

# **The bending of the time under a gravitational field.**

## **Relativity and the universal gravitational variable.**

### **The time and the universal gravitational variable.**

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After the creation of the new theory of universal gravitation, under the paradigm of the radiation of mass and the new theory of relativity, where the space not bend. i go to analyze the bending of the time under a intense gravitational field. One best notion of a black hole.

#### **1 Introduction:**

The new theory of universal gravitation that supports this study comes in annex.

#### **2 The speeds and the Universal gravitation variable.**

As already we on the basis of saw and the new theory of relativity, the speed of the light is constant in all the universe, being its value in each different referential, because of its proper bending of the time and exclusively therefore.

That is C happens therefore is this, the escape potential that if finds all in the universe and any local.

Being:  $\sum_1^n \left( \frac{Mu_{j-i}}{Re_{j-i}} \right)$  the addition of all the potentials generated in the local i for all the Universal

mass subjects to respective Doppler effect that radiates for the local i

To facilitate the presentation, we go to make to substitute:

$$\sum_1^n \left( \frac{Mu_{j-i}}{Re_{j-i}} \right) = Rad_i$$

Of where we start to have to the escape potential:

$$U_i = 2 G_i Rad_i$$

$$G_i = \frac{C^2}{2 Rad_i}$$

$$C^2 = 2 G_i Rad_i$$

Local we will have to the escape potential:

$$U_o = 2 G_o Rad_o$$

$$U_o = C^2$$

When a particle if dislocates to the speed  $V$ , which is the escape potential that if finds in the particle?

$$U_v = C^2 - V^2$$

If to care of that  $Rad_i$  it is constant for the referential in cause, we will have:

$$U_v = 2 G_v Rad_o$$

$$\frac{U_o}{U_v} = \frac{2G_o Rad_o}{2G_v Rad_o} = \frac{C^2}{C^2 - V^2}$$

$$\frac{G_o}{G_v} = \frac{C^2}{C^2 - V^2}$$

$$\frac{G_o}{G_v} = \frac{1}{1 - \frac{V^2}{C^2}}$$

$$\sqrt{\frac{G_o}{G_v}} = \frac{1}{\sqrt{1 - \frac{V^2}{C^2}}}$$

As:

$$\frac{1}{\sqrt{1-\frac{v^2}{c^2}}} = \frac{t_o}{t_v} = \frac{\sqrt{v}}{\sqrt{o}}$$

$$\sqrt{\frac{G_o}{G_v}} = \frac{t_o}{t_v} = \frac{\sqrt{v}}{\sqrt{o}}$$

Now yes we have something completely new. We are namely as the time if it relates with the gravitation variable. As well as the frequency it also varies with the gravitation variable.

### 3 The bending of the time and the gravitational field.

When we are in presence of a local gravitational field, this participates in the pure potential of universal mass, that is part of  $Rad_o$ .

This value of  $Rad_o$ , is the gotten one to the surface of celestial body.

As the potential to the surface of celestial body it is  $U_s$ :

$$U_s = \frac{G_s M_a}{R_a}$$

$$\frac{M_a}{R_a} = \frac{U_s}{G_s} = Rad_s,$$

Then we will have, for the universal pure radiation  $Rad_u$ , that to remove the local radiation:

$$Rad_u = Rad_o - Rad_s$$

In one any long-distance place  $d$  of the center of celestial body, the existing universal radiation will be:

$$Rad_d = Rad_u + \frac{U_d}{G_o}$$

$$Rad_d = Rad_o - \frac{U_s}{G_o} + \frac{U_d}{G_o}$$

$$Rad_d = \frac{c^2}{2 G_o} - \frac{U_s}{G_o} + \frac{U_d}{G_o}$$

$$G_d = \frac{c^2}{2 Rad_d}$$

$$G_d = \frac{c^2 G_o}{c^2 - 2 (U_s - U_d)}$$

$$\frac{G_d}{G_o} = \frac{c^2}{c^2 - 2 (U_s - U_d)}$$

$$\sqrt{\frac{G_d}{G_o}} = \sqrt{\frac{c^2}{c^2 - 2 (U_s - U_d)}}$$

As:

$$\sqrt{\frac{G_d}{G_o}} = \frac{t_d}{t_o}$$

$$\sqrt{\frac{c^2}{c^2 - 2 (U_s - U_d)}} = \frac{t_d}{t_o} = \frac{\sqrt{o}}{\sqrt{d}}$$

