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Vacuum Density, Repulsive Force between Celestial Bodies and the Cause of Gravity

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ABSTRACT

In the present study, the negative mass of the vacuum and the relationship between this negative mass and matter are investigated by discovering the common ground between vacuum and matter and formulating the repulsive force between the negative masses of the two matters. According to Newton's second law, the mass will accelerate if the force is applied to it and the vector of acceleration is in the direction of and in line with the force vector. In the negative mass, applying the force to the negative mass, the acceleration vector is in line with force vector but has the opposite direction due to the negativity of the mass and this acceleration is the same gravitational acceleration. So, the reason for the gravity is discovered. Moreover, the superficial repulsive acceleration of stars and in continuation vacuum suction pressure on the surface of the celestial objects can be formulated and formulated negative mass-energy.

Keywords: Repulsion, Vacuum, Energy, Acceleration, Force, Compressed.

INTRODUCTION

Since the discovery of gravity by Isaac Newton up to now, many theories on the origin of gravity have been made by scientists, but none of them have been able to prove it. In the present study, it is tried to say that gravity can be examined on a quantum scale in order to find a relationship that can justify the cause of gravity. As we know, quantum theory, also known as quantum physics or quantum mechanics, is a branch of physics that examines the behaviors of matter and energy and the interaction between them on a small atomic particle scale at low temperatures [1]. Also, in classical mechanics or Newtonian mechanics, moving and static objects are studied under external and internal forces. The laws of classical mechanics are applied to the full range of objects, from the microscopic objects, such as electrons in atoms to the planets in space, and even to galaxies in distant parts. These laws include Newton's gravitational force. If we want to find a common ground between classical mechanics and quantum mechanics in Newton's gravity, we must assume that gravity is on the quantum scale in order to find a relationship between classical mechanics and quantum mechanics. Using this relationship, we can indicate the cause of gravity. For this purpose, a set of parameters is required. Therefore, firstly, the vacuum mass must be identified and, then the behavior of the mass is examined. According to the definition of vacuum mass, vacuum refers to an environment where the density of particles (atoms and molecules) is much lower than the atmosphere [2]. So, the vacuum has a very low density. But we do not know how mass behaves. If we find how the vacuum mass behaves, we can find the relationship between vacuum and matter using Newton's laws and then, discover the cause of gravity by formulating the aforementioned relationship. Newton's laws So, firstly, the vacuum mass is calculated.

Vacuum mass

A cube with an edge length of 1m is considered. It has a volume of $1m^3$. Under the international standards and at the sea level and a temperature of 15°C, the mass of air inside this cube equals 1.225 kg. Now we remove the air so that this cube reaches the vacuum. In this case, the cube contains a vacuum. We fill the vacuum cube again with the same air that weighs 1.225 kg. In this case, we have a cube containing a vacuum and 1.225 kg of air. Hence, we can write the following equation for the cube:

$Mv+Ma=1.225$ kg (1)

Where,

M (vacuum)=Mv: Vacuum mass

M (air)=Ma: Mass of air

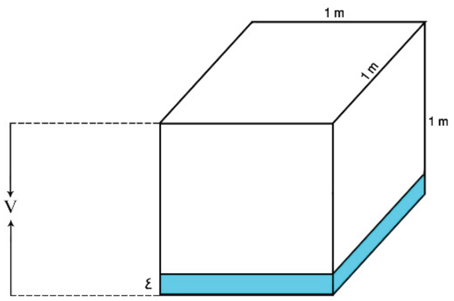

Figure 1: Cube.

