*2}d\theta^{*2} + r^{*2}\sin^2\theta^* d\varphi^{*2}$ is in the section-2, determined by which the real time-space distance invariant is $d\tau^2 = \frac{r+\beta}{\beta}d(cT)^2 - dr^2 - r^2d\theta^2 - r^2\sin^2\theta d\varphi^2$. No matter what $d\tau = dr = d\varphi = 0$, $d\tau = d\theta = d\varphi = 0$ or $d\tau = dr = d\theta = 0$, the light speed all is $c\sqrt{1+\beta/r}$. And so if fetch $\beta = 2GM/c^2$ to get $d\tau^2 = c^2(1+2GM/c^2r)dT^2 - dr^2 - r^2d\theta^2 - r^2\sin^2\theta d\varphi^2$, $dr/dT \equiv rd\theta/dT \equiv r\sin\theta d\varphi/dT = c\sqrt{1+2GM/c^2r}$ will be reached; which means that the solution-2 agreeing perfectly with M1 is unique RGPS.

According to E2, the solution-2 can be certainly transformed into the *point flat-metric* $d\tau^2 = c^2dT'^2 - dr'^2 - r'^2d\theta'^2 - r'^2\sin^2\theta' d\varphi'^2$ and so get the *extrinsic-matching eigen coordinate differential*: $dT' = dT\sqrt{1+2GM/c^2r}$, $dr' = dr$, $d\theta' = d\theta$, $d\varphi' = d\varphi$. This result means:

(Ⅰ) the clock-velocity in the deep gravitational potential well is faster (instead of slower as previously regarded) than the clock-velocity of AFF, their ratio is $\sqrt{1+2GM/c^2r}$;

(Ⅱ) but the 3-D real-space of M-filed isn't curve, of which the rule-length is identical to the rule-length of AFF.

6. Appropriate wind-up

6.1. Sum-up

The validity of assumption equation $G^{ij} + \alpha P^{ij} = 0$ has to be identified by matching its close solution with the results of fundamental practice on gravitational field. But there is no close general solution that can be gotten due to the exceeding complexity of $G^{ij} + \alpha P^{ij} = 0$. And so the deemed-unique close solution, SS-solution, as a typical representative is provided with the function of universal and profound arbitration.

Agreeing perfectly with CMM is the essential criterion for judging that whether or not a close solution of $G^{ij} + \alpha P^{ij} = 0$ is RGPS for M-field, which is originated by the identity of the GR-basic-hypotheses with the results of fundamental experiments on M-field.

Faced with SS-field contradicting to CMM, Einstein was in an impasse determined by both the confusion of scientific epistemology and the incompleteness of time-space view & Riemannian geometry!

All he could do was only to choose either denying CMM or negating $G^{ij} + \alpha P^{ij} = 0$. Because $G^{ij} + \alpha P^{ij} = 0$ was the peak of scientific perfection of Einstein's great lifework and the kernel of GR, negating which actually was giving-up GR, and so Einstein selected the former. Thusly the old complaints still existed but the right criteria was further worst denied, which certainly resulted in that GR became beyond understood.

Not only CMM and $G^{ij} + \alpha P^{ij} = 0$ being both right is shown, but also $G^{ij} + \alpha P^{ij} = 0$ being more profound and more generalized greatly than the expectation of Einstein is revealed, which caused alone by that the scientific epistemology has been corrected and both the time-space view and Riemannian geometry have been completed in this paper.

What is the three else close solution meaning? To solve this problem must base on the nature homoousia.

6.2. Achieved Success in Different Ways – the original intention & fiasco

Einstein persists in his view of the pure relative effect, which result in that the TP-twin paradox (i.e. AY - Astronautic Youth-ate) becomes inextricability in SR. Therefore, he has no choice but to judge that TP can not be solved in SR but only can be solved by the turnaround non-inertial effect, and conjectures that such an effect must equivalent to the gravitational acceleration effect. Just to make an attempt at finding a way out of this issue, which no solution in SR, is the original intention of founding GR.