#### 4 Final condition of the bending of the time and the gravitational field.

Velocity:

$$V_d^2 = U_d$$

$$\frac{G_d}{G_o} = \frac{c^2 - U_d}{c^2}$$

**Gravitational potential:**

$$\frac{G_d}{G_o} = \frac{C^2}{C^2 - 2 (U_s - U_d)}$$

**As:**

$$\frac{G_d}{G_o} = \frac{C^2 - U_d}{C^2} \frac{C^2}{C^2 - 2 (U_s - U_d)}$$

$$\frac{G_d}{G_o} = \frac{C^2 - U_d}{C^2 - 2 (U_s - U_d)}$$

$$\sqrt{\frac{G_d}{G_o}} = \sqrt{\frac{C^2 - U_d}{C^2 - 2 (U_s - U_d)}}$$

$$\sqrt{\frac{G_d}{G_o}} = \sqrt{\frac{C^2 - U_d}{C^2 - 2 (U_s - U_d)}} = \frac{t_d}{t_o} = \frac{\sqrt{o}}{\sqrt{d}}$$

Speed of light at local d.

$$C_d = C_o \sqrt{\frac{C^2 - 2 (U_s - U_d)}{C^2 - U_d}}$$

**We have now completely defined the equation of the time under the share of a gravitational field.**

**Generally we have:**

$$\frac{G_d}{G_o} = \frac{R_{ado}}{R_{adl}} \frac{C^2 - V_d^2}{C^2}$$

$$\frac{t_d}{t_o} = \sqrt{\frac{G_d}{G_o}} = \sqrt{\frac{R_{ado}}{R_{adl}} \frac{C^2 - V_d^2}{C^2}}$$

## 5 The variation of the speed of the light throughout the times.

Of the previous considerations, we conclude, that when local the gravitation variable increases the time also it increases:

With growing of the Universe the local gravitation variable, increases in the ratio of the growth of the Universe.

$$\sqrt{\frac{G_{ot}}{G_o}} = \frac{t_{ot}}{t_o}$$

As for all always the relation will be remained:

$$t_o C_o = t_{ot} C_{ot}$$

$$C_{ot} = C_o \frac{t_o}{t_{ot}}$$

$$C_{ot} = C_o \sqrt{\frac{G_o}{G_{ot}}}$$

Taking care of to the one that in the initial phase of the Universe the value of  $G_{ot}$  would be very small, at any local the speed of the light in the initial phase it was very bigger of what today.

**From there and in accordance with Magueijo (VSL), to accept the beginning of the variable speed of the light, therefore in all the universe, independently of the local, the speed of the light read in the past was very superior that one that if can measure today.**

In the same way that we will go to read a lesser speed of the light, all the speeds will also go to be chores in a lesser value.

This phenomenon goes to make with that the translation speeds want of the Hearth want of the Moon go in them to appear slower

Not because these had softened, but yes because our time will go to increase.

**The future value of the mass at local.**

$$m_{ot} = m_o \sqrt{\frac{G_{ot}}{G_o}}$$

**At local the mass increase.**

**The escape potential, in the observed referential.**

$$G_v = \frac{c_v^2}{2 \frac{M_v}{R}}$$

$$G_v = \frac{c_o^2 \left(\frac{t_o}{t_v}\right)^2}{2 \frac{M_o \frac{t_v}{t_o}}{R}}$$