Now, we remove the air from the cube. If the cube is completely emptied, we assume that there is air in the cube as much as ε (a very small number close to zero), so, according to Figure 1 Eq. (1) can be written as

$Mv+\varepsilon=\varepsilon-1.225$ kg (2)

On the right side of the equation, since the air inside the cube is emptied and just ε of it remains, the mass of the cube contents is written as follows:

$\varepsilon-1.225$ kg

By simplifying Eq. (2), we have:

$Mv+\varepsilon=\varepsilon-1.225$ kg

$Mv=-1.225$ kg (3)

Eq. (3) indicates that the mass of vacuum in a cube equals to a volume of one cubic meter. If it is assumed that this is the same vacuum mass that is obtained using air mass under the international standards, this equation will tell us that:

The vacuum looks like a shell that contains the matter. In other words, every matter has a shell around itself, called a vacuum. It can be said that the vacuum is a container that can contain any amount of matter mass (This is considered as a hypothesis), and actually, this can be observed in space, and a vacuum surrounds all the celestial objects. Since it has negative mass, it has a very low density and can vacuum the matter. Now, assuming that this is the same mass of vacuum, its mass behavior is studied. As can be seen, the vacuum mass was negative. According to Newton's second law, if a force is applied to an object, it will accelerate and its acceleration is in the direction and in line with the force, and it is directly proportional to the force and an inversely proportional to the mass [3]. But, here, vacuum mass was obtained negative, and we assumed it to be correct, and we know that negative mass is not considered. Now, in Newton's second law formula, if a negative mass is substituted for a mass of matter as follows:

$a=F/m \rightarrow a=F/-m$

It is observed that the obtained acceleration is negative, that is, if the force is applied to a negative mass, the mass will accelerate, and due to the negativity of the mass, the acceleration vector is in line with the force, but in the opposite direction. Moreover, according to the following formula,

$F=-m.a$

The obtained force is negative, in other words, the negative mass multiplied by the acceleration produces a negative force. The negative force is the opposite of gravity, so it must be said that negative force emits repulsive force. So, the vacuum's mass was obtained negative, and we accepted it with the assumption that it is correct, emits repulsive force. Now, there must be a relationship between the repulsive force of the vacuum and the gravitational force of matter, although they are against each other. To find this relationship, we use the second assumption, i.e. the matter is surrounded by a shell of vacuum. If we accept that each matter is surrounded by a shell of vacuum, we can study their behavior. We consider the same two masses with which Newton proved the law of gravity [3]. We assume that every matter is surrounded by a shell of vacuum. So, each of these two masses has a shell of vacuum around themselves. But, we said that the mass of the vacuum shell is negative and it emits repulsive force. Assuming that the center of negative mass corresponds to the center of matter mass, we say that the vacuum shell of the first mass applies repulsive force on the vacuum shell of the second mass. Since the mass of vacuum shell is negative, its acceleration vector is in line with the repulsive force of the first mass, but in the opposite direction of it. Now, we have to prove that this acceleration is the same as the gravitational acceleration defined by Newton. If we prove it, we could find the relationship between the negative mass of the vacuum and the matter. For this proof, first, the repulsive force of the vacuum shells must be calculated. Isaac Newton provided a definition for formulating the law of gravity when expressing the universal law of gravity. According to Newton, if there are two spherical and completely symmetrical masses that the center of mass is exactly the center of the sphere, the gravitational force that they apply to each other will be directly proportional to the multiplication product of two masses and inversely proportional to the squared distance between the centers of the two masses (Figure 2). We now want to assume the same masses in a manner where each of them is surrounded by a shell of the vacuum. Since Newton had assumed the masses to be quite symmetrical, the masses of vacuum shells are symmetric, and the center of the shells are also the center of spheres. Now, using these assumptions, we prove that the repulsive force between the two masses is proportional to the multiplication product of the negative mass of the two masses and inversely proportional to the squared distance between the centers of the negative masses of the two masses.

We want to prove that the repulsive force emitted a spherical surface to a particle outside the sphere, is directly proportional to the negative mass of compressed shell of the vacuum and inversely proportional to the squared distance between the particle and the surface from which the force emitted.

