On the development of gravitational mechanics theory of loading and deformation of bodies moving at high speed

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Abstract. Gravity forces are the most important factor of various areas of mechanics, including structural mechanics. In the previous papers by the authors, the construction of gravitational mechanics is proposed on the basis of consideration of graviton flows, which are ejected from the masses with a certain periodicity and are the main carrier of gravitation. The present paper is devoted to gravitational mechanics of loading and deformation of bodies moving at high speed. The results obtained by authors are important for the construction of gravitational mechanics.

1. Introduction
Gravitational forces are the most important factor of various mechanics areas, including structural mechanics. These forces are determined on the basis of the Newton's law of universal gravitation, which remains one of the basic laws of modern mechanics, although the physical nature of the transmission of gravitation over long distances remains controversial. In the works [1-3], the construction of gravitational mechanics is proposed on the basis of consideration of graviton flows, which are ejected from the masses with a certain periodicity and are the main carrier of gravitation.

Let us consider the development of gravitational mechanics of bodies moving at high speeds, when the gravitational forces and, accordingly, the laws of loading of deformation of bodies change significantly. According to [1], two directions of constructions are possible, which lead to the same results. Consider basically the first of them.

2. Initial conditions for the formation of graviton flows without taking into account the influence of the velocity of bodies
Let us consider a spherical body with the center of gravity in the center of the sphere (r_1 is the radius of the i-th sphere, m_1 is the mass of the sphere). Let m_1^* be the mass of the sphere (effective mass), which implements the release of a single stream of gravitons from the mass m_1. Masses m_1 and m_1^* corresponds to the unit masses Δm_1 and Δm_1^* referred to the unit surface of the body:

$$\Delta m_1 = m_1 /(4\pi r_1^2) ; \quad \Delta m_1^* = m_1^* / (4\pi r_1^2) , \tag{1}$$

where in accordance with [1] we have $\Delta m_1^* << \Delta m$.

We believe that the mass is surrounded by gravitons that enter it and are ejected from it by alternating comprehensive jet streams at a speed V. These flows cause all-round compression of the mass and gravitation of other masses beyond it. The compression force f_1 of the surface of the unit mass from the release of gravitons can be determined from the well-known from the theory of jet engines equation, presenting it as:

$$f_1 = (\Delta m_1^* / \Delta t_1)V = (\Delta \eta_1 m_{01} V)/\Delta t_1 = \overline{\eta}_1 m_{01} V\,; \quad \overline{\eta}_1 = \Delta \eta_1 / \Delta t_1, \tag{2}$$

where $\Delta \eta_1$ is the number of gravitons emitted during the time Δt_1 from the unit surface of the sphere; m_{01} is the inclusion of mass for the emission of a single graviton; $\overline{\eta}_1$ is the number of gravitons emitted from the surface of the sphere per unit time (conditionally unit flow of gravitons).

Let us consider the relationship of expression (2) with the known manifestation of gravity in the form of acceleration α, with which bodies are attracted to the center of the considering sphere. According to, for example, [4, 5, 6], the gravitational acceleration on the surface of the sphere is

$$\alpha = (\gamma m_1)/r_1^2\,; \quad a = (\gamma^* m_1)/(4\pi r_1^2)\,; \quad \gamma^* = 4\pi\gamma, \tag{3}$$

where γ is gravitational constant.

Acceleration (3) causes gravitational compression of the unit mass by a force f_1. Taking into account (1) and (3), we get

$$f_1 = \Delta m_1 \alpha = \gamma m_1^2 /(4\pi r_1^4). \tag{4}$$

Equating (2) and (4), we can find

$$f_1 = \gamma m_1^2 /(4\pi r_1^4) = (\Delta m_1 / \Delta t_1)V = (\Delta \eta_1 m_{01} V)/\Delta t_1 = \overline{\eta}_1 m_{01} V. \tag{5}$$

Therefore, the flow of gravitons will be equal to

$$\overline{\eta}_1 = \gamma m_1^2 /(4\pi r_1^4 m_{01} V). \tag{6}$$

Let at a distance R from the body m_1 there is a body m_2 with a radius r_2, where R is the distance between the centers of gravity m_1 and m_2. Thus, for this case we should formally replace index "1" by the index "2" in formulas (1)-(6). Thus, the flow of gravitons $\overline{\eta}_2$ for the body m_2, by analogy with the second equation from (2) and (6) will be equal to

$$\overline{\eta}_2 = \Delta \eta_2 / \Delta t_2 = \gamma m_2^2 /(4\pi r_2^4 m_{02} V). \tag{7}$$

