Model of Inertia and Gravitating Mass. Mechanism of Gravitation.

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Annotation.
It is not understanding, why physicists haven't paid attention to the elementary solution of the question about the formation of inertia mass and elementary explanation of gravity force till now. As soon as velocity-addition formula has been received by Einstein, it has become clear that derivative of total velocity of one of velocities gives two summands. At that it was clear that there can be the situation, when additional speeds would be for some object with plus and with minus at once. In this case the result for two results of total velocity can be averaged and it would be possible to receive the summand of concrete figure instead of zero result which depends on the direction of varying velocity. This improvidence of scholars causes that last one hundred years scholars have been working meaninglessly but not for the development of science in this sphere.

Key words: mass, gravitation, gravitational interaction, inertia, inertial mass.

1. **Mechanism of Gravitation**

Till the field of gravity isn't uncovered experimentally: gravity waves are not uncovered as the carrier of interaction. We have only indirect proof - gravitation of electrically neutral objects. But it's clear that the proof of occurrence of some result isn't a proof of occurrence the source itself (from which we have a result). In this case we have a question: maybe there is no field of gravity and what can we offer instead of gravitational interaction? Because the interaction of electrically neutral objects really exists. What if we try to make the model of mass and the model of interaction of electrically neutral objects, without field of gravity?
What do we need for this:
1.1. We should use the force which is scientifically known – for example electric force.

1.2. We should receive the force of interaction forty orders less than the electric force directed to gravitation.
1.3. We should differentiate impulse in time to receive force. Impulse depends on the speed of movement. So, in the process of differentiation of impulse in time we come to the speed differentiation in time. If all the speeds are in one inertial system reference (ISR) all the addings to the speed occur in linear. And differential will be linear combination of speed derivative and adding. If the speeds for the reasons are in different (ISR) the addings to the speeds occur by addition formula of speeds. In this case, the process of differentiation will be more complicated function because we differentiate addition formula by speeds. We may receive the force, which we haven't observed earlier. For the realization of the given model at least two speeds in different frames should exist. And some addings to these speeds also should exist.
1.4. In order that the model works out it is necessary that there wouldn't occur forces, that are unknown in science, or forces that neutralize the received force in the offered interaction model.
1.5. We should be distracted from that we are in nonhomogeneity (but not in isotropic and homogeneous Universe) – Galaxy, planetary system and so on. That this nonhomogeneity is restrained by the constraint forces because a model of one of these forces is observed.

1.1. As far as we search the interaction changing the gravitation (in other words gravitation, correspondingly there is no potential for gravitation) there is also no gravitational changing of metrics when considering the local metric scales (changing of metrics from the nearest celestial bodies and other bodies). In other words the changing of metrics from the nearest bodies don't neutralize cosmological changing of metrics. As far as there is red shift we'll consider that there is cosmological divergence as an integral part of changing of cosmological metrics. We'll not discuss its origins and the causes of changing. For example, it is Friedmann-Robertson-Walker metric. Practically, the reasons of this "divergence" is not important yet, its only nessesary to know that this "divergence" really exists. As the type of addition formula of velocities isn't important – whether it is type of Einstein or there is some other type. Of course, we use Einstein type of formula because we have no alternative variant now.

In this case, well-known fact: when considering the local domains there is vanishingly small divergence **U** material points, connected with cosmological divergence. And so there are no local variation of metrics because of the proximate mass (because there is no gravitation) cosmological divergence is a single divergence because of the changing of metrics. Note, that – accelerated divergence.
That's why we'd better consider this divergence at quite long range not to separate out some concrete point. We consider that given material points are deleted from their original position (in the process of divergence) at a speed of **u**. I'd like to make arrangement about the using of several velocities for one material point at one moment, for the physicists not to ask questions about the strict formulating of determination. Separately these velocities are pointless, resultant is necessary, to find it out firstly we take the velocities separately. To use this electric force instead of gravitation force we should use two neutral objects consisting of charged particles. The participle of one object interact with the participle of the other object on the principle of superimposition, interaction set the speed to the participle (in fact they differ). We'll consider they to be equal in absolute magnitude as far as this very result is interesting (and it doesn't change the similarity of verbal proves). After that the interties of these objects compensate these interactions, all this is difficult and takes a lot of time. Without breaking the line of reasoning I'll consider one object as a material point **A** with electric charge. The other object will be a material point **D**, consisting of two material points B and C with different charges which affect **A**. In fact **A** and **D** are electrically neutral to each other. Arising in the process of interaction speeds and forces will belong only to **A,** because only resulting force affecting **A**, is interesting. Of course, these forces and speeds are for different participles. We'll not break the generality, because in total we are interested in one material point and after all common compensations it's resulting speed and force affect it. Consideration of material point comes to the consideration of macro-systems and release from the consideration of quantum mechanical effect.
1.2. I'll recollect that we consider the divergence of material points, not connected with inertial motion but with the changing of the metrics. At that we consider two divergence material points in some distance. Each material point is moving away from its original position with some speed. We'll consider some fixed ISR1, connected with **D'**. Just yet without the determination of the origin of speeds: we have low speed **u** in ISR2 (relative to ISR1), connected with **D**, where **D** is that very material point **D'** at the next moment of time. And it moves relative to the fixed ISR1. This material point **A** may have adding to speed **+V** or separately **-V** (because of electric interaction with **B** or separately with **C**). If we now consider fixed **D**, and connected with it ISR, due to the addition formula of speed from ISR we'll receive the speed of movement **A** relative to **D** for every variant of electric interaction:

$$w = \frac{(v+u)}{1+\frac{vu}{c^2}}$$

Now in formula for force (force expression through impulse) we have additional terms:

$F = \frac{dP}{dt}$, where $\mathrm{P} = \mathrm{P}(\mathrm{w})$ is the dependence of impulse on speed – only the variant of change of speed in (look. literature [1]). Then:

$$F = \frac{dP}{dt} = A\frac{dw}{dt},$$

Where $A = \frac{m}{(1-\frac{w^2}{c^2})^{\frac{2}{3}}}$ (this is from that very source),

and $\frac{dw}{dt}$ is the time derivative of the formula of speed addition.

