

ESSENCE OF INERTIA AND GRAVITATION

This article has intention to describes of nature of inertia and gravitation by an appropriate hypothesis exposed in the text below.

ESSENCE OF INERTIA

Let we start from the following equation:

$$\vec{B} \approx \frac{\vec{v} \times \vec{E}}{c^2} \quad (1)$$

We can introduce a new value $\vec{E}_m$ that represents effective magnetic charges, i.e. it describes magnetic field $\vec{B}$:

$$\epsilon \cdot \frac{\vec{E}_m^2}{2} = \frac{\vec{B}^2}{2 \cdot \mu} \quad (2)$$

Anent:

$$|\vec{E}_m| = c \cdot |\vec{B}| \quad (3)$$

Applying (3) to (1) it is obtained:

$$|\vec{E}_m| \cdot \hat{B} \approx \frac{\vec{v}}{c} \times \vec{E} \quad (4)$$

The direction of $\vec{E}_m$ is not clear at the moment, but in case of two free particles in vacuum it is clear that there must be following relation:

$$|\vec{E}_m| \cdot \hat{B} \approx \frac{\vec{v}}{c} \times \vec{E} \quad (5)$$

We can assume that following equation is valid, too:

$$\vec{E}_m \approx -\frac{1}{c} \cdot \frac{d|\vec{r}|}{dt} \cdot \vec{E}_0 \quad (6)$$

Than the formula for total electric force is:

$$\vec{E} = \vec{E}_0 + \vec{E}_m = \vec{E}_0 \cdot \left(1 - \frac{v}{c}\right) \quad (7)$$

Force between two electrical particles is:

$$\vec{F}_{1,2} = \frac{1}{4 \cdot \pi \cdot \varepsilon} \cdot \frac{Q_1 \cdot Q_2}{\vec{r}_{1,2}^2} \cdot \left(1 - \frac{\hat{r}_{1,2} \cdot \dot{\vec{r}}_{1,2}}{c} \right) \cdot \hat{r}_{1,2} \quad (8)$$

Anent:

$$\vec{F}_{1,2} = \frac{1}{4 \cdot \pi \cdot \varepsilon} \cdot \frac{Q_1 \cdot Q_2}{\vec{r}_{1,2}^2} \cdot \left(1 - \frac{v_{1,2}}{c} \right) \cdot \hat{r}_{1,2} \quad (9)$$

Gravitation formula is:

$$\vec{F}_{1,2} = \gamma \cdot \frac{m_1 \cdot m_2}{\vec{r}_{1,2}^2} \cdot \left(1 - \frac{v_{1,2}}{c} \right) \cdot \hat{r}_{1,2} \quad (10)$$

Equation (9) is completely opposite to Weberian formula:

$$\vec{F}_{1,2} = \frac{1}{4 \cdot \pi \cdot \varepsilon} \cdot \frac{Q_1 \cdot Q_2}{\vec{r}_{1,2}^2} \cdot \left(1 - \frac{\dot{r}_{1,2}^2}{2 \cdot c^2} + \frac{r_{1,2} \cdot \ddot{r}_{1,2}}{c^2} \right) \cdot \hat{r}_{1,2} \quad (11)$$

Which is independent to direction of velocity.

The full classic non-linear Doppler formula for light is:

$$\frac{1}{f_0} = \frac{1}{f_1} \cdot \left(\frac{e^{\left(\frac{d}{f_1 \cdot dt} \right)} - 1}{\left(\frac{d}{f_1 \cdot dt} \right)} \right) \cdot \left(1 - \frac{v(t)}{c} \right) \quad (12)$$

Second order approximation is:

$$f_1 = \frac{f_0 \cdot \left(1 - \frac{v}{c} \right)}{2} + \frac{\sqrt{f_0^2 \cdot \left(1 - \frac{v}{c} \right)^2 - \frac{2 \cdot f_0 \cdot a}{c}}}{2} \quad (13)$$

Regarding following formula:

$$\vec{E}_{\text{tot}} = \vec{E}_0 \cdot \frac{1}{\xi} \cdot \frac{f(\xi \cdot \vec{E}_0, \vec{v})}{f_0} \quad (14)$$

