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The Elastic Nature of the Mass and of the Gravitation

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Abstract

We generalize the Schwarzschild horizon radius by considering a spherical immobile mass m_0 of radius R_0 of center located at a fixed ether point $\boldsymbol{O}$**,** and consider a particle of mass m_1, of velocity $\boldsymbol{V_1}$ due to the interaction of the fields created by m_0 and by m_1.

We prove how a mass is related to a field and what is the constitution of this field. The great lines of this proof is that even when it is immobile, a mass m is related to a frequency ν_m by the relation $m = h\nu_m/c^2$. This shows that a mass m creates a field of frequency ν_m propagated in the ether. The nature of such a field is that it is an ensemble of ether points only rotating on themselves, such that axes of these rotations are situated on any line passing through the center of this mass.

We proves that on the axis joining two masses m_1 and m_2 then, between them the fields of the rotation of the ether points due to m_1 and m_2 are of inverse senses that is, they partially destroys themselves, that is, there, the fields are smaller than the those that are not between m_1 and m_2 and situated on this axis. It follows that m_1 and m_2 have the tendency to get closer, that is, are submitted to a force that tends to make them closer and finally to form only one mass. This force is the gravitational attraction.

Keywords: mass, ether points rotation, gravitational attraction ensuing from the ether elasticity, electronic attraction and repulsion

1. Introduction

Let us consider the case where to the left side of an ether point denoted P there is an ether rotation in one sense of rotation and on the other side of P that is at its right, there is a rotation of opposite sense of rotation but of same amplitude. In this case P, near which are applied these two opposite rotations, remains immobile, cf. Figure 1.

Now if the left and the right rotations are not of same amplitude, the point P will not remain immobile. In this case the question is: how happens that at the two sides of P along for example on the $x\ axis$, the **amplitude** of these ether point rotations are not equal?. The response to this question is the following: there is a supplementary effect that causes this non equilibrate situation. This supplementary effect is the following: there is a supplementary point P_1 of also in particular two sides of rotations of the ether points, such that between P and P_1 the total ether rotations are smaller than those that are outside of this interval on the line that joints them. This fact, i.e., that between these two points, the ether rotations are smaller is due to the interference of the two rotations of inverse senses that exist between these two sources of rotations that interfere and cause the forces that bring these two points to be closer.

2. Generalization of Schwarzschild's Case

One generalizes the Schwarzschild radius $\alpha \equiv 2m_0k/c^2$, Cf. Ref. 1, by considering a spherical immobile mass m_0 of radius R_0 of center located at a fixed ether point $\boldsymbol{O}$**,** and a particle of mass m, of velocity $\boldsymbol{V}$ due to the fact that it is submitted to the field created by m_0. The expression for V is then**,** Cf. Ref. 2**,**

$$V = cB\gamma/\hat{\gamma}, \tag{1}$$

where

$$\gamma = \sqrt{1 - R_0/r},\ \hat{\gamma} = \sqrt{1 + R_0 cos^2(\widehat{\mathbf{V}\mathrm{r}})/(r\gamma^2)}. \tag{2)(3}$$

In these expressions**,** $\boldsymbol{r}$ denotes the radius vector originated from the center of m_0 and directed toward the center of m; $\widehat{\mathbf{Vr}}$ denotes the angle made by $\boldsymbol{r}$ and $\boldsymbol{V}$; B and Ω denote the quantities defined by

$$\Omega = \frac{mc^2}{mc^2 + h\Delta\nu}, \quad B = \sqrt{1 - (1 - R_0/r)\Omega^2}. \tag{4)(5}$$

In Eq. (4), c denotes the free light velocity and ν a frequency. It follows that Eq. (1) can then be written as following

$$V = c\frac{\sqrt{1-R_0/r}}{\sqrt{1+R_0 cos^2(\widehat{\mathbf{V}\mathrm{r}})/(r\gamma^2)}}\sqrt{1 - \left(1 - \frac{R_0}{r}\right)\Omega^2}. \tag{6}$$

For $m = 0$, i.e., $\Omega = 0$, Eq. (6) becomes the photon velocity denoted V_{ph} defined by

$$V_{ph} = c\frac{\sqrt{1-R_0/r}}{\sqrt{1+R_0 cos^2(\widehat{\mathbf{V}\mathrm{r}})/(r\gamma^2)}} \tag{7}$$

In the free case, that is for $m_0 = 0$, that is for $R_0 = 0$, V becomes V_{free} defined by

$$V_{free} = c\sqrt{1 - \Omega^2}, \tag{8}$$

that, for $m = 0$, i.e., $\Omega = 0$, takes the value c.