We'll put it into the formula of force:

$$F = A[\frac{\frac{dv}{dt}}{(1+\frac{vu}{c^2})} - \frac{u+v}{(1+\frac{uv}{c^2})^2}\frac{dv}{dt}\frac{u}{c^2}] = f\frac{1-\frac{u^2}{c^2}}{(1+\frac{vu}{c^2})^2},$$

where $f = A\frac{dv}{dt}$ – expression for force (from that very source), in the process of changing the velocity in magnitude. We'll take positive direction for **f** and **V** will be the direction for removal and we'll find average force between the repulsion force **A** and force of gravity **A**, (correspondingly we use speeds: **-V** and **+V)**:

$$F_{Average} = \frac{1}{2}f(1-\frac{u^2}{c^2})(\frac{1}{(1+\frac{uv}{c^2})^2} - \frac{1}{(1-\frac{uv}{c^2})^2}) = -f(1-\frac{u^2}{c^2})\frac{\frac{2uv}{c^2}}{(1-(\frac{uv}{c^2})^2)^2} \qquad (1)$$

In this formula **f,V** are absolute magnitudes, clearly, that $F_{Avg} \ll f$, because $u, v, \frac{1}{c^2}$ linear enter into a formula. It is clear that with quite low speed value of the required correlation in 40 times is received. At that the force is always negative, so there is always gravitation there.

I'd like to mark specially that speed **+u** is coming, as divergence with one sign +. But if it would be necessary to consider formula (1) for some speed at approaching, so speed **-V** at that formula (1) would be the formula of repulsion force.

1.3. It is necessary to find two frames of reference and add the moving from the known interaction to their moving. It's clear that considered earlier ISR2 isn't that one frame of reference, in which charged material points have been interacting. That's why the speed of divergence of ISR2 and speed received in the result of electric interaction should be combined due to the addition formula of speeds.

We have at once a question as for the interaction of accelerating, for example, rocket with accelerating Earth (we mean accelerating when moving around the Sun). In this case the accelerating of Earth and the rocket are in one frame of reference though this frame of reference is accelerating. In that time the cosmological divergence speeds up every participle without its dependence on the other participle.

Formula (1) gives an opportunity to determine the gravitating mass. Now we may try to make a model of formation of inertial mass. If we consider all the participles of the Universe (lets'

consider it to be isotropic) **D** will interact with each of them. In other words every material point of the Universe gravitates to itself **D**, if we consider **D** to be static. At that they will gravitate equally in all the directions because the Universe is identical and there are no reasons to gravitate **D** more in some concrete direction. If we speed **D** up, speed of divergence in accordance with moving with the material points of the Universe will decrease at the moment of acceleration and the speed of divergence in the opposite direction will increase. Correspondingly, due to the formula (1) the gravitation in direction of moving will decrease and in the other direction it will increase. Here are inertial and gravitating mass. No doubts, in any cases the force effective on **D is** proportional to charges that this material point includes, in other words, the masses are proportional.

2. **The crude estimate of masses**.

2.1. It's clear that gravitating mass should be received from formula (1). There are 2n of charges with average charges **q** at the material point. These points interact with **2N** of charges and average charge **q'**. If we take off multipliers uniquely defined we'd receive the following formula (1)

$$F = -f\frac{2uv}{c^2} = -k\frac{qnq'N}{r^2}\frac{2uv}{c^2} \tag{2}$$

it's clear that there is a formula that could be referred to mass **D**

$$m_D = Mqn \tag{3}$$

where M is some multiplier. In this case we may refer to the gravitation constant:

$$\Gamma = \frac{k}{M^2}\frac{2uv}{c^2} \tag{4}$$

2.2. In the case of inertial mass we'll take off multipliers uniquely defined by the same way. But instead of **V** we should take its changing (let's consider that only decreasing and increasing relate to the equal value, though it isn't so) connected with acceleration of object **D**. This would change **dV**, for the short period of time t_0.

We should notice that **V** also has been determined by this short period of time. Let's consider that there is the number of charged participles in the Universe **2P** and their average charge is **Q** and they are in average distance **R**.

At this case:

$$M_{inert(D)} = \frac{F_{universe}}{a} = k\frac{qnQP}{R^2}\frac{2u}{c^2} \tag{5}$$

(Explanation: inertial mass of body **D=** force of gravity of the Universe divided into acceleration conventional sign).

We have just to find these electrical components of the objects to compare inertial and gravitating masses. And will it be enough this description by quarks for exhaustible setting this model of mass is a question.

Literature : 1)L.D. Landau and E.M. Lifshitz, «Fiel Theory», P.2, Moscow chief editorial board of physico-mathematical literature, 1967r., printed sheets 28,75., Page. 43.

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