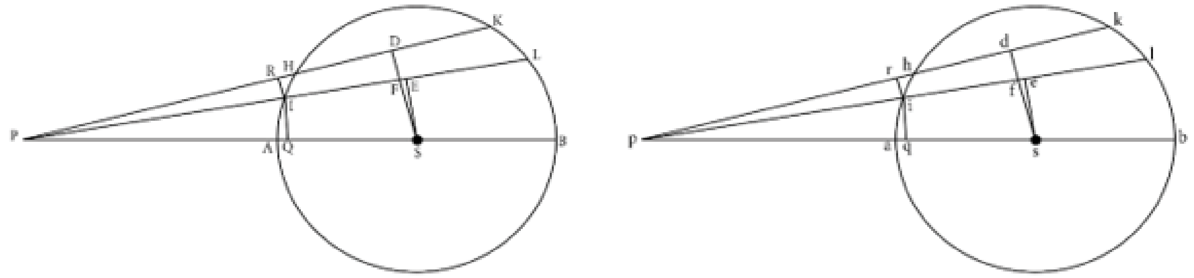

Figure 2: Representation of two spheres.

If we prove that the repulsive force emitted from the compressed vacuum shell of the sphere to the particle is directly proportional to the area of a sphere, we can conclude that it is directly proportional to the negative mass of the compressed vacuum shell. That is why the mass is estimated by multiplying the area of the vacuum shell surface by one-third of the radius of the sphere multiplied by the vacuum density. So, what emits from the sphere surface actually emits from the center of sphere mass.

If there are two spheres, then, according to the above figures, the following assumptions are available:

Two spherical surfaces=AHKB, ahkb

The diameter of circle=AB, ab

Circle center=S, s

Two particles located along the diameter=P, p

The radius of the repulsive force emitted to the particle=(PK, PL), (pk, pl)

As can be seen in the figure, when the repulsive radii are emitted to the particle, some arcs are obtained on the circle:

The arcs obtained from circles=HK, hk, IL, il

Hk=hk

IL=il

(SE) ⊥ (PL), (se) ⊥ (pl)

(SD) ⊥ (PK), (sd) ⊥ (pk)

(IQ) ⊥ (AB), (iq) ⊥ (ab)

(IR) ⊥ (PK), (and) ⊥ (pk)

Location of intersection=F,f

Now if the following lines which collide the particle at an angle simultaneously approach zero, we will have:

(PL, pl) → 0, (PK, pk) → 0

Because

(DS, ds)=(ES, es)

The following lines can be considered equal,

(PE, PF)=(pe, pf)

DF=df

Because, as said above, when the following angles simultaneously approach zero, their proportions eventually equate to each other.

Angle DPE → 0

Angle dpe → 0

So, considering all the conditions stated above, we can write:

PI/PF=RI/DF

Pf/pi=DF/ri

By multiplying the two above terms and simplifying the product, we have:

(PI.pf)/(PF.pi)=RI/ri=arc(IH)/arc (ih) (4)

This means that the repulsive force emitted from the surface of the sphere affects the particles outside the surface of the sphere. It is directly proportional to the surface of the sphere.

Again, we can have:

PI/PS=IQ/SE

Ps/pi=SE/iq

By multiplying these two terms and simplifying its product, we have:

(PI.ps)/(PS.pi)=IQ/iq (5)

By multiplying equations (4) and (5), we have:

$(PI^2.pf.ps)/(pi^2.PF.PS)=(HI.IQ)/(ih.iq)$

From the above result, it can be said that the arc of the spherical surface, where the repulsive force emitted from the surface of the sphere to the particle, is inversely proportional to the squared distance between the sphere surface from which the repulsive force emitted and the particle. Since the repulsive force is directly proportional to the arc, as proved before (Eq.4), the repulsive force is inversely proportional to the distance between the sphere surface and the particle. Then the repulsive force between the two masses can be formulated as follows:

$F1=F2=E(-m1)(-m2)/r^2$ (6)

Repulsive constant: $E=-1007295872\ m^3/kgs^2$

F: The force of repulsion between the star and the planet

-m1: Negative mass of compressed vacuum shell of mass 1

- m2: Negative mass of compressed vacuum shell of mass 2

r: The distance between the center of negative mass 1 and the center of negative mass 2

In Eq. (6), the negative sign indicates that the mass is negative. The negative mass is calculated through a computational process and the mass negative resulted from this process must be substituted to the negative mass in Eq. (6). For example, if in the computational process, a negative is estimated as follows.

