

A New Proposal that Completes and Verifies, Newton's Gravity and the Law of the Universal Attraction

Abstract

Gravity: Could there ever be, a physical phenomenon simpler than watching an apple falling downwards? However, the initial explanation given for this phenomenon, i.e., that the Earth is the center of the Universe and as all bodies are attracted towards this center, they will be attracted towards the Earth, was erroneous. The correct explanation that: all material bodies are attracted to one another, as well as towards the Earth, which is a material body too, has been formulated by Newton and it was a very simple, correct and successful explanation. Since then, many changes have been made in physics disputing some of Newton's beliefs about gravity and the Law of the Universal Attraction, as defined by Newton. These changes, I describe in the present paper, adding a new proposal, as well, which completes, verifies and confirms, Newton.

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At first, and until Newton's era, the word "gravity" defined the force that made material bodies 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 decided to study the phenomenon of the fall of bodies more attentively, he discovered 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.

Newton's gravity and the Law of the Universal Attraction

Newton generalized this explanation on all material bodies in the Universe, i.e. the attraction of satellites by the planets, the attraction of planets by the stars, the movement and coherence of the galaxies, as well as any other object found in the Universe, generating the notions of Earthly and Celestial gravity, notions defining the same thing, i.e.: the gravitational force between two material bodies, a force owing its name to Newton, as it is called Newton's gravity.

Then, Newton discovered also, the Law of the Universal Attraction, which, furthermore, defined the measure of Newton's gravity, F_{Ng} , for two material bodies, by the following well known formula:

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

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

The weak points in Newton's gravity and the Law of the Universal Attraction

Although the above descriptions of Newton's gravity and the Law of the Universal Attraction were very simple and complete descriptions, in their detail presented several serious weak points, that had to be clarified, i.e.:

1. First weak point: According to formula (1), in the case of very small distances¹ between two material bodies or atoms, or distance $r=0$, Newton's gravity takes very high values or becomes infinite, something not conform with the behavior of gravity in nature and

¹ Distances not exceeding some atomic radii.

2. Second weak point: In the case of big masses² and relatively small distances³, the results of the formula (1) differed significantly, compared to the real physical results of gravity.

Note: There is also a third weak point, which can be formulated in the following question: How are the masses generating gravity, created? However, this particular third point is an issue concerning the creation of masses and not the generation of gravity. But, physicists believe that together with the answer to this question on how masses have been created, answers to the questions on the weak points 1 and 2 will be also given and, therefore, they correlate them with the third point.

The more recent theories: The theory of the General Relativity (GR), Quantum Mechanics (QM) and the theory of Quantum Gravity (QG)

In order to resolve the above weak points, the theory of the General Relativity (GR), the Quantum Mechanics (QM) and the theory of Quantum Gravity (QG) have been proposed; where:

The theory of the General Relativity (GR) tells us that gravity is due to the curvature of time-space. Einstein just assumed that the masses can curve the space around them and, along with time, they can produce gravity; this assumption is quite daring and somewhat incomprehensible and has not been definitely confirmed. However, (GR) completes the second weak point only, by calculating with accuracy the orbits of the planets and explaining why these are not static orbits. Certainly the (GR), explains also several other physical phenomena, such as the deflection of light by large material bodies and the gravitational displacement of light towards red; however, these mentioned explanations are not related to gravity but are useful in the proof of the correctness of the theory. (GR) whereas completing the second weak point, does not answer the questions concerning the first and third weak points.

Quantum Mechanics (QM) is based, in what concerns the explanation of gravity, on the exchange of the hypothetical particles called gravitons between material bodies during the interactions of gravity. The idea of the exchange of gravitons between material bodies arose from electromagnetism, where the generation of the electromagnetic force is the result of the exchange of the respective particles, the photons, between charged bodies. Therefore, the following question can be formulated: Why couldn't something similar happen with gravity too? Under this rationale, (QM) answers the

² For masses equal to about that of a planet.

³ For distances within the solar system, such as the orbits of the planets.

third weak point but does not answer the first and second ones, which are the more important.

Therefore, as the theory of the General Relativity (GR) does not explain but some of the cases of gravity and some of the other cases are completed by Quantum Mechanics (QM), the question whether the unification of the two theories, (GR) and (QM) might lead us to a better result, rose. Thus, the theory of Quantum Gravity (QG) has been created, but it has not provided yet any positive results. However, even if the theories (GR), (QM) are (QG) are proven to be correct, the first weak point: Why is gravity in the case of very small distances or $r=0$ not infinite, but, on the contrary, it becomes even zero, will remain unanswered?

A new proposal that answers the weak points 1 and 2, completes and verifies Newton’s gravity and the Law of the Universal Attraction

Atoms, although are created by charged –protons and electrons– and neutral –neutrons– particles, in their fundamental condition, are presented as neutral elements of matter. But, if we study attentively the electromagnetic forces that are generated between the protons and electrons in two atoms, we will notice several very small and barely noticeable differences because of which their sum does not become zero but remains a very small –infinitesimal– remainder, df_e .