In [1] it is established that the action of flows $\overline{\eta}_1$ on the body m_2 and, conversely, the action of flows $\overline{\eta}_2$ on the body m_1, taking into account the effect of their dispersion as they move away from the centers of mass, leads to the force of their mutual gravitation

$$F = \pm(\gamma m_1 m_2)/R^2. \tag{8}$$

Signs of "+" pass to the law of gravitation of I. Newton, which confirms the possibility of transmission of gravity flows of gravitons. A more detailed derivation of (8) is given in [2], here we only have the formula from which follows the formula (7) from [2]. Thus we have

$$\overline{\eta}_{12} r_2 / V = \overline{\eta}_{12}^* r_2 \cos\varphi / V.$$

It is possible that the gravitons have mass, then all the dependencies (1) – (8) and others remain in force, changes only the interpretation of specific variables. So m_1^* becomes a mass ejected from the mass m_1 of graviton flows over time Δt_1, Δm^* becomes the mass ejected graviton flow over time Δt_1 from the unit surface of the sphere, $m_{01} = m_{02} = m_0$, where m_0 is the mass of graviton.

The gravitons emitted from the mass form a field around the mass of the gravitons attracted by the emissions of the gravitons wandering in space, which moves along with the mass, forming a gravitonic field around the mass.

3. The influence of the speed of movement of the body on the above dependence

Let the body m_1 move relative to its initial state at speed υ_1. The first formula from (2) changes. Let us denote for this case all the values included in the formulas (1)-(2) by the upper wave (~). Respectively f_1 is replaced by $\tilde{f}_1$, r_1 is replaced by $\tilde{r}_1$, Δm_1^* is replaced by $\Delta\tilde{m}_1^*$, Δt_1 is replaced by $\Delta\tilde{t}_1$, $\bar{\eta}_1$ is replaced by $\tilde{\eta}_1$, m_{01} is replaced by $\tilde{m}_{01}$. Thus, dependencies (1)-(3) will be presented as

$$\Delta\tilde{m}_1^* = \tilde{m}_1^* /(4\pi\tilde{r}_1^{\,2}); \quad \tilde{f}_1 = (\Delta\tilde{m}_1^* / \Delta\tilde{t}_1)V = (\Delta\tilde{\eta}_1\tilde{m}_{01}) / \Delta\tilde{t}_1 V = \tilde{\eta}_1\tilde{m}_{01}V; \quad \Delta\tilde{\eta}_1 / \Delta\tilde{t}_1 = \tilde{\eta}_1. \tag{9}$$

The radius of the body r_1 changes to values $\tilde{r}_1$ as a result of increasing the uniform compression force $\tilde{f}_1$. Let's take the regularity of the radius change in the form

$$\tilde{r}_1 = r_1\sqrt{1-\upsilon_1^2 /(n_1^2V^2)} = r_1\beta_1; \quad \beta_1 = \tilde{r}_1 / r_1 = \sqrt{1-\upsilon_1^2 /(n_1^2V^2)}, \tag{10}$$

where n_1 and β_1 are generalized parameters of bodies ' compliance to compression.

However, the parameter n_1 takes into account another factor, namely the influence of the braking forces of the moving body by the surrounding gravitational field and the influence of this factor on the release of gravitons and the compression force (the actual n_1 is the product of two different coefficients).

Let us consider two approaches to determining the values included in the dependence (9).