Regretfully, the result of doing Einstein's best ten years to achieve perfection is fiasco! There is no any 'gravitational acceleration effect' in SS-solution $d\tau^2 = c^2\left(1-2GM/c^2r\right)dT^2 - dr^2/\left(1-2GM/c^2r\right) - r^2d\theta^2 - r^2\sin^2\theta d\varphi^2$! The $\left(g_{11}\right)^{-1/2} = g_{44}{}^{1/2} = \sqrt{1-2GM/c^2r}$ of SS-solution is the Lorentz factor $\beta = \sqrt{1-v^2/c^2}$ as $v = \sqrt{2GM/r}$, and so which is some 'velocity effect' rather than any 'acceleration effect'!! Such a fact shows:

(1)There is absolutely no any 'non-inertial effect' existing in the field describing by EGFE $G^{ij} + \alpha P^{ij} = 0$ in 4-D real time-space! And so the adjudgment by Einstein: 'TP has been solved by the turnaround non-inertial effect, equivalent to the gravitational acceleration effect, in GR', which is either a thorough deceit or a lowest-class mistake(how retardate a man who is actually incapable of that to understand the essential difference between velocity & acceleration throughout his life)!

(2)In SS-field, time-space metric of every point all owns its Lorentz factor $\beta = \sqrt{1-v^2/c^2} = \left(g_{11}\right)^{-1/2} = g_{44}{}^{1/2} = \sqrt{1-2GM/c^2r}$, the Lorentz factor of real 4-D time-space movement of velocity ($v = \pm\vec{R}\sqrt{2GM/r^3}$), but its every point all don't move in real cspace. What is the meaning? According to the consider-discuss of the nature homoousia, the signification only can be what in the 'movement effect' of the time-space metric, the energy-potential φ must equivalent to movement velocity $v = \sqrt{2\varphi}$, and the energy-potential φ of SS-field is $\varphi = v^2/2 = (\pm\vec{R}\sqrt{2\mathrm{GM/r}^3})^2/2 = GM/r > 0$, which all are positive value for every point! Comparing it with that the well-potential $\varphi = -GM/r < 0$ of gravitational M-field is the negative value, the positive value potential $\varphi = v^2/2 = (\pm\vec{R}\sqrt{2\mathrm{GM/r}^3})^2/2 = GM/r > 0$ of SS-field is undoubtedly the barrier-potential of the repulsion field, and so SS-field is logically the repulsion field rather than the gravitational field! Such a repulsion SS-field must own its repulsion acceleration $\vec{a} = \vec{R}GM/r^3$ (Must emphasize that it isn't the $\partial^2 r/\partial T^2 = \vec{R}2GM(1-2GM/c^2r)/r^3$) instead of the gravitational acceleration $\vec{a} = -\vec{R}GM/r^3$. Exactly caused by this repulsion acceleration $\vec{a} = \vec{R}GM/r^3$, the velocity $dr/dT = -c\left(1-2GM/c^2r\right)$ of the radial-inward photons may become slower and slower, until to zero at the Schwarzschild singularity-sphere (i.e. $r_0 = 2GM/c^2$), just as imaged in GR. And then the velocity becomes $dr/dT = c\left(1-2GM/c^2r\right)$, opposite direction & faster and faster until to c at infinity, rather than become of imaginary-value inside the sphere imaged by GR! As a whole, every free body (i.e. solely the field-force act on them) must all be repulsed to infinity & those starting inside the Schwarzschild singularity-sphere must all ultimately be provided with the super speed of light! Such a repulsion Schwarzschild singularity-sphere is the arrant 'White hole' rather than any 'Black hole'!!

What I must emphasize is matter with in the Schwarzschild 'White hole (mistaken by GR for 'Black hole') or in the repulsion SS-field (mistaken by GR for gravitational field), which can all only exist in the demented brain of Stephen Hawking and his like, instead of absolutely in physical world!!

Justly mistaking the repulsion SS-field (the Schwarzschild 'White hole') for the gravitational M-field (the Schwarzschild 'Black hole') that sunk gravitational theory into the fantastic abyss almost a century! And to deracinate those bedlamites, who not only wallow in this fantastic abyss so deeply can't get themselves away but

also push the fantastic Misfortune from bad to worse such as Stephen Hawking, that will possibly elapse time over several century!