We have:

$$\vec{E}_{\text{tot}} = \vec{E}_0 \cdot \left(1 - \frac{v_r}{c} - \frac{m_e}{e} \cdot \frac{\vec{a}_r}{|\vec{E}_0|} \right) \quad (15)$$

And

$$\vec{G}_{\text{tot}} = \vec{G}_0 \cdot \left(1 - \frac{v_r}{c} - \frac{\vec{a}_r}{|\vec{G}_0|} \right) \quad (16)$$

More precisely:

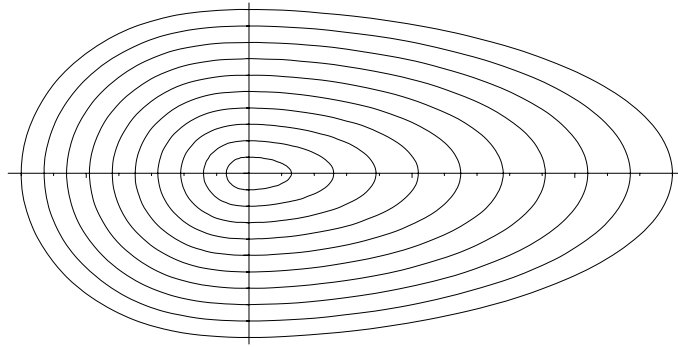
$$\vec{E}_{\text{tot}} = \vec{E}_0 \cdot \left(1 - \frac{v_r}{c} + \frac{v_r^2}{4 \cdot c^2} - \frac{m_e}{e} \cdot \frac{\vec{a}_r}{|\vec{E}_0|} \right) \quad (17)$$

Also

$$\vec{G}_{\text{tot}} = \vec{G}_0 \cdot \left(1 - \frac{v_r}{c} + \frac{v_r^2}{4 \cdot c^2} - \frac{\vec{a}_r}{|\vec{G}_0|} \right) \quad (18)$$

We can conclude now that inertia has origin in self-brake force that arises in interaction between pole and its asymmetric field deformed by higher terms of Taylor approximation of non-linear Doppler effect. Doppler field of a pole:

Fig. 1



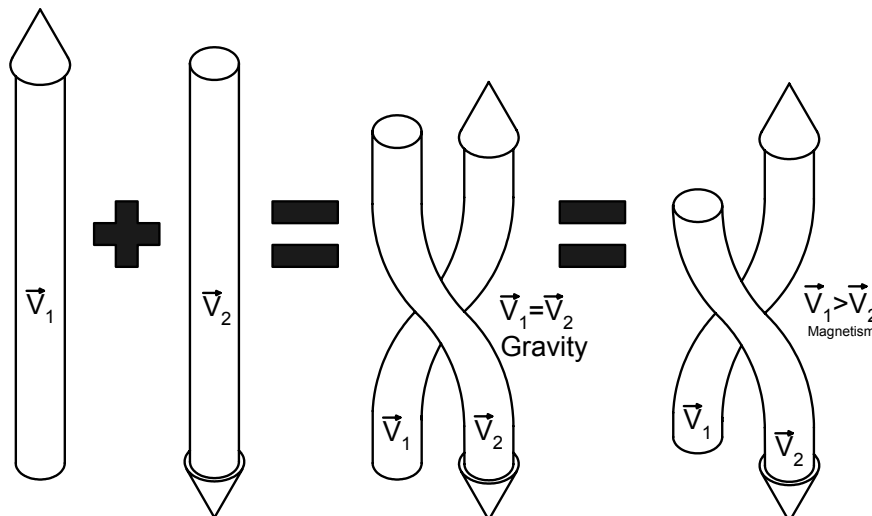
Forces defined by (16), (17), (18) well describe rosette's trajectory of Moon and other planets.

The beauty of the theory is that it works regardless the Doppler's theory. It is operable with all Doppler's equations from various theories due to huge constant of light speed.