3.1. The first approach

We believe that the mass of the body m_1 and the mass m_1^* used to release the flow of gravitons from the body do not depend on the speed υ_1. In this case, taking into account (1) and the first formula from (9), we get

$$\Delta\tilde{m}_1 = (\Delta\tilde{m}_1^* r_1^2) / \tilde{r}_1^{\,2}. \tag{11}$$

Taking into account (11) the second equation from (9) is transformed to the form

$$\tilde{f}_1 = \Delta\tilde{m}_1^* V / \Delta\tilde{t}_1 = \Delta m_1^* r_1^2 /(\tilde{r}_1^{\,2}\Delta\tilde{t}_1)V = (\Delta\tilde{\eta}_1\tilde{m}_{01} / \Delta\tilde{t}_1)V = [\Delta\eta_1 m_{01} r_1^2 /(\tilde{r}_1^{\,2}\Delta\tilde{t}_1)]V = \tilde{\eta}_1\tilde{m}_{01}V; \tag{12}$$

$$\Delta\tilde{\eta}_1\tilde{m}_{01} = (\Delta\eta_1 m_{01}) r_1^2 / \tilde{r}_1^{\,2}. \tag{13}$$

Conditions (12) and (13) satisfy many variants of values $\Delta\tilde{\eta}_1$, $\tilde{m}_{01}$ and $\Delta\tilde{t}$ that indicates the possibility of formation of various gravitational fields. Let us consider, for example, three variants of them.

Variant 1.1. The time for the release of gravitons and the value $\tilde{m}_{01}$ do not change ($\Delta\tilde{t} = \Delta t$; $\tilde{m}_{01} = m_{01}$).Thus from conditions (12), (13) it follows that

$$\Delta\tilde{\eta}_1 m_{01} = (\Delta\eta_1 m_{01}) r_1^2 / \tilde{r}_1^{\,2}; \quad \Delta\tilde{\eta}_1 / \Delta t = \Delta\eta_1 r_1^2 / \Delta t\, \tilde{r}_1^{\,2}; \quad \tilde{\eta}_1 = \bar{\eta}_1 r_1^2 / \tilde{r}_1^{\,2} = \bar{\eta}_1 / \beta_1^2; \quad (14)$$

$$\tilde{\eta}_1 = \gamma m_1^2 r_1^2 / (4\pi r_1^4 m_{01} V\, \tilde{r}_1^{\,2}) = \gamma m_1^2 / (4\pi r_1^4 \beta_1^2 \tilde{m}_{01} V). \quad (15)$$

Comparing the dependence (15) with the dependence (6), it can be seen that the increase in flows $\tilde{\eta}_1$ is equivalent to an increase in body weight to values m_1 / β_1.

Variant 1.2. The time for the release of gravitons is extended, and the value m_{01} is reduced according to the formulas:

$$\Delta\tilde{t} = \Delta t r_1 / \tilde{r}_1 = \Delta t / \beta_1; \quad \Delta\tilde{\eta}_1 = \Delta\eta_1 r_1^3 / \tilde{r}_1^{\,3} = \Delta\eta_1 / \beta_1^3; \quad \tilde{m}_{01} = m_{01}\tilde{r}_1 / r_1 = m_{01}\beta_1. \quad (16)$$

Taking into account (6) and (16) we get

$$\bar{\eta}_1 = \gamma m_1^2 \tilde{r}_1 / (4\pi r_1^4 \tilde{m}_{01} r_1 V); \quad \tilde{\eta}_1 = \Delta\tilde{\eta}_1 / \Delta\tilde{t}_1 = \tilde{\eta}_1 r_1^2 / \tilde{r}_1^{\,2} = \tilde{\eta}_1 / \beta_1^2; \quad (17)$$

$$\tilde{\eta}_1 = \gamma m_1^2 \tilde{r} / (4\pi r_1^4 \tilde{m}_{01} r_1 V) \cdot (r_1^2 / \tilde{r}_1^{\,2}) = \gamma m_1^2 / (4\pi r_1^4 \tilde{m}_{01} \beta_1 V); \quad (18)$$

This case is excluded when considering gravitons with mass.

Variant 1.3. The time for the release of gravitons is shortened, and the value m_{01} does not change:

$$\Delta\tilde{t} = \Delta t\ (\tilde{r}_1 / r_1); \quad \Delta\tilde{\eta}_1 = \Delta\eta_1 (r_1^2 / \tilde{r}_1^{\,2}); \quad \tilde{m}_{01} = m_{01}; \quad (19)$$

$$\tilde{\eta}_1 = \bar{\eta}_1 (r_1^3 / \tilde{r}_1^{\,3}) = \gamma m_1^2 / (4\pi r_1^4 m_{01} V) \cdot (r_1^3 / \tilde{r}_1^{\,3}) = \gamma m_1^2 / (4\pi r_1^4 \beta_1^3 \tilde{m}_{01} V). \quad (20)$$