$m1=-3.496815467 \times 10^{-6}$ kg

In Eq. (6), negative mass is substituted as follows:

$-m1=-3.496815467 \times 10^{-6}$ kg

Theorem (1)

Now we want to prove that if an object applies a repulsive force to another object, the second object will have acceleration and since the mass of its vacuum shell is negative, its acceleration vector is in the opposite direction of the repulsive force vector of the first mass. Moreover, this acceleration is the same gravitational acceleration as the first mass.

We prove that if a box is located near the earth, a repulsive force will be applied to the box by the earth. If this negative repulsive force is applied to the vacuum shell of the box, its acceleration vector will be in the opposite direction of the Earth repulsive force, and this acceleration is the surface gravity of Earth.

The repulsion force applied to the vacuum shell of the box by the ground is negative and the mass of the vacuum shell is negative. By substituting it in Newton's law [3], acceleration of the vacuum shell of the object is calculated as follows:

$-F/-m=a$

Now, the product of multiplication of the acceleration obtained by mass of the box is the gravitational force, which is the same gravitational force that the earth applies to the box. So we write:

$F=m.a$

But this gravitational force is equal to the gravitational forces of the earth and the box, that is, we can write:

$m.a=GmM/r^2$

where,

m=Mass of the box

M=Earth Mass

By simplifying:

$a=GM/r^2$

Thus, it was proved that the acceleration of the negative mass of the box near the surface of the earth, that its vector in the opposite direction of the earth repulsive force vector, is the gravitational acceleration of earth. At the beginning of the present study, we sought to find a common ground between the repulsive force and the gravity and this common ground was acceleration. Moreover, it was proved that this acceleration, resulted from the repulsive force applied to the second mass by the first mass, is the same gravitational acceleration.

So far, we have found the relationship between the material mass and negative mass, and we know that the acceleration produced due to the repulsive force by a negative mass is the same gravitational acceleration of the opposite mass that has emitted a repulsive force. Now, in order to obtain the negative mass of the compressed vacuum shell around the material mass, we must know the thickness or radius of the shell, so in this case, we use the theory of general relativity published by Albert Einstein in this case.

In the theory of general relativity, Albert Einstein argued that if mass becomes heavier, it would create curvature in spacetime [4]. If we assume that every object creates a curvature in space-time as large as its own heaviness, and assume that along with this curvature, the vacuum around the mass is compressed, we can say the following assumption:

We consider a star that its mass is twenty times the mass of the sun. At the birth of the star, it is a nucleus that surrounded by the vacuum. As the radius of the star expands as much as r, the vacuum is compressed equally (due to the force exerted by the mass of the star). Therefore, the potential energy is stored by compressing the vacuum. The potential energy is equal to the kinetic energy [5], so, we have:

$U=K$

$-mar=-1/2\ mv^2$

$ar=1/2v^2$

$2ar=v^2$

We proved that the acceleration of the negative mass of an object near the surface of the earth is equal to the surface gravity of Earth (proved in Theorem 1). This proof is true for all planets and stars, so, by substituting, Eq. (7) is obtained.

$a=GM/r^2$

$$2GMr/r^2=v^2 \tag{7}$$

If the kinetic energy is released, its velocity will be equivalent to the speed of light, because in the death of a star, after its fuels finishes, its mass falls in singularity, this happens in less than a second [6]. Therefore, by substituting the velocity of light in Eq. (7), we have,

$V=c$

$r=2GM/c^2$

$r(\text{vacuum})=2GM/c^2$

$$rv=2GM/c^2 \tag{8}$$

Where,

rv: Radius of vacuum shell

G: Gravitational constant

M: Star mass

C: Speed of light in vacuum

Eq. (8) is the radius of the compressed vacuum shell around the star or planet and is discussed here. In this equation (Eq. 8), the radius of the vacuum shell is directly proportional to the mass. That is, as the mass increases, the shell radius increases, and the increase in the radius of the shell will result in the increase in the volume and consequently increase in the negative mass (due to the negative density of the vacuum). As the negative mass increases, the repulsive force increases and strong repulsive force in colliding with the negative mass of another object, as previously proved, produces a strong gravitational acceleration. This gravitational acceleration is toward an object with a large shell radius. Therefore, we can say that black holes have strong gravitational forces. According to Eq. (8), if a star radius is smaller than the radius of its vacuum shell, that star is a black hole.