$$G_v = G_o \left(\frac{t_o}{t_v}\right)^3$$

$$U_v = 2G_v \frac{M_v}{R}$$

$$U_v = 2G_o \left(\frac{t_o}{t_v}\right)^3 \frac{M_o \frac{t_v}{t_o}}{R}$$

$$U_v = 2G_o \frac{M_o}{R} \left(\frac{t_o}{t_v}\right)^2$$

$$U_v = U_o \left(\frac{t_o}{t_v}\right)^2$$

$$C_v^2 = C_o^2 \left(\frac{t_o}{t_v}\right)^2$$

$$C_v^2 = C_o^2 \left(\frac{t_o}{t_v}\right)^2$$

$$C_v = C_o \frac{t_o}{t_v}$$

$$C_v = \frac{C_o}{\sqrt{1 - \frac{v^2}{c^2}}}$$

## 6 Black Holes.

Now that we know the bending of the time under the share of a gravitational field, we are in conditions to analyze what is transferred in a black hole. Generically for the unit of unitary time  $t_o$  we will have then the potential of escape given for:

$$C^2 = 2 G_o Rad_o$$

$$G_o = \frac{C^2}{2 Rad_o}$$

To be black hole, as we saw:

$$\frac{M}{R} = k Rad_o \text{ para } k \geq 1$$

The universal radiation to the surface of the black hole, would start to be:

$$Rad_s = (1 + k) Rad_o$$

We would have then in the referential for the black hole:

$$G_s = \frac{C^2}{2(1+k) Rad_o}$$

$$U_s = 2 G_s Rad_o$$

$$U_s = \frac{C^2}{(1+k)}$$

As now, we know:

$$G_s = \frac{c^2}{2(1+k) Rad_o}$$

$$\frac{G_s}{G_o} = \frac{1}{(1+k)}$$

$$\frac{G_o}{G_s} = (1 + k)$$

$$\frac{G_o}{G_s} = \left(\frac{t_o}{t_s}\right)^2 = (1 + k)$$

$$C_s = C_o \sqrt{\frac{G_o}{G_s}}$$

$$C_s = C_o \frac{t_o}{t_s} = C_o \sqrt{(1 + k)}$$

$$m_s = m_o \sqrt{\frac{G_s}{G_o}}$$

$$m_s = m_o \frac{t_s}{t_o}$$

$$U_s = U_o \frac{G_o}{G_s} = U_o (1 + k)$$

In the referential of the black hole, visa of our referential we would have:

$$G_s = \frac{C_s^2}{2Rad_s}$$

$$G_s = \frac{C_o^2 \left(\frac{t_o}{t_s}\right)^2}{2(1+k) Rad_o \frac{t_s}{t_o}}$$

$$G_s = \frac{C_o^2 \left(\frac{t_o}{t_s}\right)^2}{2\left(\frac{t_o}{t_s}\right)^2 Rad_o \frac{t_s}{t_o}}$$

$$G_s = G_o \frac{t_o}{t_s}$$

$$U_s = 2G_o \frac{t_o}{t_s} \frac{M_s}{R}$$

$$U_s = 2G_o \frac{t_o}{t_s} \frac{M_o \frac{t_s}{t_o}}{R}$$

$$U_s = U_o = C^2$$

The black hole is really black, the escape potential is always equal the  $C^2$ ..

The black hole lives in the limit of the potential of  $C^2$  escape, independently of its dimension.

The maximum potential of escape of a black hole, any that is its relation,  $\frac{M}{R} \geq Rad_o$ , is always  $C^2$ ., and never superior.

The black hole lives in the limit of not the radiation, for what, is enough any small alteration in its balance, to radiate.