3. The Elastic Nature of the Mass

Eq. (4) shows that mc^2 has the dimensions of $h\nu$, therefore there is a frequency ν_m such that

$$mc^2 \equiv h\nu_m. \tag{9}$$

and such that Ω can be written

$$\Omega = \frac{\nu_m}{\nu_m + \Delta\nu}. \tag{10}$$

Considering Eqs. (4), (8), and (10), it appears that:

a free massive particle of mass m moves at a velocity V_{free} defined at (8), (4), and (10), that depends upon the frequency ν_m that causes $|V_{free}| < c$; while a free massless particle, that is, a free photon, moves at the velocity c independently of its frequency.

The explanation of these facts is that the mass modifies the medium in such a way that there, for example, a free particle moves at the velocity V_{free} different from c. Since a free photon moves independently of its frequency and since V_{free} is defined in Eq. (8) and in Eq. (10), it follows that for the photon, $\nu_m = 0$, that is, $\mathrm{m} = 0$. Since a **free** photon moves always at the velocity c, it follows that the photon moves independently of its frequency.

One considers now the physical constitution of the free mass m that can be immobile and then the constitution of the photon, that moves at the velocity c when it is free, but can move at a velocity less than c and even can be immobile, for example, when it is located at the Schwarzschild horizon.

In fact, a question is now: how a mass is related to a field and what is the constitution of this field? The response is the following: even for an immobile mass m one has, Cf. Eq. (9), $m = h\nu_m/c^2$, this shows that an immobile mass m creates a field of frequency ν_m propagated in the ether. We call this phenomenon: "**mass wave of frequency** $\nu_m = mc^2/h$ ", Cf. Ref. 3 and Ref. 4. This mass wave concept is generalized to electrical charges and fields as specific changes in the medium ether such that they influence one the others. Regarding in particular the field $h\nu_0/c^2$created by a immobile mass m_0, one sees that it **generalizes** the case treated by Einstein - Schwarzschild. Then, in the concept of the first ascertainment on the nature of the mass, one has

$$R_0 \equiv K\nu_0. \tag{11}$$

where K is a constant of dimensions $2hk/c^4$, that is,

$$2m_0k/c^2 = 2hk\nu_0/c^4 \implies m_0c^2 = h\nu_0. \tag{12}$$

That is, γ^2 and $\hat{\gamma}^2$ defined in (2) and (3) can be written as being the following functions of ν_0

$$\gamma^2 = 1 - K\nu_0/r,\ \hat{\gamma}^2 = 1 + K\nu_0(cos^2\widehat{\nabla \mathrm{r}})/(r - K\nu_0), \tag{14}$$

One sees that for $\widehat{\nabla \mathrm{r}} = 0$, that is for $\boldsymbol{V}$ directed toward $\boldsymbol{O}$ or toward its opposite sense, one has

$$\hat{\gamma}^2 = r/(r - K\nu_0), \tag{15}$$

and considering the expressions for γ^2 given in (14) and that for $\hat{\gamma}^2$ given in (15), one has then

$$\gamma^2/\hat{\gamma}^2 = \frac{(r-K\nu_0)^2}{r^2}. \tag{16}$$

and Eq. (6) becomes in the vector form along the x axis, where $\lfloor x \rfloor$ is the distance from the origin **O** to the point $\pm x$, and considering that $1 - K\nu_0/\lfloor x \rfloor \equiv \lfloor \Delta x \rfloor/\lfloor x \rfloor$,

$$\boldsymbol{V}(x) = \boldsymbol{e}_x c \frac{x}{\lfloor x \rfloor}\left(1 - \frac{K\nu_0}{\lfloor x \rfloor}\right)\sqrt{1 - \left(1 - \frac{K\nu_0}{\lfloor x \rfloor}\right)\Omega^2}. \tag{17}$$

and for the photon, i.e., for $\Omega = 0$

$$\boldsymbol{V}_{ph}(x) = \boldsymbol{e}_x c \frac{x}{\lfloor x \rfloor}\left(1 - \frac{K\nu_0}{\lfloor x \rfloor}\right). \tag{18}$$

Eqs. (17) and (18) take the particular values

$$\boldsymbol{V}(K\nu_0) = \boldsymbol{V}_{ph}(K\nu_0) = 0 \tag{19}$$

and

$$\boldsymbol{V}(\infty) = \boldsymbol{e}_x c\sqrt{1 - \Omega^2},\ \boldsymbol{V}_{ph}(\infty) = \boldsymbol{e}_x c. \qquad (20)(21)$$