Vacuum density:

So far, we have found that the vacuum mass is negative, so, the vacuum density is also negative. By substituting the negative mass in the density formula [7]

$\rho=m/v \rightarrow \rho=-m/v$

Where,

ρ=Density

m: Mass=m → -m: negative mass

v: Volume

The negative density in the antimatter is quite opposite of the matter density. Here, the larger the negative mass (that is, a large number with the negative sign), the heavier the mass (in antimatter) and its density is greater, and the greater density in the antimatter means greater flotation (in vacuum), which means that the reason for motion of stars or planets in space is their mass asymmetry in the center. So, that area of the sphere closer to the center of mass has a thicker vacuum shell, and consequently, the shell volume in that area is larger and larger volume has greater negative mass, and greater negative mass produces greater density and greater density in the antimatter means greater flotation. Then the sphere moves forward in that area.

Calculation of repulsive constant

According to Kepler's second law, a line joining a planet and its star sweep out equal areas during equal intervals of time [8]. Therefore, in order to make the mathematical calculations easier, we can assume that the orbit of Earth is a circle, and we use the mean radius. If the orbit of Earth orbit moves in the direction of the orbit as much as alpha by the line joining the Earth and sun, the area of the swept surface is equal to:

$S=\alpha/360 \times (\text{лr}^2)$

By differentiating the radius, we have:

$P=\text{лr}\alpha/180$

This equation is used to calculate the length of orbit. So, for a circular orbit of the earth, the length of the orbit is:

P=939953595.5 km

Now, with the orbital period of Earth and converting it into seconds, we can calculate the movement speed of Earth in the orbit around the sun. If the orbital period of Earth around the sun is 365 days and 6 hours and 9 minutes and 54.9 seconds, we have:

$V=d/t$

$V=939953595.5\{(365 \times 24 \times 3600)+(6 \times 3600)+(9 \times 60)+(54.9)\}$

V=29.78 km/s

We said that the cause of the orbit of the star or planet is its compressed vacuum shell, and this shell is always associated with the mass of a star or planet. We calculated the movement speed of Earth in the orbit around the sun, and the velocity of the vacuum shell around the earth is equal to that of Earth. In the case of translational motion, the acceleration is centripetal [9]. The gravity between the Earth and the Sun is calculated in a circular motion with centripetal acceleration as follows:

$F=mv^2/r$

This equation is the force of gravity. Here, the earth rotates around the sun and since the acceleration is centripetal, an equation changes to this form. We use the negative mass of the shell instead of the mass of Earth in order to obtain the repulsive force of it in that orbit because we have proved that the repulsive force is directly proportional to the negative mass, so the equation changes as follows:

$$F=-mv^2/r \quad (9)$$

By substituting the negative mass of Earth shell in Eq. (9) and the velocity of the translational motion of the Earth and the radius of the orbit of the Earth around the sun, the force of repulsion between the sun and earth is calculated. First, in order to obtain the negative mass of the vacuum shell, the radius of the compressed shell of the earth must be calculated.

$rv=2GM/c^2$

$rv=2 \times (6.67384 \times 10^{-11}) \times (5.9736 \times 10^{24})/(300000 \times 1000)^2$

$rv=8.8 \times 10^{-3}$ m

$V=(4/3)$ лr$^3=2.912640303 \times 10^{-6}$ m^3

Now, the vacuum density is calculated according to the formula with the assumption of the negativity of the vacuum mass:

$Mv=-1.225$ kg

Since the vacuum mass was estimated in a box with a volume of one cubic meter under the international standards of air, the vacuum density becomes as follows.