The speed of the light in the proper time of the black hole will be:

Being  $G_o$  the value of the gravitational variable of our referential:

Being  $G_b$  the value of the gravitational variable of the black hole referential

$$C_b = C_o \sqrt{\frac{G_o}{G_b}}$$

In the proper referential of the black hole:

$$U_s = 2 G_s \frac{M_s}{R}$$

$$G_s = \frac{C_s^2}{2 \frac{M_s}{R}}$$

$$G_s = \frac{C_o^2 \frac{t_o^2}{t_s^2}}{2 \frac{M_o \frac{t_s}{t_o}}{R}}$$

$$G_s = G_o \frac{t_o^3}{t_s^3}$$

$$U_s = 2 G_o \frac{t_o^3}{t_s^3} \frac{M_o \frac{t_s}{t_o}}{R}$$

$$U_s = U_o \frac{t_o^2}{t_s^2}$$

$$C_s^2 = C_o^2 (1 + k)$$

$$C_s = C_o \sqrt{(1 + k)}$$

### Experience of confirmation of the theory.

When thinking about the future, with the increase of the local gravity, they will appear two different phenomena:

The ray of the matter, diminishes in the same ratio of the increase of the ray of the Universe.

$$R_1 = R_0 \frac{t_0}{t_1}$$

On the other hand, with the increase of the local gravity the time goes to increase, for what the speed of the light deals will be lesser:

$$t_1 = t_0 \sqrt{\frac{G_1}{G_0}}$$

$$C_1 = C_0 \sqrt{\frac{G_0}{G_1}}$$

Now let us analyze the time that a blinking will delay to give the return to the Hearth:

$$T_0 = \frac{2 \pi R_0}{C_0}$$

In the future, being:

n - Number of passed years.

Age of universe - 15.197.368.380 a.l

$$T_1 = \frac{2 \pi R_1}{C_1}$$

$$T_1 = \frac{2 \pi R_0 \frac{t_0}{t_1}}{C_0 \sqrt{\frac{G_0}{G_1}}}$$

$$T_1 = \frac{2 \pi R_0 \frac{t_0}{t_1}}{C_0 \sqrt{\frac{t_0}{t_1}}}$$

$$T_1 = \frac{2 \pi R_0 \sqrt{\frac{t_0}{t_1}}}{C_0}$$

$$T_1 = T_0 \sqrt{\frac{t_0}{t_1}}$$

$$T1 = T0 \sqrt{\frac{15.197.368.380}{15.197.368.380+n}}$$

Logically that the annual variation will be almost imperceptible.

1 year, 1 return  $\partial T = - 0,0044$  nanos.

1 year 1000 returns  $\partial T = - 4,4$  nanos.

25 years, 1 return  $\partial T = - 0,11$  nanos.

25 years 1000 returns  $\partial T = - 110$  nanos.

Either perhaps possible to make the experience .....

### **The time at the solar system.**

If to take care of, to the Earth rate:

$$Vt = 464.56 \text{ m/s}$$

$$Urt = 215.820 \text{ (m/s)}^2$$

$$B = \frac{1}{1 - \frac{U_{rt}}{c^2}}$$

$$\sqrt{\frac{G_d}{G_o}} = \sqrt{B \frac{c^2 - U_d}{c^2 - 2(U_s - U_d)}} = \frac{t_d}{t_o}$$

In the case of the satellite, Moon.

$U_{sl}$  – Gravitational potential of the Moon.

$$\sqrt{\frac{G_d}{G_o}} = \sqrt{B \frac{c^2 - U_d}{c^2 - 2(U_s - U_d - U_{sl})}} = \frac{t_d}{t_o}$$

Place the surface with rotation Ref: Earth time in Ecuador, h = 0	Advance the clock for a day, for the time on Earth nanosecond s	Speed of light m/s	Differential I C local - C Earth m/s	Modification of the length a) Partes	Apparent speed of light. m/s	Differential apparent local C - C Earth m/s
Earth	0	299.792.458,40	0,00	0,00000E+00	299.792.458,40	0,000
Space station h=380 km	-24.921	299.792.458,49	0,09	-7,82827E-11	299.792.458,51	0,11
Satellite h=20.200 km	38.552	299.792.458,27	-0,13	-1,05811E-09	299.792.458,58	0,18
Moon	55.998	299.792.458,21	-0,19	-1,30661E-09	299.792.458,60	0,20
Orbit around the Sun h=2.000.000km	-62.457.851	299.792.675,12	216,72	1,45563E-06	299.792.238,73	-219,67
Mercury	-1.974.364	299.792.465,25	6,85	3,00701E-08	299.792.456,24	-2,16
Venus	-484.230	299.792.460,08	1,68	7,40788E-09	299.792.457,86	-0,54
Mars	487.869	299.792.456,71	-1,69	-7,89836E-09	299.792.459,08	0,68

