

The Dual Cause of the Force of Gravity the Completion and Verification of the Law of the Universal Attraction and a New Proposal for the Origin of the Mass of Subatomic Particles

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Abstract

Newtonian gravity, Einstein's space-time, the gravitons, the Higgs particle of the established model, the remainder dF_e and the Global gravity, of the "Modern theory of everything" [1]. Could you imagine a natural phenomenon, simpler than watching an apple to be falling to the ground? However, the initial explanation be given to this simple phenomenon that, "*The Earth is the center of the Universe, and as all bodies are attracted to this center, they will be attracted to the Earth*", was wrong. The correct explanation that: "*All material bodies are attracted to each other, as well as to the Earth, which is also a material body*", was given by Newton and was a very simple, correct and successful explanation. The force that bodies are attracted to the Earth been called "Gravity" and the law that calculates this force been called the law of the "Universal Attraction". Since then been made, many changes in Theoretical Physics, challenging some of Newton's explanations, for gravity and the law of the Universal attraction. These changes I describe in this paper, adding the suggestion of the dual cause of gravity, which complements and verifies Newton's views. At the end of the work I formulate a new proposal for the origin of the mass of subatomic particles, which goes beyond the Higgs mechanism.

Introduction

At first, and until Newton's era, the word "gravity" defined the force that made the material bodies to fall downwards. The phenomenon was very simple and people explained it by the following rationale: "*The Earth is the center of the Universe and as all bodies are attracted towards this center, they are also attracted towards the Earth*".

The explanation provided was so convincing and so simple that no one could think to provide a more complete one. However, when, in the end of the seventeenth century, Newton studied the phenomenon of the fall of bodies more attentively, he discovered that the explanation provided was erroneous and that the correct one was that: "*All material bodies are attracted to one another and, therefore, they are also attracted towards the Earth, which is a material body too*".

The “Newtonian gravity” and the law of the “Universal attraction”

Newton generalized the above explanation on all the material bodies in the Universe, i.e. the attraction of satellites by the planets, the attraction of the planets by the stars, the movement and coherence of the galaxies, as well as, for any other material object that is found into the Universe, unifying the notions of the Earthy and Celestial gravity, notions defining the same thing, i.e.: the force between two material bodies, a force owing its name to Newton. And usually it is called Newtonian gravity.

Then, Newton discovered also, the law of the “Universal attraction” that defined the size of the Newtonian gravity F_{Ng} , for two material bodies, by the following well known formula:

$$F_{Ng} = G_{Ng} \frac{m_1 \cdot m_2}{r^2} \quad (1)$$

where: F_{Ng} the gravitational force, the –Newtonian gravity–, generated between the two material bodies, G_{Ng} the Newton’s Universal constant, m_1 and m_2 the masses¹ of the two material bodies and r the distance between them.

The weak points in the “Newtonian gravity” and in the law of the “Universal attraction”

Although the above descriptions of Newtonian gravity and the law of the Universal attraction were very simple and complete descriptions, in their details presented some serious weak points, that had to be clarified, i.e.:

- ✓ Newton's views may have correctly described the phenomenon of gravity, but they did not describe the cause of this phenomenon.
- ✓ The formula (1), in the case of very short distances², between two atoms, or two material bodies, or for a distance $r = 0$, is untrue and calculates very large values of gravity, while in fact gravity, for such distances takes small values and values around zero.
- ✓ In the case of large masses³ and relatively short distances⁴, the values of the formula (1) differ significantly from the actual experimental results.

The proposed theories to resolve the above weaknesses

To resolve the weak points of the “Newtonian gravity” and the law of the “Universal attraction” many theories were proposed, from which the General Theory of Relativity (GR), the Quantum Mechanics (QM)⁵ and the Theory of Quantum Gravity (QG) stood out; where:

¹ The mass of an atom, or a material body, is the sum of the masses of the electrons, protons and neutrons, of the atom or of the material body.

² For distances comparable to the size of the atoms.

³ For masses comparable to the masses of the planets.

⁴ For distances into our solar system.

⁵ As well as the part, of the theory, explains gravity.

The General Theory of Relativity (GR)

The General Theory of Relativity (GR), tell us that gravity is due to the curvature of space-time. Einstein simply assumed that masses could curve space around them and along with time, could produce gravity. This hypothesis is a rather bold and somewhat difficult one, which has not yet been fully confirmed. However, even if this hypothesis will be confirmed that gravity is due to the curvature of space-time, (GR) as a theory completes only the weak point, of the case of large masses and relatively short distances, calculating the orbits of the planets more accurately and explaining why these are not static orbits.

