DEVELOPMENT OF GERLOVIN'S THEORY (2)

A NEW GLANCE AT THE NATURE OF THE Λ – TERM (DARK ENERGY) IN THE TRI-UNITY EQUATION.

According to the FFT, the basic law of Einstein's GTR ([1], c.77, (5.52)) is in fact only one case of application of FFT's fundamental Tri-Unity Law, uniting the space – time – matter ([1], c.78, (5.53)), which is binding to all the types of physical fields.
In the equation of the Tri-Unity Law, there is a Λ – term ([1], c.79, (5.57)), which characterizes the distribution of mass and charges in all the space [1,c.86].
At the present stage, this Λ – term has a fully different meaning: it is considered that it represents the negative pressure of the physical vacuum (in the GTR, the vacuum also gravitates), which leads to the acceleration of the Universe's expansion.
In fact, at the link between the FFT's subspaces, the Λ – term shall dominate over all the other tensors. This interpretation of the Λ – term should then be construed as a "Quadri-Unity Law" uniting space – time – matter – dark energy: this is absurd in the framework of the TFF.
What could be the exit door to this problem? May we find a compromise?
The present article goes into this direction.

DEFINITION OF THE PROBLEM

What did I.L. Gerlovin bring in our modern understanding of the world? It is his fundamental field, having a potential equal to $-c^2$.
Based on this, the author, in his article [2], came to the following conclusion : «*... all the elementary particles which find themselves in the* ***homogeneous gravitational field of the Universe****, whose* ***potential*** *is* $\varphi_{univ} = -c^2$ *, have a rest energy of* $E_o = mc^2$*, ... : in other words, the zero-sum total energy equilibrium law in Universe is respected both locally and globally ».*
And these conditions are necessary and sufficient, in order to consider our Universe as being a dark hole.

Are these findings of the TFF taking into account in cosmology? For sure, NOT.
Does cosmology consider the influence of the "gravitational background" of the Universe ($\varphi_{univ} = -c^2$) on the propagation of light? Again, NO.
Of course, for physicists, the potential is not so important: what is important is the difference of potential. But we live in a dynamic Universe, where all the space is subject to the redshift. For instance, regarding the cosmic background radiation, the Z-redshift reaches approx. 1000!

Hence the question: does the gravitational background of the Universe lead to certain predictions? Yes, it does!

In cosmology, there is an observed, but so far unexplained fact: we speak about the **dark energy**, and to be more precise, about the non-linear characteristic of Hubble's Law.

Let's take the two following postulates of the GTR:

1. The gravitational mass is equivalent to the inertial.
2. The accelerated movement is equivalent to the gravitational field.

Then, according to these postulates, the laws of gravitation and inertia should be identical; Л-invariant inertial forces should be identical to the forces of gravitation.

From this position we will demonstrate that the non-linear nature of Hubble's law corresponds to the dynamics of the Universe's evolution, through the prism of equivalence gravitation – inertia.

For this, let's consider the question how is the energy equilibrium observed in the expanding Universe throughout all times (the full array of time). To put it more clearly: **does the gravitation, as well as all types of radiation, obey the cosmic redshift of the expanding Universe?**

With respect to this particular question, we will refer to the article of P.H. Frampton (US, Japan) [3], where the Universe, as in our version, is considered to be a black hole, but we will interpret it differently.

HOW IS THE ENERGY EQUILIBRIUM (BALANCE) OBSERVED IN THE EXPANDING UNIVERSE?

This issue can be comfortably analyzed at the stage of the dominating radiation, the time when the matter can be neglected.

As well known, radiation is subject to the redshift over time, according to Hubble's law, i.e. the energy of electromagnetic quanta arriving to the observer from the limits of Hubble's sphere strives to zero.

Energy in GTR gravitates. Hence gravitation from gravitation sources (in our case, radiation) should also be subject to a certain redshift. The more energy of incoming radiation decreases, the more their contribution in forming gravitation decreases.