3.2. The second approach

The mass of the body m_1^* used for the release of the graviton flux also depends on the velocity of the body. Let us assume

$$\tilde{m}_1^* = m_1^* r_1 / \tilde{r}_1 = m_1^* / \beta_1. \quad (21)$$

In accordance with the second formula (1) and the second formula (9) we have

$$\Delta\tilde{m}_1^* = \tilde{m}_1^* / (4\pi\tilde{r}_1^{\,2}) = m_1^* r_1 / (4\pi\tilde{r}_1^{\,3}) = \Delta m_1^* r_1^3 / \tilde{r}_1^{\,3}; \quad (22)$$

$$\tilde{f}_1 = (\Delta\tilde{m}_1^* / \Delta\tilde{t}_1)V = (\Delta m_1^* r_1^3 / \tilde{r}_1^{\,3}) / \Delta\tilde{t}_1 \cdot V = \Delta\tilde{\eta}_1 \tilde{m}_{01} / \Delta\tilde{t}_1 \cdot V = \\ = (\Delta\eta_1 m_{01}) \cdot (r_1^3 / \tilde{r}_1^{\,3}) \cdot (V / \Delta\tilde{t}) = \tilde{\eta}_1 \tilde{m}_{01} V; \quad (23)$$

From the set of variants satisfying (20) we consider two of them.

Variant 2.1. The time for the release of gravitons is extended, and the value m_{01} does not change:

$$\Delta\tilde{t} = \Delta t \cdot (r_1 / \tilde{r}_1); \quad \tilde{m}_{01} = m_{01}; \quad \Delta\tilde{\eta}_1 / \Delta\tilde{t}_1 = \Delta\eta_1 r_1^2 / \tilde{r}_1^{\,2} / \Delta t_1; \quad \tilde{\eta}_1 = \eta_1 (r_1^2 / \tilde{r}_1^{\,2}). \quad (24)$$

Thus, we obtain the third formula (14) and formula (15) for $\tilde{\eta}_1$, which is equivalent to an increase in mass at m_1 / β_1 times.

Variant 2.2. The time for the release of gravitons and the value m_{01} do not change, while

$$\Delta\tilde{t} = \Delta t; \quad \tilde{m}_{01} = m_{01}; \quad \Delta\tilde{\eta}_1 / \Delta t_1 = \Delta\eta_1 r_1^3 / (\Delta t_1 \tilde{r}_1^{\,3}). \quad (25)$$

Thus, we obtain the formula (20) for $\tilde{\eta}_1$.

4. General notes

Following [7], we note that the first formula (10) for $\tilde{r}_1$, formulas (16), (22) for $\Delta\tilde{t}_1$ and the action of these flows, which are equal to the increase in m_1 / β_1 times of body mass, become similar to the dependences of Lorentz, and also to the corresponding formulas of special theory of relativity of Einstein at equality in the first formula (10) $n_1 V = c$, where c is the speed of light (a review of these paper is presented, for example, in [5, 6]).

However, here these dependences are presented from a completely different position (from the standpoint of the graviton model) and have a clear physical meaning. The case of equality $n_1 V = c$ is related to the braking of moving bodies by the gravitational fields of the Earth, which moves with the Earth, n_1 is a generalized parameter of braking and deformability. In the Earth's gravitational field we have $n_1 V = c$, in a weak gravitational field we, apparently, have $n_1 \to 1$, $n_1 V \to V$. At the same time, the moving flows of light particles are inhibited by the gravitational field of the Earth, which moves with the Earth, which is accompanied by the appearance of light wave flows and their oscillations.

The velocities of the type υ_1 in the presented dependences represent the velocities of the body and its gravitational field relative to the gravitational field surrounding it (usually weak around a large mass and strong inside the environment of a large mass).

The universality of dependence $n_1 V = c$ is possible only if $V = c$. However, such proofs are absent.

5. About gravitation of moving bodies

Let in the initial state together with the body m_1 , there was a body m_2 , and then they began to move relative to the initial state: the body m_1 with speed υ_1 , and the body m_2 with speed υ_2 .