$\rho=-m/v$

$\rho=-1.225/1$

$\rho=-1.225$ kg/m^3

Where,

-m: Negative vacuum mass=-m

The negative mass of the compressed earth vacuum shell is obtained by multiplying the vacuum density by the volume of the vacuum shell. We have:

$m=-1.225 \times 2.912640303 \times 10^{-6}=-3.496815467 \times 10^{-6}$ kg

Now with the gravitational force formula, we have:

$F=-mv^2/r$

$F=-3.496815467 \times 10^{-6} \times (29.78\times1000)^2/(149598261 \times 1000) =-2.07298212 \times 10^{-8}$ kg m/s^2

By substituting the repulsive force obtained in the following formula and calculating the negative mass of the compressed vacuum shell of the sun, as similar to the above calculations, we have:

Mass of compressed vacuum shells of the sun: $M=-1.317100388 \times 10^{11}$ kg

$F1=F2=E\ (-m)\ (-M)/r^2$

$-2.07298212 \times 10^{-8}=E \times (-3.496815467\times10^{-6})*$

$(-1.317100388 \times 10^{11})/(149598261 \times 1000)^2$

$E=-1007295872$ m^3/kg s^2

Above value is a repulsive constant between two compressed vacuum shells.

Problem: We have two masses, like the sun and earth, we want to computationally prove that as the result of the force of repulsion between the sun and the earth, the negative mass accelerates and its acceleration is equal to the gravitational acceleration.

We first calculate the gravitational force of the Earth and the Sun. We have the following formula [3]

$F1=F2=Gm\ M/r^2$

G: Gravitational constant

m: Earth mass

M: Mass of the Sun

r: Distance between the center of the earth and the center of the sun

$F1=F2= (6.67384 \times 10^{-11}) \times (5.9736 \times 10^{24}) \times (1.989 \times 10^{30})/(149598261 \times 1000)^2$

$F1=F2=3.543183311 \times 10^{22}$ kg m/s²

This is the gravitational force between the earth and the sun. We substitute it in the following equation to obtain the gravitational acceleration.

$F=mv^2/r$

$3.543183311 \times 10^{22}=5.9736 \times 10^{24} \times (v^2/r)$

$a=v^2/r$

$$a=5.93 \times 10^{-3} m/s^2 \quad (10)$$

The earth gravitational acceleration around the sun is calculated. Now, given the equation of repulsive force, we obtain the repulsive force between the Earth and the sun. Since we require the negative masses of the Earth and the Sun in order to substitute them in the equation, we first calculate their negative masses.

First, we calculate the radius of the Earth vacuum shell using the following equation:

$rv=2Gm/c^2$

$rv=2 \times (6.67384\times10^{-11}) \times (5.9736 \times 10^{24})/(300000 \times 1000)^2$

$rv=8.8 \times 10^{-3}$ m

The volume of the Earth vacuum shell is calculated according to the radius obtained:

$V=(4/3)\,\text{л}r^3= (4/3).\,\text{л}.\,(8.8 \times 10^{-3})^3$

$V=2.854543238 \times 10^{-6}$ m³

The volume obtained is multiplied by the vacuum density to obtain a negative mass.

$m=\rho V$

$m=-1.225 \times (2.854543238 \times 10^{-6})$

$m=-3.496815467 \times 10^{-6}$ kg

the obtained mass is the negative mass of the earth, and the negative mass of the sun is calculated in the same way:

$M=-1.317100388 \times 10^{11}$ kg

The obtained values are substituted in the repulsive force formula

$-m1= m=-3.496815467 \times 10^{-6}$ kg

$-m2= M=-1.317100388 \times 10^{11}$ kg

$F1=F2=E\,(-m)(-m2)/r^2$

$F1=F2=-1007295872 \times (-3.496815467 \times 10^{-6}) \times (-1.317100388 \times 10^{11})/(149598261 \times 1000)^2$

$F1=F2=-2.072982119 \times 10^{-8}$ kg m/s²

This is a repulsive force between the earth and the sun. Now we introduce it in the following formula to get the acceleration

$a=F/-m$

$a=-2.072982119 \times 10^{-8}/-3.496815467 \times 10^{-6}$

$$a=5.93 \times 10^{-3} m/s^2 \quad (11)$$

As can be seen, the two acceleration values are the same. This means that the acceleration obtained from the sun's repulsive force on the earth is the same as the gravitational acceleration of the sun. Therefore, the cause of the gravity of the earth is a repulsive force between the earth and the sun, and its result is acceleration. This acceleration, due to the negative masses of the earth and the sun, is in line with the repulsive force, but opposite to the direction of the repulsive forces. That is, the repulsive force of the sun on the ground causes an acceleration that its vector is in the opposite direction to the repulsive force of the sun and towards the sun due to the negative mass of the earth. This is the same gravitational acceleration of the sun. If this acceleration is multiplied by the mass of the earth, the product is the same gravitational force between the sun and the earth.