(3)Every point of M-field all are rest in real space and all owns negative value well-potential ($\varphi = -GM/r < 0$), and so in the 'movement effect' of the time-space metric M-field has to be equivalent to the moving field with the real-time & imaginary-space velocity $v = \sqrt{2\varphi} = \sqrt{-2GM/r} = i\sqrt{2GM/r}$. Therefore, real time-space distance invariant of M-field is $d\tau^2 = c^2\left(1+2GM/c^2r\right)dT^2 - dr^2 - r^2d\theta^2 - r^2\sin^2\theta d\varphi^2$. Which shows that in M-field the real light speed is $v = c\sqrt{1+2GM/c^2r} > c$ rather than c; the clock-velocity is all faster (rather than slower as previously regarded) than the clock-velocity of AFF, their ratio is $\sqrt{1+2GM/c^2r}$; the 3-D real-space isn't curve, the rule-length is all identical to the rule-length of AFF.

Such a result is perfectly identical with above '5.2.'!

How worthy of the name an 'Achieved Success in Different Ways' it is!

6.3. A nature homoousia

Synthesizing *<Special Theory of Relativity is Right Only in External-form but Intrinsic-origin Deleted Innately a Basically Imperfect Theory>, <Unique Existence of Absolute Lorentz-Filtzgerald Contraction Induces Standing Alone in No-Paradox a Special Theory of Relativity>, <Dialectical View of Nature in Physical Time-Space -- Standing Alone in No-Paradox a Special Theory of Relativity>, <Quantum Epistemology & Its Four Foundational Laws>* and this paper, we reach an important nature homoousia:

It must objectively exist in the universe that the Unique Absolute Reference System, of which the time-space is isotropic and steady-homogeneous, *relative to which all the Lorentz effect of whole universe are* Intrinsic Real Physical Change Effect, for which the simultaneity is the absolute unified sole of whole universe, by which AY & SR (only displacing the nominal value field of initial moments) is originated; and moreover *relative to which:* gravitational field is the movement field in real-time & imaginary-space; quantum state is the quantization movement state in imaginary-time & real-space; rest mass is the quantization movement energy in imaginary-time & imaginary-space!

7. Significant verification

Recently *Nature* announces: neutrino travelled faster than light. Out of which arise astonishment and disbelieve drastically.

We believe that the data of the experiment is reasonable, and so is trusty. But the conclusion is the result of mistake. Because:

(1)The neutrino speed is: 'c+6km/s'.

(2)By SS-solution, the light speed is $c(1-2GM/c^2r)$, and so at the surface of the earth is 'c-42km/s'.

(3)By this paper, the light speed is $c\sqrt{1+2GM/c^2r}$, and so at the surface of the earth is 'c+21km/s'.

There for, the neutrino speed 'c+6km/s' is faster than the 'c', and so really it is the 'super c speed'. But at the same gravitation potential well, the real light speed 'c+21km/s' is also faster than the neutrino speed 'c+6km/s' ,and so the neutrino speed isn't the 'super velocity of light'.

This result of this experiment testified authoritatively that:

(1) General theory of relativity is the result of three disfigurements!

(2)Our theory of time-space & gravitation is tally with the facts.

(3) Neutrinos have rest mass, and so its velocity must slower than light speed.

References

[1] P.G. Bergmann. *Introduction to the theory of relativity* , (1958).

[2] X. Xie, "Opposite-unity View of Time-Space", *Journal of Harbin Institute of Technology* , Vol.32 (2000), No.2, pp.81-89.

[3] Y.H. Lin, "Quantum Picture and Quantum Philosophy", *Journal of Harbin Institute of Technology,* Vol.31 (1999) No.2, pp.23-26.

[4] Y.H. Lin, "Complex 8-D Time-Space", *Journal of Zhejiang University,* Vol.32 (1998) No.10, pp.22-25.

4/25/2012