In this case, for a body m_2 with a radius r_2 , all dependencies (9)-(23) are valid, where only the lower index "1" is replaced by the index "2". Thus, for example, dependences (14), (15) now are

$$\tilde{\eta}_2 = \bar{\eta}_2 (r_2^2 / \tilde{r}_2^2) = \bar{\eta}_2 / \beta_2^2; \quad \beta_2 = \tilde{r}_2 / r_2 = \sqrt{1 - \upsilon_2^2 / (n_2^2 V^2)}\,; \tag{26}$$

$$\tilde{\eta}_2 = \gamma m_2^2 / (4\pi r_2^4 m_{02} V) \cdot (r_2^2 / \tilde{r}_2^2) = \gamma m_2^2 / (4\pi r_2^4 \beta_1^2 \tilde{m}_{02} V)\,; \tag{27}$$

Let us consider the mutual gravitation of moving bodies at varying distances R between their centers of gravity.

This gravitation is due to the action of the flow $\tilde{\eta}_1$ on the body m_2 and the flow $\tilde{\eta}_2$ on the body m_1 . In this case, the flows change significantly. We denote the value of flow $\tilde{\eta}_1$ at the level of the center of gravity of the body m_2 in the form $\tilde{\eta}_{12}$, and the same value of flow $\tilde{\eta}_2$ at the level of the center of gravity of the body m_1 in the form $\tilde{\eta}_{21}$. Let R be the changing distance between the centers of gravity of bodies m_1 and m_2 . It is necessary to take into account the factor of dispersion of flows at a distance R according to [2] and their amplification near bodies m_1 and m_2 in accordance with formulas (14), (17), (24) or (20), (25) in accordance with recommendations [7]. Note only that in formula (2) of work [7] is replaced by .

So, according to (14), (16), (17), (19), (24) for a body m_1 within a local space, bounded by radiuses r_1 and $\tilde{r}_1$ the time of emission of gravitons can vary. Besides, gravitonic flows are amplified proportionally to the ratio $r_1^2 / \tilde{r}_1^2$. In a similar way for the body m_2 in space $r_2 - \tilde{r}_2$ this force is proportional to the ratio $r_2^2/\tilde{r}_2^2$. In accordance with (20), (25) this force is proportional to the relationships $r_1^3/\tilde{r}_1^3$ and $r_2^3/\tilde{r}_2^3$.

Flows $\tilde{\eta}_{12}$ and $\tilde{\eta}_{21}$ with allowance for dispersion and amplification in accordance with (14), (17), (24) are defined by formulas:

$$\tilde{\eta}_{12} = \tilde{\eta}_1(\tilde{r}_1^2/R^2)\cdot(r_2^2/\tilde{r}_2^2) = \bar{\eta}_1(r_1^2/\tilde{r}_1^2)\cdot(\tilde{r}_1^2/R^2)\cdot(r_2^2/\tilde{r}_2^2) = \bar{\eta}_1 r_1^2 r_2^2/(R^2\tilde{r}_2^2); \quad (28)$$

$$\tilde{\eta}_{21} = \bar{\eta}_2(r_2^2\tilde{r}_1^2)/(R^2\tilde{r}_1^2). \quad (29)$$

Flows $\tilde{\eta}_{12}$ and $\tilde{\eta}_{21}$ with allowance for dispersion and amplification in accordance with (20), (25) are defined by formulas:

$$\tilde{\eta}_{12} = \tilde{\eta}_1(\tilde{r}_1^2/R^2)\cdot(r_2^2/\tilde{r}_2^2) = \bar{\eta}_1(r_1^3/\tilde{r}_1^3)\cdot(\tilde{r}_1^2/R^2)\cdot(r_2^3/\tilde{r}_2^3) = \bar{\eta}_1 r_1^3 r_2^3/(\tilde{r}_1\tilde{r}_2^3 R^2); \quad (30)$$

$$\tilde{\eta}_{21} = \bar{\eta}_2(r_1^3\tilde{r}_2^3)/(\tilde{r}_2\tilde{r}_1^3 R^2). \quad (31)$$