ESSENCE OF GRAVITATION

Following picture shows essence of magnetic and gravitational fields: these fields arise in annulations of electric fields:

Fig. 2



There is obvious evidence that when the direction of time is changed gravitational field transmutes to electrical one and vice versa. Direction of time axe determines kind of manifestation of the major physical field. The fields can be equalized on the energy density and then we obtain:

$$\frac{Q^2}{m^2} = \sqrt{4 \cdot \pi \cdot \varepsilon \cdot \gamma} \cdot \frac{r_Q}{r_m} \quad (19)$$

But, simply calculation shows:

$$\frac{e}{m_e \cdot 2 \cdot \sqrt{\pi \cdot \varepsilon \cdot \gamma}} = 2 \cdot 10^{21} \quad (20)$$

This clearly demonstrates that energy balance cannot be applied to real poles because radiuses of these two poles are not equal.

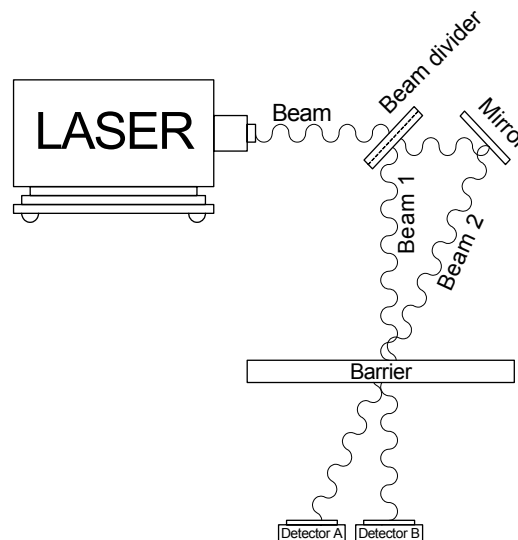
Let we assume that annulations of two electric charges of one electron and one proton yields a new particle able to emit gravitational field.

Regarding above hypothesis we have:

$$m \approx m_0 - \frac{m_n}{e \cdot c} \cdot \int I \cdot d\ell = m_0 - \ell \cdot I \cdot 3.487 \cdot 10^{-17} \frac{\text{kg}}{\text{A} \cdot \text{m}} \quad (21)$$

Let we suppose that annulations of electrons and protons gives the basic gravity unite. Regarding above equations annulled lights directly transforms into gravitational waves:

Fig. 3



This new G wave is able to penetrate opaque barriers. The passed light beams are attenuated and also completely equal. Their unequal parts are thermally absorbed or reflected by the barrier opaque to the light.

This device can be used as AND logic gate in optical computers and also like analog optic mirror of two light or microwave beams on thin opaque barrier as it is case with Widlerr current mirror.

This assumption predicts that mass of neutron should be equal to mass of proton

and two masses of an electron. Proton has one positron charge more than electron charges and thus it is positively charged. But the additional charge is not able to produce mass force and thus it become mass only after it is annulled with an additional electron that produces a neutron, as it is shown by Thierrin [1] in equation (15).

Recent theoretical research done by Thierrin [1] showed that formula for neutron's mass is:

$$m_n = m_p + m_e \cdot \left(2 - \frac{\alpha^2}{2}\right) \quad (22)$$

More accurate formula based on [3] is:

$$m_n = m_e \cdot \frac{12 \cdot \pi^2 \cdot \sqrt[4]{3}}{(1-\alpha) \cdot \sqrt{\alpha}} \cdot \frac{1 + \pi \cdot \alpha^2}{1 - \pi \cdot \alpha^2} \approx 1838.67 \cdot m_e \quad (23)$$

We have by experiment:

$$\frac{m_p}{m_e} = 1836.15 \quad (24)$$

And

$$\frac{m_n}{m_e} = 1838.68 \quad (25)$$

The difference between masses of a proton and a neutron is:

$$\frac{m_n - m_p}{m_e} = 2.53 \quad (26)$$

This means that the theory even could have experimental proof.