Of course, the (GR) explains some other physical phenomena, such as the deflection of light by large material bodies, the shift of the light spectrum of galaxies to red, etc. However, these explanations are not related to gravity but serve, just to verify the correctness of the (GR). So (GR) even if it be verified as a correct theory, to explain gravity, it completes only the weak point concerning the case of large masses and relatively short distances, but does not answer the other questions about the weak points of gravity.

The Quantum mechanics (QM) and the theory of Quantum gravity (QG)

According to Quantum Mechanics (QM), there is the subatomic particle “Higgs” which contributes to the formation of the quarks, electrons, protons and neutrons masses. From the masses of the quarks, electrons, protons and neutrons are created the masses of the atoms and material bodies. Then, between the masses of the atoms and material bodies, hypothetical particles (particles that have not been detected) the “gravitons” are exchanged, which create Newtonian gravity.

The idea of exchanging gravitons between atoms or material bodies to create the Newtonian gravity arose from the comparison of gravity with electromagnetism, where the creation of electromagnetic force is the result of the exchange of the corresponding “photon” particles between charged particles, or charged material bodies. So, we can assume that, maybe what happens with electromagnetism, also will happens with gravity.

Although the hypotheses: a) That, indeed, there is the Higgs particle that creates the mass of the quarks, electrons, protons and neutrons and b) that there is the graviton particle that creates the gravity of the atoms and material bodies, have not been confirmed yet, Swedish Academy hastened to award the 2013, Nobel Prize in Physics to François Englert and Peter W. Higgs, “for the theoretical discovery of a mechanism that contributes to our understanding of the origin of mass of subatomic particles, the discovery of the predicted fundamental Higgs particle in the ATLAS and CMS experiments at CERN's Large Hadron Collider”.

Of course, even if the theory of (QM) proves to be correct theory, in terms of Higgs particle and graviton, it only answers the weak point about how the mass of subatomic particles was created and what is the cause of gravity. However, it does not answer the questions: a) why formula (1), in the case of very short distances, between

two atoms, or two material bodies, or for a distance $r = 0$, calculates very large values of gravity, when in fact gravity, for such distances it takes very small values, or values around zero and b) why in the case of large masses and relatively short distances, the values of formula (1) differ significantly from the actual experimental results.

After the above analysis we observe that we have two theories (GR) and (QM), each of which explains only some of the weaknesses of “Newtonian gravity” and the law of the “Universal attraction”. So the question is, if the unification of the two theories, (GR) and (QM), can lead us to a more complete result? Thus, the theory of Quantum gravity (QG) was created, which tries to unify the two theories, (GR) and (QM). But to date (QG) has not yet given any substantial results. I personally believe that the effort to explain the weaknesses of the Newtonian gravity and the law of the Universal attraction in this direction is on the air, as the questions that remain unanswered, are very basic and too many questions. However, even if the theories (GR), (QM) and (QG) prove to be correct theories and can then be unified, the weak point: *Why gravity in the case of very short distances or distances $r = 0$? it is not infinite, but on the contrary it is very small and becomes even zero, will remain unanswered.*

The explanation of gravity according to the proposed theories

Although the above theories have not been confirmed yet; due to the great persistence of the researchers who proposed them and the scientists who support them, have been established with the result that instead of answering the weaknesses I described, many of Newtonian views of gravity been challenged. And the situation to be further confused.

So if you ask a physicist today what gravity is and how gravity is created, he will probably not answer, or if he does, he will give you a vague answer and then will advise you to ask another colleague who specializes in gravity. If you succeed and find a specialist, the most likely answers you can get are:

- ✓ If the expert you are going to ask has studied (GR), the answer you will get is that, gravity is the force of attraction, between two materials bodies and is due to the curvature of space-time. If you ask what the curvature of space-time means, he will explain that the curvature of space-time is a complex mathematical concept that requires careful study of (GR) to understand it.
- ✓ If the expert you ask has studied (QM), the answer will be that gravity is due to the Higgs particle, which creates the masses of subatomic particles, and the graviton particle, which are exchanged between masses of atoms, or of material bodies and creates gravity. If you ask what the Higgs particle is and what the graviton is, the expert will tell you that the Higgs particle is a particle that creates the masses of all the other subatomic particles, which then, with the help of gravitons exchanging, create gravity. However, to understand how this whole mechanism works, the expert will advise you to carefully study the respective chapters of the (QM).
- ✓ If the expert you are going to ask has studied both the theories, (GR) and (QM), he will tell you to wait, because the final answer as to what gravity is and how it is created will be given in the coming decades by the new theory (QG) which will describe the unification of the two theories, (GR) and (QM).