Flows $\tilde{\eta}_{12}$ and $\tilde{\eta}_{21}$ cross unit surfaces, respectively, of the bodies m_1 and m_2. The General flows, which are denoted $\tilde{\eta}_{12}$ and $\tilde{\eta}_{21}$, crossing completely the surfaces of bodies m_1 and m_2 in accordance with [2] are defined by formulas

$$\tilde{\eta}_{S12} = \tilde{\eta}_{12}\cdot 4\pi\tilde{r}_2^2; \quad \tilde{\eta}_{S21} = \tilde{\eta}_{12}\cdot 4\pi\tilde{r}_1^2. \quad (32)$$

Let us first consider the case described by dependencies (28), (29). At the same time, considering (14), (15), (24), we get:

$$\tilde{\eta}_{S12} = \bar{\eta}_1(r_1^2 r_2^2/(R^2\tilde{r}_2^2))\cdot 4\pi\tilde{r}_2^2 = (4\pi r_1^2 r_2^2/R^2)\bar{\eta}_1 = \gamma m_1^2 r_2^2/(R^2 r_1^2 \tilde{m}_{01} V); \quad (33)$$

$$\tilde{\eta}_{S21} = \gamma m_2^2 r_1^2/(R^2 r_2^2 \tilde{m}_{02} V). \quad (34)$$

The force F_{12} with which the flows $\tilde{\eta}_{S12}$ acts on a body m_2, and the force F_{21} with which the flows $\tilde{\eta}_{S21}$ acts on a body m_1 are defined by formulas

$$F_{12} = \tilde{\eta}_{S12}\cdot\tilde{m}_{02}V = \gamma m_1^2 r_2^2 \tilde{m}_{02}/(R^2 r_1^2 \tilde{m}_{01}); \quad -F_{21} = \tilde{\eta}_{S21}\cdot\tilde{m}_{01}V = \gamma m_2^2 r_1^2 \tilde{m}_{01}/(R^2 r_2^2 \tilde{m}_{02}). \quad (35)$$

We believe that the third Newton's law for graviton flows in the form of “action equals counteraction” remains valid.

$$F_{12} = -F_{21} = F \quad \text{or} \quad F_{12}\cdot(-F_{21}) = F^2. \quad (36)$$

Substitution (35) in (36) leads to dependencies:

$$F^2 = \gamma^2 m_1^2 m_2^2/R^4. \quad (37)$$

We can get Newton's law (8) from (37). This indicates that the emission of gravitons by dependencies (17), (18), (24) when moving bodies leads to a local effect of weighting bodies and does not affect the action of bodies outside the local areas $(r_1 - \tilde{r}_1)$ and $(r_2 - \tilde{r}_2)$.

Let us consider the additional case described by dependencies (17), (18). In this case, the dependencies (33), (34) have the form

$$\tilde{\eta}_{S12} = (4\pi r_1^2 r_2^2/R^2)\cdot\bar{\eta}_1 = \gamma m_1^2 \tilde{r}_1 \; r_2^2/(R^2 r_1^3 \tilde{m}_{01} V); \quad (38)$$

$$\tilde{\eta}_{S21} = 4\pi r_2^2 r_1^2/R^2 = \gamma m_2^2 \tilde{r}_2 \; r_1^2/(R^2 r_2^3 \tilde{m}_{02} V). \quad (39)$$

After transformations of (35), (36) and considering (10), (26) we come to dependences

$$F^2 = \gamma^2 m_1^2 m_2^2 \beta_1 \beta_2 / R^4 \quad \text{and} \quad F = \pm \gamma m_1 m_2 \sqrt{\beta_1} \cdot \sqrt{\beta_2} / R^2 . \tag{40}$$

Thus, under the action of the factors described by the dependencies (17), (18) the force of gravitation between the bodies decreases.

Consider the second case, which is described by dependencies (20), (25). In this case, taking into account the additional dependencies (6), (7), we get

$$\tilde{\eta}_{S12} = \bar{\eta}_1 (r_1^3 r_2^3 /(\tilde{r}_1\ \tilde{r}_2^3 R^2)) \cdot 4\pi \tilde{r}_2^2 = 4\pi r_1^3 r_2^3 \bar{\eta}_1 /(\tilde{r}_1\ \tilde{r}_2\ R^2) = \gamma m_1^2 r_2^3 /(r_1\ \tilde{r}_1\ \tilde{r}_2\ R^2 \tilde{m}_{01} V) ; \tag{41}$$

$$\tilde{\eta}_{S12} = \tilde{\eta}_2 (r_1^3 r_2^3 /(\tilde{r}_2\ \tilde{r}_1\ R^2)) = \gamma m_2^2 r_1^3 /(r_2\ \tilde{r}_2 \tilde{r}_1 R^2 \tilde{m}_{02} V) . \tag{42}$$