### The future of the speed of light in Earth.

Real value.		
Year	Value of real C	Variation
1978	299.792.458,87	0.00
2005	299.792.458,60	-0,27
2008	299.792.458,57	-0,30
2028	299.792.458,46	-0,41
2053	299.792.457,96	-0,91
2078	299.792.457,47	-1,40

If we repeat the experiment in 1978 by the English group, which concludes that the speed of light would be  $299.792.458.8 \pm 0.2$  m / s, it appears that the value measured today, 31 years later, varying 0.31 m / s which is already outside the margin of error.

We believe that, given the time elapsed, it should repeat the experiment under the same conditions of 1978.

The experience made in 1987 however, should provide a range of 0.09 m / s, which would still be within the margin of error.

**The value of the Universal gravitation variable in Hearth.**

$$G_t = \frac{C_t^2}{2 \frac{Mur_t}{Reu_t}}$$

$$G_t = \frac{C_t^2 Reu_t}{2 Mur_t}$$

$$G_t = \frac{C_0^2 \left(\frac{t_0}{t_t}\right)^2 Reu_0 \left(\frac{t_1}{t_0}\right)^2}{2 Mur_0 \frac{t_1}{t_0}}$$

$$G_t = \frac{C_0^2 \left(\frac{t_0}{t_t}\right)^2 Reu_0 \left(\frac{t_1}{t_0}\right)^2}{2 Mur_0 \frac{t_1}{t_0}}$$

$$G_t = G_0 \frac{t_0}{t_t}$$

$$G_t = G_0 \sqrt{\frac{R_{u0}}{R_{ut}}}$$

Value read	
Year	Value
1978	6,672600000E-11
2005	6,672599994E-11
2008	6,672599993E-11
2020	6,672599991E-11
2070	6,672599980E-11
2120	6,672599969E-11

## The future of the gravity on Earth.

$$g_t = G_t \frac{M_t}{R_t^2}$$

$$g_t = G_o \frac{t_o}{t_t} \frac{M_o \frac{t_t}{t_o}}{(R_o \frac{t_o}{t_t})^2}$$

$$g_t = g_o \left( \frac{t_t}{t_o} \right)^2$$

$$g_t = g_o \frac{T_t}{T_o}$$

The value of gravity on Earth or in any place will increase in proportion to the age of the universe.

Valor lido	
Ano	Valor de g
1978	9,810000000
2005	9,810000017
2009	9,810000020
2059	9,810000052
2159	9,810000117
3009	9,810000666

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### Annex

We go here to make a summary of the new theory of universal gravitation as introduction to the subjects that I will go to treat. All the reasoning had as broken the expression of the gravitational potential:

$$U = \frac{G M}{R}$$

One analyzed which the scientific concepts in cause, concluding itself that the expression  $\frac{M}{R}$ , it did not correspond to any concept.

After an interpretation of what it would represent the expression, was opted to make to substitute  $\frac{M}{R}$ , by  $\frac{M C^2}{4 \pi R}$  this yes represented the potential of local radiation of the mass.

The expression, thus passed to be

$$U = G_k \frac{M C^2}{4 \pi R}$$

Where  $G_k$  would be then the inhibiting factor of the local pure radiation, provoked for the Universal masses/energies. Curious: then my  $G_k$  is not more than what the gravitation permeability of the vacuum.

Our expression also can be presented in the form:

$$U = \frac{G_k C^2}{4 \pi} \frac{M}{R}$$

Soon one concludes that the value of G of our initial expression, is not more than what:

$$G = \frac{G_k C^2}{4 \pi}$$

We can now retake the initial expression, therefore already we know which the direction of its terms.

$$U = \frac{G M}{R}$$

**Let us now think in Universal terms.**

For any place in the universe's radius i:

**What is M?**

As seen before M will be the mass radiation of any mass in the place j,  $M_{U_j}$ .