After the thinking about of the above three paragraphs, I believe that the reader will realize that if one wants to understand gravity, must not only be a simple physicist, but also must have specialized knowledge of (GR) and (QM). And the question arises: Is it possible that such a simple natural phenomenon as the fall of an apple to the ground is so confusing that in order someone to understand it must not only be a physicist, but must also have specialized knowledge in (GR) and (QM)? But however there are much simpler explanations for gravity, such as the suggestion I describe below where I prove that, in order to understand gravity, we do not need to be specialist physicists: but all we need to do is to go back to Newtonian gravity, study the suggestion I describe next carefully, and then try to explain the weaknesses of the Newtonian gravity, with simple but correct thoughts, based on the following suggestion, without complicated assumptions that take us, away from reality.

The suggestion for the dual cause of gravity, the answers to the weak points and the completion and verification of the “Newtonian gravity” and the law of the “Universal attraction” and a new proposal for the creating of the mass of the subatomic particles

Atoms, although created from charged (protons and electrons) and neutral (neutrons) particles, in their original state, are presented as neutral elements of matter. But if we study carefully the electromagnetic forces created between protons and electrons in two atoms, we will notice some very small and slightly noticeable differences due to which the sum of the forces created, is not zeroed, but remains a very small (infinitesimal) remainder dF_e .

For a better understanding of this thought, I present Figure 1, where I note the forces created between protons and electrons in two Hydrogen atoms. Figure 1 shows that, due to the different distances between electrons and protons, these forces differ, albeit slightly, from each other.

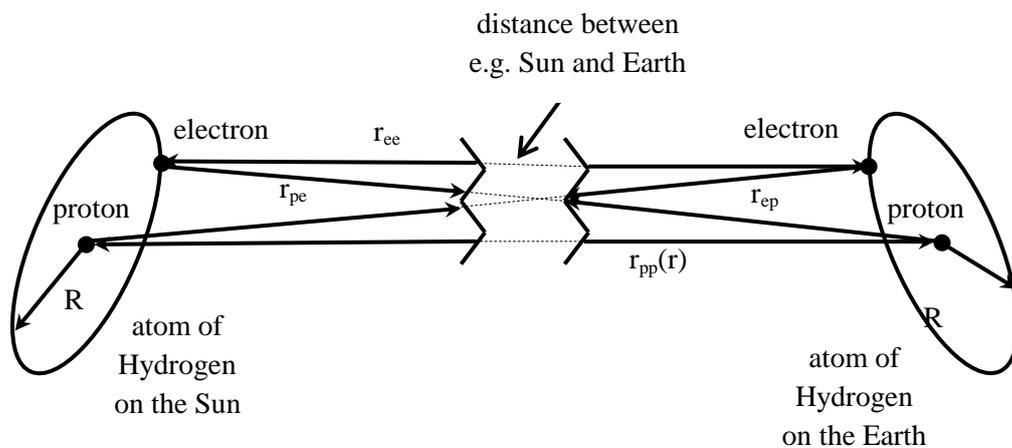


Figure 1: The attractive and repulsive forces between the protons and the electrons of two Hydrogen atoms.

In my book, “A Modern Theory of Everything” [1], I describe some other factors that contribute to the formation of the dF_e remainder, such as the motion of the electron around the nucleus, the shape of the orbit of the electron and the possible even the smallest difference in electrostatic constant K between attraction or repulsion of protons and electrons.

I formulated the above thought in the following suggestion:

“When the negatively charged electrons, enter in rotational orbits around the positively charged nuclei, in order to form atoms, the difference between the attraction and repulsion forces exerted by the charges of the electrons and nuclei of those atoms, to the electrons and nuclei of the other atoms, are not totally zeroed, but remains a very small remainder dF_e . This remainder in conjunction with the existing masses of the protons, neutrons and electrons, generates the gravity of the atoms and furthermore the gravity of the material bodies.”

In fact we can say that gravity of the atoms and material bodies is generated by two different causes that each one plays its own role in its formulation. Specifically gravity is formulated by:

- ✓ The attraction F_{Ng} of the masses of the atoms, or the material bodies, as the formula (1) on page 2.
- ✓ And from the remainder dF_e , as the above suggestion.