By analogy with (35), the forces of mutual influence of flows on the gravitation of bodies are defined by formulas

$$F_{12} = \tilde{\eta}_{S12} \cdot \tilde{m}_{02} V = \gamma m_1^2 r_2^3 \tilde{m}_{02} /(r_1\ \tilde{r}_1 \tilde{r}_2 R^2 \tilde{m}_{01}) ; \tag{43}$$

$$- F_{21} = \tilde{\eta}_{S21} \cdot \tilde{m}_{01} V = \gamma m_2^2 r_1^3 \tilde{m}_{01} /(r_2\ \tilde{r}_2 \tilde{r}_1 R^2 \tilde{m}_{02}) . \tag{44}$$

Following the rule (36), we can find

$$\begin{aligned} F^2 &= \gamma^2 m_1^2 m_2^2 \tilde{m}_{02} \tilde{m}_{01} r_1^3 r_2^3 /(r_1 \tilde{r}_1 \tilde{r}_2 R^2 \tilde{m}_{01} r_2\ \tilde{r}_2\ \tilde{r}_1 R_2 \tilde{m}_{02}) = \\ &= \gamma m_1^2 m_2^2 r_1^2 r_2^2 /(\tilde{r}_1^2 \tilde{r}_2^2 R^4) = \gamma^2 m_1^2 m_2^2 /(\beta_1^2 \beta_2^2 R^4); \end{aligned} \tag{45}$$

$$F = \pm \gamma m_1 m_2 /(\beta_1 \beta_2 R^2) , \tag{46}$$

where the parameters β_1, β_2 are defined by formulas (10) and (26) and can lead to a significant correction of Newton's law of gravitation. The emission of gravitons in accordance with dependences (20), (25) ceases to be local and the gravitation of bodies increases.

Formulas (38), (39) were obtained in a slightly different way earlier in [7]. In the paper corresponding local type descriptions $\upsilon_1 /(n_1 V)^2$, $\upsilon_2 /(n_2 V)^2$ should be read $\upsilon_1^2 /(n_1 V)^2$, $\upsilon_2^2 /(n_2 V)^2$.

6. Conclusion

We assume that the masses surround the gravitons which enter the masses and are ejected from them at a certain periodicity at a speed V according to the proposed equation. This phenomenon is also associated with the formation of gravitational fields around the masses, which move along with the masses. The intensity of the emission of gravitonic flows depends on the velocity of the bodies and their fields relative to the surrounding gravitational fields. In this case, the effect of deceleration of the surrounding field, the movement of another body in it (another field) is manifested.

Increased emission of gravitonic flows leads to increased compression of the body, the change in its size due to deformation (in this case, the change in the radius from r_1 to $\tilde{r}_1$) and weighting of the body without changing its initial mass (and to the same extent when it changes). Two cases are considered. In the first case, the increase in the emission of gravitonic flows and the weighting of the body is local in nature, being realized in the $(r_1 - \tilde{r}_1)$ volume and without affecting the gravitation of bodies outside of the $(r_1 - \tilde{r}_1)$ volume. In the second case, in addition to the local weighting of the bodies there is more intense emission of gravitons from outside the area and the body begins to more heavily influence the gravitation of the surrounding bodies. We also consider the case when the emission of gravitons leads to a weakening of the force of gravitation of bodies. The correction of I. Newton's law of gravitation in all these cases is obtained. The equation that describes all these phenomena is established. It also follows from this equation that the time of gravitons ejection can change in moving bodies (the time of flows ejection can slow down or accelerate).

It is shown that for some values of the braking parameters, which are related to the Earth, the laws of weighting bodies, changing its size when moving, the increase in the time of emission of gravitonic flows (taken for slowing the passage of time) coincide with the values of the special theory of relativity, although they have a different physical meaning. Thus, the mechanics of formation of various gravitational fields and their interactions leading to strengthening or weakening of gravitation of bodies or not influencing this process is established.

The results obtained are important for the construction of gravitational mechanics theory.

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