Here, the way GTR' postulate (equivalence gravitation – inertia) works is clearly shown: it is exactly in this way that energy equilibrium (balance) is observed.
If we don't see any radiation nor matter beyond Hubble's sphere, meaning that we also don't see gravitation either, we can interpret it as the tendency of incoming radiation's energy to strive to zero, as well as the gravitation potential along the time array ($E_{rad} \rightarrow 0$, $\varphi_{univ} \rightarrow 0$).
The influence of Hubble's law on gravitation and radiation is synchrone and identical.
Thus, the radiation propagating in the Universe's field, whose potential φ_{univ} begins at $-c^2$ and further strives to zero for the contemporary observer, is subject not only to the redshift, but also (according to the GTR) to the **gravitation shift**, which is prorate

$$Z_{grav} = \varphi_{univ} / c^2,$$

Which corresponds, in Friedman's equation of energy, to :

$$\Phi_{univ} = 8/3\pi G\rho_{univ}(t)R^2(t)$$

hence

$$\mathbf{Z_{grav} = 8\pi G\rho_{univ}(t)R^2(t) / 3c^2} \qquad \mathbf{(1)}$$

THE ILLUSION OF DARK ENERGY

In the equation (1), we find the constant $8\pi G\rho_{univ} / 3c^2$, which is exactly equal to the cosmological constant of Einstein

$$\Lambda = 8\pi G\rho_{univ} / 3c^2$$

Because the constant of « gravitational shift » has the same form than the cosmological constant of Einstein, we can draw the conclusion that the physical meaning of these two constants is the same, and is directly linked to the gravitational shift of radiation spectrum in the expanding Universe.

We can thus write the equation (1) in the following way:

$$\mathbf{Z_{univ} = \Lambda R^2(t)} \qquad (2)$$

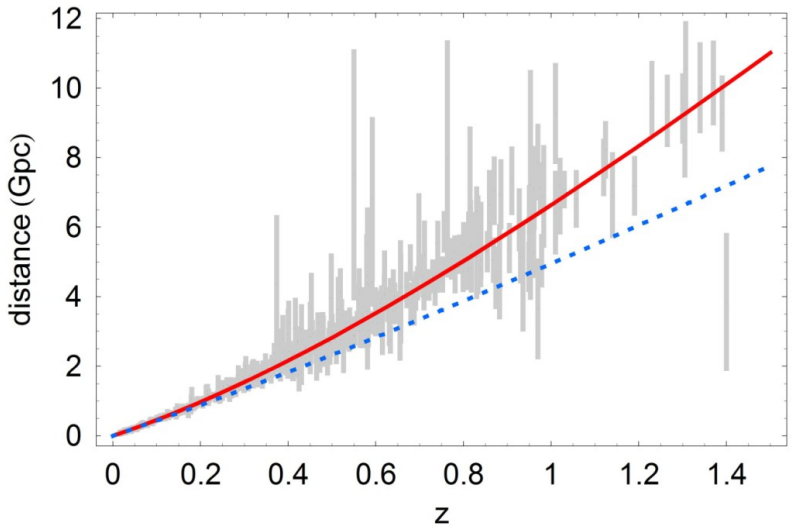

Fig. 1. Diagram of Hubble

On Fig.1 – the diagram of Hubble, on which basis the dark energy has been discovered. The red line shows the dependence of distance against redshift of galaxies' spectrum, based on the observation of Ia-type supernovas, which corresponds to the accelerated expansion of Universe for the observer (Z_{obs}).
The blue dotted line corresponds to the theoretical calculations for a linear expansion of the Universe (Z_{theor}), and the difference between the two line can be computed as:

$$Z_{obs} - Z_{theor} = Z_{grav} = \Lambda R^2(t)$$

and corresponds to the correction mentionned above, for the gravitational shift of spectrum.

Hence the equation (2) should be included in Hubble's law, and the diagram above becomes linear, which is in line with observations.

CONCLUSIONS

The gravitational shift, as a correction term in Hubble's law, it is in fact what has been understood as "dark energy".
Consequently, there is no such "negative pression". It is a pure optical effect and it has absolutely no relation to the dynamics of the Universe's evolution.

Hence the correction with the Λ – term in Einstein's GTR equation:

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

should be taken away, and this gives:

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

This term should be accounted for only in Hubble's law:

$$1 + Z_{Hubble}(R) - \Lambda R^2(t) = \nu(R) / \nu_o \quad , \text{ where:}$$

$\nu(R)$ – observed frequency ; ν_o – real frequency,

and **this automatically eliminates the issue of dark energy: it simply doesn't exist!**

AFTERWORD

Of this version is realistic from a physical point of view, then **the non-linear nature of Hubble's law is indeed the first observable proof of GTR's working capacity. Hence, a proof of the Tri-Unity law at the scale of the whole Universe…**

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3. Resolution of the problem of dark energy: http://www.timeorigin21.narod.ru/rus_translation/DE_Frampton.pdf