So we have:

$$F_{Gg} = F_{Ng} + dF_e = G_{Ng} \frac{m_1 * m_2}{r^2} + dF_e \quad (2)$$

Where: with F_{Gg} characterize the new value of gravity, named Global gravity, to separate it from Newton’s gravity F_{Ng} .

In my book, “A Modern Theory of Everything” [1], I calculate the formula of the remainder dF_e which is:

$$dF_e = 1.27 \cdot 10^{36} \left\{ \ln \left[\left(1 + \frac{1}{f^2 - 1} \right)^{f^2 - 1} * \left(1 + \frac{1}{2f^2} + \frac{1}{\chi f^4} \right) \right] - 1 \right\} * G_{Ng} \frac{m_H^2}{r^2} \quad (3)$$

where for certain values of x into the interval ($x = 2$ to $x = 4$), the values of the above remainder dF_e may be correspond to the actual values of the dF_e , in nature It is f the quotient $r / 2R$, r is the distance between the two atoms, R and m_H is the radius and the mass of the hydrogen atom and G_{Ng} the Newton’s Universal constant.

If in the above formula we replace:

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$$G_{dF} = 1.27 \cdot 10^{36} \left\{ \ln \left[\left(1 + \frac{1}{f^2 - 1} \right)^{f^2 - 1} * \left(1 + \frac{1}{2f^2} + \frac{1}{\chi f^4} \right) \right] - 1 \right\} * G_{Ng}$$

We will yield the formula:

$$dF_e = G_{dF} \frac{m_H^2}{r^2}$$

And with a similar reasoning for two atoms or two material bodies of masses m_1 and m_2 , at a distance r we will yield the formula:

$$dF_e = G_{dF} \frac{m_1 * m_2}{r^2}$$

So the formula (2) on page 6 becomes

$$F_{Gg} = F_{Ng} + dF_e = G_{Ng} \frac{m_1 * m_2}{r^2} + G_{dF} \frac{m_1 * m_2}{r^2} = G_{Gg} \frac{m_1 * m_2}{r^2}$$

or

$$\boxed{F_{Gg} = G_{Gg} \frac{m_1 * m_2}{r^2}} \quad (4)$$

Where we have: F_{Gg} the new value of gravity, the Global gravity, G_{Gg} the Global gravitational factor, which is the sum of G_{Ng} and G_{dF} , m_1 and m_2 the masses of the two atoms or the two material bodies and r the distance between them. The formula (4) gives us the new value of gravity, the Global gravity that applies with mathematical precision to the whole Cosmos⁶, from elementary particles to infinity.

The investigation of the formula (3) of the dF_e remainder has a huge mathematical interest and plays a very big role in the investigation of gravity. But I think it is too early to describe this investigation –which is quite complicate–, since this is a topic of mathematics and will get us away from the main purpose of this work. However it is very easy to distinguish and describe in advance three very basic and very important properties of the dF_e ⁷, namely:

⁶ In my book, “From elementary particles to the limits of the infinite Cosmos” [2], I describe the “Theory of the Chain Reaction”. According to the “Theory of the Chain Reaction”, together with matter, antimatter is created and consequently, together with the Universe, the Antiuniverse is created too, and perhaps many other Universes and Antiuniverses that all together create Cosmos.

⁷ At this stage of the research, we are not interested about the precise determination of the value of dF_e , but what is of high significance is the presence of the dF_e , because as we shall

- ✓ For conventional distances r and conventional masses values, the dF_e , is infinitesimal and almost zero⁸.
- ✓ For conventional distances and large masses, acquire small but measurable values of the dF_e and
- ✓ For very short, –atomic–, distances, the dF_e , acquire measurable values, which affect Newton’s gravity.

These properties of the dF_e remainder are very basic properties for explaining gravity. Especially if there was no the third property, there would be no the Cosmos too. The above properties, in addition to giving answers to all the weak points of Newtonian gravity and the law of Universal attraction, also give answers to the following questions, which have remained unanswered, from the existing theories up to date, namely:

-Why, in the long distances of the megacosm, Newton’s gravitational constant G_{Ng} is really constant?

-Why, at very short –atomic– distances, the gravitational constant G_{Ng} becomes even zero and even negative?

-Why, atoms do not destroy themselves, by their attraction when approaching, as with the charged elementary sub-atomic particles happen?

-Why, gravity and electromagnetic interactions have the same range –infinite–, but a huge power difference, -10^{-36} –?

-Why light is attracted by large masses?

-What is the cause that creates the anomalous precession of the perihelion of Mercury ? etc.