**We speak of mass radiation. But which are its characteristic?**

In local gravity we have mass radiation, which despite controlled is the mass radiation. Is this mass radiation subject to the action of the local gravity?

In order to answer we should look to the black hole. They are masses generator of gravitational field, capable of bending completely their own radiation of light. Although that happens, the black holes besides their own critical radius, given  $(2 G \frac{M}{C^2})$ , continue to create a gravitational field therefore **this type of radiation does not bend under the action of the local gravity.**

We should look a justification for this realization.

**The gravity is not capable of bending the mass radiation, therefore it's radiation itself in a straight line way across the whole universe.**

Other conclusion we take out of this observation, is the existence of radiation which doesn't bend by action of the gravity, I.e. in its radial spread there will always be radiation perpendicular to the surface of the universe, for which:

If to look at for the beginning, the Big-Bang, then more easily we understand that the Universe grows to the speed of the Light, the energy radiation is radial.

**The universe will grow at the speed of light.**

As electromagnetic radiation, the mass radiation will be limited also by the limit of the speed of light, condition for the consideration of the Doppler effect.

Being  $e_{d_{j-i}}$  the Doppler effect between mass j and the place i.

$$M_{u_{j-i}} = M_{u_j} e_{d_{j-i}}$$

**What is R?**

R is therefore the radius of emission of the mass radiation j to the universal place i, given the date of emission

$R_{u_{j-i}}$ .

$$\frac{M}{R} = \sum_1^n \left( \frac{M_{u_{j-i}}}{R_{e_{j-i}}} \right)$$

$$U_i = G_i \sum_1^n \left( \frac{M_{u_{j-i}}}{R_{e_{j-i}}} \right)$$

Lets, for simplification, replace:

$\Sigma M_{u_{j-i}}$  – All universal mass subject to its Doppler effect which radiates to the place i.

$$M_{uri} = \Sigma M_{u_{j-i}}$$

$$R_{eui} = \frac{\Sigma M_{u_{j-i}}}{\sum_1^n \left( \frac{M_{u_{j-i}}}{R_{e_{j-i}}} \right)}$$

By the equation of the Universal gravitational potential, we will have:

$$U_i = G_i \frac{M_{uri}}{R_{eui}}$$

**What is the value of U?**

Are we capable to determine which is the mass potential created at the local I by all universal masses?

There is an element that relativity has already clearly characterized as the limit speed of this universe, the speed of light, C.

If the maximum velocity permitted in the Universe is C, then it's that same escape speed in any particular point of the Universe.

$$C^2 = 2 G_i \frac{M_{uri}}{R_{eui}}$$

$$G_i \frac{M_{uri}}{R_{eui}} = \frac{C^2}{2}$$

The universal gravitational potential created in any local point will be given by  $\frac{C^2}{2}$ .

We now find the homogeneity talked earlier. The basic texture which means the universal space is homogeny, i.e. the space.

Here is the reason of the non curvature of the mass radiation, because it on its path always finds the same potential in any direction.

In a universe with these absolute homogeneity, locally, it is unthinkable the increase in distance of the celestial bodies, unless it is by the increase of the gravitational variable.

We can now obtain the value for  $G_i$ :

$$G_i = \frac{C^2}{2} \frac{R_{eui}}{M_{uri}}$$

$$G_i = \frac{C^2}{2} \frac{1}{\sum_1^n \left( \frac{M_{uj-i}}{R_{ej-i}} \right)}$$

$$G_i = \frac{C^2}{2} \sum_1^n \left( \frac{R_{ej-i}}{M_{uj-i}} \right)$$

We then get the gravitational variable expression in any point of the universe.

We are really before a new paradigm, the gravitation, “gravitational constant”, has a different nature of that we thought.

Because the Universe is in expansion, therefore  $R_{ej-i}$  grows, and  $M_{uj-i}$  is always constant, then  $G_i$

it grows in the same ratio of the growth of the Universe.