Connection between constant of gravitation and electrostatic force, constant of fine structure, speed of light and Plank constant could be theoretically derived:

$$\gamma = \frac{h \cdot \epsilon_0^2 \cdot \alpha^4 \cdot c^7}{2^6 \cdot \pi^9} \cdot (2 - \alpha)^2 \approx \frac{2}{\sqrt[7]{2^4 \cdot \pi^2 \cdot \epsilon_0^2 \cdot c^{11}}} \approx \frac{12}{5} \cdot \pi \cdot \epsilon \quad (27)$$

⇒

$$\gamma = 6.672926 \cdot 10^{-11} \frac{\text{N}}{\text{kg}^2 \cdot \text{m}^2} \approx 6.67128 \cdot 10^{-11} \frac{\text{N}}{\text{kg}^2 \cdot \text{m}^2} \approx 6.6759 \cdot 10^{-11} \frac{\text{N}}{\text{kg}^2 \cdot \text{m}^2} \quad (28)$$

Recent experimental value from <http://physics.nist.gov/constants> for γ constant is:

$$\gamma = 6.6742 \cdot 10^{-11} \frac{\text{N}}{\text{kg}^2 \cdot \text{m}^2} \quad (29)$$

It is interesting that $\frac{12}{5}$ is Pythagorean coma and that it nicely describes ratio between these two constants that cannot have origin in physical reality. The reason for the ratio could be only in way of choosing values for basic physical units, like kilogram, coulomb, etc. So, a coulomb could be chosen bit less and a kilogram could be chosen a bit greater or vice versa and middle and right part of equation (27) could not be valid at all. But it is not a case and thus a nice Pythagorean relation exists between these two constants.

Whereas formulas for $\vec{G}$ and $\vec{E}$ forces are:

$$\vec{F}_{1,2} = \gamma \cdot \frac{m_1 \cdot m_2}{\vec{r}^2} \cdot \hat{r} \quad (30)$$

And:

$$\vec{F}_{1,2} = \frac{1}{4 \cdot \pi \cdot \epsilon_0} \cdot \frac{Q_1 \cdot Q_2}{\vec{r}^2} \cdot \hat{r} \quad (31)$$

Equation (27) is based on the hypothesis of Plank's particles described in [2], [3] and [4]. Plank's particles have equal radius for electric and gravitational fields and thus their energy formulas can be equalized. Although the theory is purely speculative, the accuracy is obtained mainly by nature of h and constant.

Theories [2], [3] and [4] indicate that h constant somehow defines ratio of energy distribution between gravitational and electric fields.

ARE THE GRAVITATIONAL AND INERTIAL MASSES IDENTICAL?

The major question that is connected to equalization of inertial and gravitational masses is whether it can be done or not. Einstein said that these two masses are identical, but essential field's theory says something completely different. Inertia uses center of mass as effective force's point and gravitational force uses center of gravitation as effective force's point in the body. These two points are not geometrically identical.

Center of total field generated by a set of particles with r^{-2} fields is given by the following equation:

$$\vec{r}_G = \sqrt{m} \cdot \frac{\int_0^V \frac{\vec{r}}{|\vec{r}|^3} \cdot \rho_m(\vec{r}) \cdot dV}{\left| \int_0^V \frac{\vec{r}}{|\vec{r}|^3} \cdot \rho_m(\vec{r}) \cdot dV \right|^{\frac{3}{2}}} \quad (32)$$

But center of mass and center of charge is:

$$\vec{r}_m = \frac{1}{m} \cdot \int_0^V \vec{r} \cdot \rho_m(\vec{r}) \cdot dV \quad (33)$$

And

$$\vec{r}_Q = \frac{1}{Q} \cdot \int_0^V \vec{r} \cdot \rho_Q(\vec{r}) \cdot dV \quad (34)$$

So, total force if given by the following equation:

$$\vec{F}_{1,\vec{G}} = \gamma \cdot m_1 \cdot \hat{r}_{\vec{G}} \cdot \left(\frac{\int_0^V \rho_m(\vec{r}) \cdot dV}{\vec{r}_{\vec{G}}^2} \right) \quad (35)$$

But:

$$\vec{F}_{1,m} = \ddot{\vec{r}}_m \cdot \left(\int_0^V \rho_m(\vec{r}) \cdot dV \right) \quad (36)$$

Gravitational force requires center of field and inertial force requires center of mass that is different to center of field. This is proof that inertial and gravitational masses are not exactly equals.

References:

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