An equation of repulsive force is as two following equations:

$F=-mv^2/r$ $F1=F2=E\ (-m)(-M)/\ r^2$

Equating these two relations:

$-mv^2/r=E(-m)(-M)/r^2$

Simplifying:

$V=\sqrt{(E.(-M)/r)}$

The above equation is an equation used to calculate the velocity of planets in its orbit.

Repulsive constant=E=-1007295872 $m^3/kg\ s^2$

-M: The negative mass of the vacuum shell of the star that the planet rotates around it

r: Orbital radius that the planet rotates

Calculation of the superficial repulsive acceleration of planets and stars:

(Source): In the book "Introduction to Astronomy" by Dr. Mohammad Reza Haydari. The Khwaje Pour explained and proved the calculation method of the gravitational constant developed by Isac Newton. I change this method and then, explain and prove how to calculate the repulsive acceleration.

Suppose a ball falls on the surface of the earth. This ball and the earth apply forces to each other. For this ball and the earth, near the surface of the earth, the repulsive force is calculated as follows:

$$F=E\ (-m)(-M)/r^2 \quad (12)$$

Where,

E: Repulsive constant

-m: Negative mass of ball vacuum shell

-M: Negative mass of the earth vacuum shell

r: Earth radius

The repulsive force that the ball applies to the earth is equal to:

$$F=-ma \quad (13)$$

Equating Eq. (12) and Eq. (13), then we get

$-ma=E(-m)(-M)/r^2$

Simplifying:

$$a=E(-M)/r^2 \quad (14)$$

Eq. (14) is used to calculate the repulsive acceleration of the planet or star.

Where,

a: repulsive acceleration of planet or star=a

E: repulsive constant

-M: Negative mass of planet or star vacuum shell

r: Earth radius

For example, the Earth repulsive acceleration according to this equation is equal to:

$a=8.677898346 \times 10^{-11}$ m/s²

It should be noted that this acceleration is different from the acceleration resulted from the repulsive force of a star on the planet. This acceleration is the earth repulsive acceleration and the repulsive acceleration of each planet or star is specific to it and obtained using the above equation.

The relationship between energy and negative mass:

Now, we want to say that we understand what the negative mass is. So, this negative mass can be converted into energy, so in the repulsive acceleration equation, we have:

$a=E(-M)/r^2 \rightarrow \quad -M=ar^2/e$

$E=e \; A=F/-M \quad \rightarrow A=F/(ar^2/e)=eF/ar^2$

According to theorem (1) $A=GM/r^2$

$GM/r^2= eF/ar^2 \rightarrow M=eF/Ga$

$E=MC^2 \rightarrow E=(e/G).(F/a).c^2$

$e=-1007295872$ m³/kgs² and $G=6.67384 \times 10^{11}$ m³/kgs²

$\rightarrow e/G=-1.50931978\times10^{19}$

$$E=(1.50931978\times10^{19}).(-F/a).c^2 \quad (15)$$

E: Negative mass energy

-F: Repulsive force

a: superficial repulsive acceleration

C: Speed of light in vacuum

Equation (15) is the energy derived from the negative mass. In this equation, the equivalence between energy and negative mass is evident because

-F/a

As the negative mass increases, the repulsive force increases, and the repulsive acceleration increases as well as the energy increases. Also, if the repulsive acceleration value in the denominator increases, the repulsive acceleration will increase. An increase in each of them (repulsive acceleration or force) depends on the increase in the negative mass. This increase (in repulsive acceleration or force) increases energy. We conclude that increasing or reducing the negative mass causes an increase or a decrease in energy. So, in this equation, energy is also equivalent to the negative mass.