One considers now the case where the particle of mass m is immobile that is where $\Omega^2 = 1$. that is where the particle has a null kinetic energy then (17) becomes

$$\boldsymbol{V}(x, \Omega = 1) = \boldsymbol{e}_x c \frac{x}{\lfloor x \rfloor}\left(1 - \frac{K\nu_0}{\lfloor x \rfloor}\right)\sqrt{\frac{K\nu_0}{\lfloor x \rfloor}} \tag{22}$$

It follows that:

$$\boldsymbol{V}(K\nu_0, \Omega = 1) = \boldsymbol{0},\ \boldsymbol{V}(\infty, \Omega = 1) = \boldsymbol{0}, \tag{23}$$

that is, a particle of null kinetic energy in the field created by the immobile mass m_0 is immobile only in the two following cases: when it is located at $\lfloor x \rfloor = K\nu_0$ or at $\lfloor x \rfloor = \infty$.

Until here we considered the expression for the velocity of a particle in the frame of the ether where this velocity is that of a massive or massless particle free or under the influence of an immobile mass and in particular in a field of Schwarzschild. We will show now that the concept of mass is of completely different nature than that of electric charge. Indeed, we are going to analyze and demonstrate the physical effect that causes to two electric charges of different sign to attract one the other and then, the physical effect that causes to two electrical charges of same sign to repulse one the other.

Now, before analyzing how **two masses** attract one the other, we are going to consider the effects that an isolated immobile mass of radius R causes to the ether.

4. Elastic Natures of One Isolated Immobile Mass, of Two Interactive Masses and of the Gravitational Forces

An immobile isolated mass creates a field of the rotations of the ether points on themselves, such that the axes of these rotations are situated on any line passing through the center of this mass. These rotations do not depend of the angle of such a line relatively to a specific one passing through the center of this mass. Here is the picture Fig. 1 of such a line passing through the mass center, the arrows indicating the axes and the senses of the rotations of the ether points along such a line

m

←←←←← ⊙ →→→→→

Figure 1

Now let us consider that at a given instant t, two masses m_1 and m_2 are disposed as in Figure 2.

$$m_1 \qquad\qquad\qquad\qquad m_2$$
$$\leftarrow\leftarrow\leftarrow\leftarrow\leftarrow \odot \rightarrow\rightarrow\rightarrow\rightarrow\rightarrow \qquad \leftarrow\leftarrow\leftarrow\leftarrow\leftarrow \odot \rightarrow\rightarrow\rightarrow\rightarrow\rightarrow$$

Figure 2

At this instant t, the center of a spherical mass m_1 of radius R_1 is located at the point X_1 on the $x\ axis$, and the center of the mass m_2 of radius R_2 is located at the point X_2 also on the $x\ axis$, such that at this instant, the distance of $L > 0$ is defined by

$$L = X_2 - R_2 - (X_1 + R_1), \tag{24}$$

In Figure 2, the arrows indicate the axes and also the senses of the rotations of the ether points along the straight line passing through the two mass centers.

Let $[m_1, m_2]$ denote the free interval between the two masses m_1 and m_2 on the $x\ axis$.

The fields of the rotations of the ether points in $[m_1, m_2]$ due to m_1 and m_2 **are of inverse senses that is, destroy themselves**. That is, in $[m_1, m_2]$ the total field is smaller than outside of it on its prolongations on this $x\ axis$.

That is, the masses m_1 and m_2 have the tendency to get closer, and finally to be so close that they will form only one mass. This explains the gravitational attraction.

If these moving masses would not move one toward the second in strait trajectory, they would move one around the second for not too large velocities, but if at less one of them would have a sufficiently large velocity then they would only deviate from their initial trajectories.

Now let us consider what happens at the point P_1 on the $x\ axis$ of which the position is defined by

$$P_1 = X_1 + R_1 + \Delta x \tag{25}$$

where Δx is a variable such that

$$0 \le \Delta x \le L \tag{26}$$

and also what happens at the point y defined by

$$\Delta x + y = L. \tag{27}$$

In particular let us consider the photon velocity $\boldsymbol{V}_{ph1}$ due to a mass m_1 located at the point X_1 on the $x\ axis$ such that $\boldsymbol{V}_{ph1}$ is directed toward $\boldsymbol{O}$ **or in the opposite sense**. Considering Eq. (15), and $\Omega \equiv 0$, Eq. (15) becomes for the component along the x axis, where $\lfloor x \rfloor$ is the distance from X_1 to the point $X_1 + R_1 + \Delta x$ on the $x\ axis$, that is ,

$$\lfloor x \rfloor = R_1 + \Delta x, \ R_1 = K\nu_1,$$
$$V_{ph1}[X_1 \pm (R_1 + \Delta x)] = \pm c \frac{R_1 + \Delta x}{\lfloor R_1 + \Delta x \rfloor}\left(1 - \frac{K\nu_1}{\lfloor K\nu_1 + \Delta x \rfloor}\right) \tag{28}$$

that is, in particular

$$V_{ph1}(X_1 \pm R_1) = 0, \quad V_{ph1}[X_1 \pm (R_1 + \infty)] = \pm c. \qquad (29)(30)$$