These; for gravity and the remainder dF_e . Next, I will describe a very interesting new proposal regarding the origin of the mass of the subatomic particles and I would ask readers to take it very seriously, as this new proposal completely changes the existing data of Theoretical Physics and leads us to new very interesting views. The proposal is that:

“The mechanism of the remainder dF_e can remove effectively the Higgs mechanism, which has been proposed for generating of the mass of subatomic particles”

And in very simple words, we can say that when subatomic particles enter in rotational orbits around the oppositely charged particles to form new particles⁹, the

see, it explains and completes all the weak points, in Newtonian gravity and in the law of the Universal attraction.

⁸ In this case the formula (4) that gives, the new value of gravity, the Global gravity, coincides with the formula (2) that gives the Newtonian gravity.

forces between their charges are not completely neutralized but a very small remainder, corresponding to the remainder dF_e , which we have studied, remains. This remainder contributes to the creation of the mass of the subatomic particles.

Specifically, when pointons¹⁰ enter in rotational orbits around the antipointons, –or vice versa–, to form the quarks, electrons and their antiparticles, the remainder dF_e creates the mass of quarks and electrons. When the quarks enter in rotational orbits to form the nucleons, i.e. the protons and neutrons, the remaining dF_e , added to the already existing quark masses, creates the mass of the protons and neutrons. Then we have the case we have already discussed, where the remainder dF_e , creates the gravity and mass of the atoms and material bodies.

I describe the above mechanism in the theory of the chain reaction, in my book “From elementary particles to the limits of the infinite Cosmos” [2] and in my book “A Modern Theory of Everything” [1] I will describe the detailed details of the mechanism in the theory of the creation of matter and antimatter, in the third book of the trilogy of creation, “The first second”, where I will describe how the first moments of the creation evolved from the beginning , until the end of the first second.

As far as the 2013 Nobel Prize for Higgs particle, is concerned, it's up to the Swedish Academy decision whether it will insist on the unilateral support for the unconfirmed Higgs mechanism for the creation of the mass of subatomic particles, or it will take equal distances, giving the same opportunities in the mechanism of the dF_e remainder.

Conclusions and the return to Newtonian gravity and in the law of the Universal attraction

If we make a summary of the above reasonings on the questions, why atoms and material bodies are attracted to each other and how the forces with which they are attracted behave? We will notice that, initially, a very successful explanation was given by Newton, with Newtonian gravity and the law of the Universal attraction. However, the explanation given by Newton, in its details, presented some weak points that needed to be clarified.

To clarify the weaknesses of Newtonian gravity, and the law of the Universal attraction, many theories were proposed, of which (GR) and (QM) stood out today. But (GR) and (QM) instead of explaining the weaknesses of the Newtonian gravity and of the law of Universal attraction, normalizing somewhat the situation, confused

⁹ In the theory of the chain reaction [2], the circular orbits of particles to form new particles are not limited to the formation of atoms from nuclei and electrons, but also continue to particles that are created inside the nucleus of the atom.

¹⁰ Pointons and antipointons are the subdivisions of electrons and quarks. They are massless particles, have only electromagnetic charge and are the elementary particles of matter and antimatter [3].

it even more, with the result that Theoretical Physics in the field of gravity has been led to a complete impasse.

Many researchers who realized this situation, i.e. that (GR) and (QM) are not going to lead us to a positive result, tried to explain the weaknesses of gravity with new theories. However, the persistence of the proponents of the (GR) and (QM), as well as, the complexity of these theories, did not allow the acceptance or the study of these new theories proposed. The result of this tactic was that the situation became even more confusing, and perhaps even beyond the complete impasse.

Given this situation, I believe that the suggestion for the dual cause of gravity that I describe, fully explains the weaknesses of Newtonian gravity and the Law of Universal attraction. So in this case to explain gravity we no longer need the theories (GR) and (QM) to explain the weaknesses, but what we need is to return to Newtonian gravity and in the law Universal attraction and after ignoring the theories (GR) and (QM), not as false theories, but as theories we do not need to explain gravity, to explain the weaknesses of Newtonian gravity and the law of Universal attraction according to the above suggestion of the dual cause of gravity.

As for now the origin of the mass of subatomic particles, it is a matter of science to decide, that is, whether it will be based on the disputed Higgs mechanism, or the mechanism of the remainder dF_e , after of course carefully studying the two mechanisms at equal distances. However, whatever the choice of science, (Higgs mechanism, or the mechanism of the remainder of dF_e), the other data we examined in the above section on the double cause of gravity will remain unchanged.

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