Vacuum pressure:

So far, there are some problems in calculating vacuum pressure because according to the pressure equation [10]

$P=F/A$

$F=mg$

$P=mg/A$

But this equation cannot be used for vacuum pressure. Because we do not use gravitational acceleration to calculate vacuum pressure, and we should use repulsive acceleration instead of that. Because the vacuum acts as suction, we should also use a vacuum density that is negative. Therefore, we have calculated the repulsive acceleration of the planet or star in the above equation, and we can calculate repulsive acceleration. For example, if we get out of Earth's atmosphere by a meter. Vacuum pressure will be a volume of a cubic meter on a surface of one square meter.

$P=\rho v\ a/A$

ρ: Vacuum density

V: Vacuum volume

a: superficial repulsive acceleration

$P=-1.063042547 \times 10^{-10}$

The negative sign in vacuum pressure means suction, for example, the vacuum suction at ground level near the atmosphere is maximum and reduces due to reduced repulsive acceleration by moving away from the ground. In other words, if we use the term "pressure", we should say vacuum suction pressure means the word "pressure with suction".

Proof of translational motion of earth due to the effect of vacuum pressure:

It was said, the higher the repulsive acceleration, the greater the vacuum suction. We have already explained the cause of the translational motion of the Earth in the section of the vacuum density. Here, we prove it with respect to vacuum suction pressure.

We said that the greater the repulsive acceleration, the greater, the vacuum suction pressure is. In the following equations, it is observed that:

$$rv=2GM/c^2 \qquad (12)$$

$$\rho=(-m)/v \qquad (13)$$

$$a=E(-M)/r^2 \qquad (14)$$

$$P=\rho va/A \qquad (16)$$

In Eq. (12), the radius of the vacuum shell increases as the mass increases. By increasing the radius of the shell, the hell volume increases. In Eq. (13), the negative mass increases as the volume increases. With the increase in the negative mass in Eq. (14), the repulsive acceleration increases. With increasing repulsive acceleration in Eq. (16), the suction pressure increases. Then, in the translational motion of the star or planet, each part of the planet or star is closer to the center of mass, the surface of the star or planet has a greater radius of the vacuum shell in that part. As we said earlier, the greater the radius of the shell, the larger is its volume at that level, as the result, the greater its negative mass at that level. According to Eq. (14), where the negative mass is greater, there is a higher suction acceleration, and therefore, at that level, the suction pressure is higher than the other surfaces. It moves forward.

CONCLUSION

Therefore, the vacuum has a negative mass which has repulsive force. Every material, in addition to gravity, has a repulsive force that is developed by the compressed vacuum crust around the material or its negative mass. By calculating the repulsive force and imposing it to the negative mass, it will have an acceleration that the vector of this acceleration is in the reverse direction of the first mass repulsive force. This is the gravity acceleration of the first mass. If we multiply it to the second mass, gravity force of the first mass will be obtained. Vacuum with its negative mass also has negative density i.e. if negative mass value approaches infinite negative side, its density will reduce, and the density reduction means the higher floating for the mass; therefore, the reason for orbital motion of stars and planets is first the asymmetry of mass center. Vacuum radius is higher where the mass center is near to the sphere and higher radius occupies the larger part of the crust and as a result, negative mass approaches infinite negative direction and the closer to the infinite, the more reduction in density will occur; lower density means higher floating and this floating probably causes orbital motion. If we want to study the orbital motion of stars in terms of vacuum suction, we should say that due to the asymmetry of the mass of the surface nearer to the mass center, vacuum crust radius is higher which increases the volume of vacuum crust. This higher volume approaches the negative mass to the infinite negative direction and increases the surface repulsive acceleration (higher surface gravity on the earth is the result of the proximity of mass center to the crust) and where the surface repulsive acceleration is higher the vacuum suction increases. As a result, vacuum suction surface is higher than other directions and moves with star and planet. This causes the orbital motion of a star or a planet.

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