Denoting

$V_{ph1}(X_1 + R_1 + \Delta x) \equiv W_1(\Delta x)$, and $V_{ph2}(X_2 - L - R_2 + \Delta x) \equiv W_2(\Delta x)$,
one has from Eq. (28), considering Eq. (11) and $R_1 \equiv K\nu_1$,

$$W_1(\Delta x) = \frac{c\Delta x}{K\nu_1 + \Delta x} \equiv \frac{c\Delta x}{R_1 + \Delta x} \tag{31}$$

and also, considering that the radius R_2 of the mass m_2 is $R_2 \equiv K\nu_2$,

$$W_2(\Delta x) = \frac{c(L - \Delta x)}{L + K\nu_2 - \Delta x} = \frac{c(L - \Delta x)}{L + R_2 - \Delta x}. \tag{32}$$

Therefore,

$$W_1(\Delta x) - W_2(\Delta x) = \frac{c\Delta x}{R_1+\Delta x} - \frac{c(L-\Delta x)}{R_2+L-\Delta x}. \tag{33}$$

In particular,

$$W_1(0) - W_2(0) = -\frac{cL}{L+R_2} \tag{34}$$

$$W_1(\mathrm{L}) - W_2(\mathrm{L}) = \frac{cL}{R_1+L} \tag{35}$$

where one recalls $R_1 \equiv K\nu_1$ and $R_2 \equiv K\nu_2$. Eq. (34) and Eq. (35) ensue from the facts that in these cases m_1 and m_2 attract each the other. Furthermore,

$$[L = 0,\ i.e.\ \Delta x = 0] \implies W_1(0) - W_2(0) = 0 \tag{36}$$

In this last case, the two masses m_1 and m_2 are unified in one mass $m = m_1 + m_{2.}$. that creates a new gravitational field.

One sees that there is no any symmetry around the masses m_1 and m_2 more precisely one see that the ether rotations on the two sides of the each of these masses are not symmetrical. This is the cause that makes move the masses m_1 and m_2 one toward the other until their spherical surfaces touch one the other.

Now we have to determine the mathematical relation between the fact that for example around a spherical mass can be a dissymmetry or a symmetry regarding the rotations of the ether points located at the two sides of a mass denoted for example m. This is like a mass would be pushed on its two sides such that it remains immobile but if it is pushed by two non-exactly inverse forces this mass would move. Therefore, I have to show that the rotation of the ether points near the mass is equivalent to a force applied to this mass. This is due to the fact that the only changes that occur on the ether points is that they can only rotate, and not move. What is yes is moving are the rotations, therefore the gravitational field is rotations of the ether points due to this field. That is the gravitation creates rotations of the ether point such that when there are immobile, these rotations are symmetrical around this mass.

5. Elastic Nature of the Isolated Immobile Electric Charge Versus That of Two Electric Charges

Contrarily to a mass, an electric charge can be positive or negative we denote them respectively e_+ and e_-. An electric charge is a small length in the ether such that each of its points has rotated and these rotations are such that their axes are situated along this small length as it appears in these two following pictures:

$$e_+$$

$$\leftarrow\leftarrow\leftarrow\leftarrow\leftarrow\leftarrow\leftarrow\leftarrow\leftarrow$$

Figure 3

and

$$e_-$$

$$\rightarrow\rightarrow\rightarrow\rightarrow\rightarrow\rightarrow\rightarrow\rightarrow\rightarrow$$

Figure 4

One recalls that in these pictures, the arrows indicate the direction and the senses of the rotations of the ether points. It is evident that theses rotations engender the rotation of the ether points situated at its vicinity and these rotations engender new rotations of ether points and so on. One sees that electric charges of same sign repulse one the other because the fields generated by these charges are rotations of same sense and are greater than any of them. But, one sees that two electric charges of different signs will attract one the other because the fields generated by these charges are rotations of inverse senses and the sum of these rotations are smaller than any one of the element of this sum.

6. Conclusions

The ether theory permits to explain, Cf. Ref. 5, the gravitational attraction that occur between any two masses, the attraction between two different electric charges and the repulsion that occurs between two different electric charges.

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