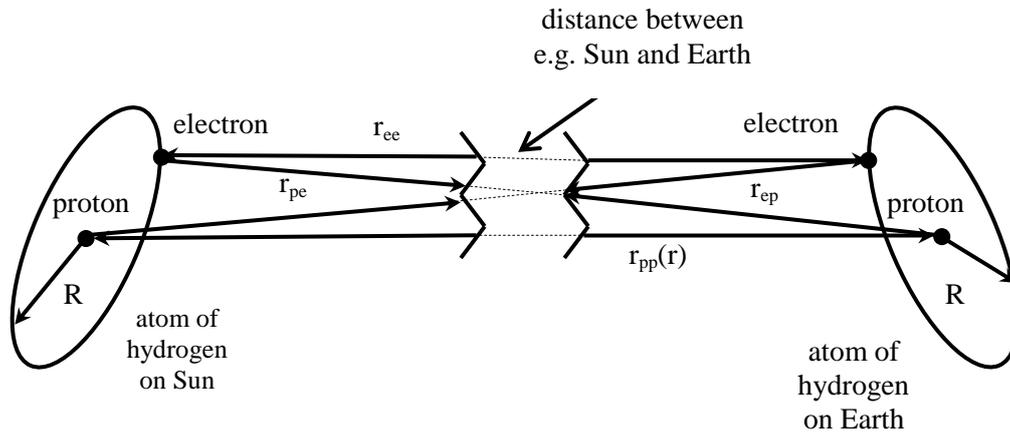


Figure 1: The attractive and repulsive forces between the protons and the electrons of two hydrogen atoms.

For a better understanding of this thought see Figure 1 above, where I note the forces generated between the protons and electrons by two atoms of Hydrogen. Figure 1 shows that, due to different distances between the electrons and protons, these forc-

es differ minimally at the very least.

Several other probable factors that contribute in the formulation of the remainder df_e ⁴ are the following: The movement of the electron around the nucleus, the form of the orbit of the movement of the electron and the eventual even minimal difference of the electrostatic constant K between the attraction or repulsion of protons and electrons. The difference dF_e for two material bodies is given by the following function:

$$dF_e = \Sigma df_e(m_1, m_2, r) \quad (2)$$

where: dF_e is the remainder of the electromagnetic forces described above, m_1 and m_2 the masses of the two material bodies and r the distance between them⁵.

By establishing the remainder dF_e the value of the gravity for two material bodies is calculated as the sum of the values (1) and (2); therefore:

$$F_{Wg} = F_{Ng} + dF_e \quad (3)$$

The formula (3) provides the value F_{Wg} of gravity for the whole Universe and for any case, either for individual atom masses or for small conventional masses or for the masses of satellites or planets or stars or galaxies and for distances from $r=0$ to infinite. In reality, this means that gravity is generated by two different components: Newton's gravity, generated the F_{Ng} force, calculated by formula (1) of the Law of the Universal Attraction and the electromagnetic difference, dF_e , described above, calculated by function (2). We will name the new value of gravity, F_{Wg} , Universal gravity, in order to distinguish it from Newton's gravity.

Specifically, as discussed in detail in my book "The Real Grand Unification" [1], for conventional values of distances and masses, or for very big distances, dF_e becomes so small that it is considered almost zero; therefore, formula (3) for the Universal gravity turns into formula (1) for Newton's gravity. For masses corresponding to the size of satellites or planets, as well as for distances in the size of the orbit of a planet, dF_e remains very small, but fairly appreciable⁶ and, finally, for very small distances –those of just some atomic radii–, dF_e presents significant values, which, added to Newton's Gravity, F_{Ng} yield the Universal gravity, F_{Wg} , which, instead of reaching at very high values or even infinity, as it will be happened by the mathematical formu-

⁴ df_e corresponds to the difference of the electromagnetic forces at the level of atoms and dF_e to this same difference at the level of masses. Index e indicates that the differences df_e and dF_e originate from differences by electromagnetic forces.

⁵ At this stage of the research, we are not interested about the precise determination of df_e and dF_e ; but what is of high significance is the presence of df_e and dF_e , because as we shall see, it explains and completes the weak points 1 and 2, described.

⁶ This remainder is the cause of the non-static orbits of the planets.

la (1) for Newton's Gravity, it takes conventional values, exactly as gravity behaves in nature.

Conclusions and the return to Newton's gravity and the Law of the Universal Attraction.

If you ask a physicist what gravity is and how it is generated, he/she will give you an answer, but, in general, he/she will advise you to ask also another colleague of his/hers, specialized in the subject of gravity. If you do find a specialist in the subject of gravity, the most probable answers you will get will be that:

Gravity is the force of attraction between two material bodies and is due to the curvature of time-space. If you ask what curvature of time-space means, he/she will explain that the curvature of time-space is a mathematical notion that needs careful study of the (GR) in order to be understood.

Another answer you might be given is that gravity is due to Higgs particle. If you ask what Higgs particle is, the specialist will tell you that Higgs particle is a particle that creates the masses of all the other subatomic particles that, in turn, create gravity. However, in order to understand how this mechanism functions, you have to study the respective field of the (QM).

Having read the three previous paragraphs, you have most probably realized that if one wishes to understand gravity, he/she should not only be a physicist but he/she must also have specialized knowledge in (GR) and (QM). At this point, the following question arises: Is it possible such a simple physical phenomenon like the fall of an apple towards the earth to be so perplexed that, in order for someone to understand it, he/she should not only be just a physicist, but he/she should also have specialized knowledge in (GR) and (QM). But, indeed, much simpler explanations for gravity exist, such as the above proposal that proves that the only thing necessary to understand gravity is to go back to Newton's gravity and try to cover the weak points 1 and 2 described above by simple thoughts, without any complicated reasoning or assumptions that part us from the reality.

Based on this rationale, I believe that the proposal described about the remainders df_e or dF_e of the electromagnetic forces between the electrons and protons in two atoms or two bodies covers the weak points 1 and 2 of Newton's gravity and the Law of the Universal Attraction and extends their implementation in the whole Universe and in all cases.

However, the ever-existing question about how the masses of the material bodies have been created remains unanswered. But, by establishing the proposal about the remainders df_e or dF_e , which covers the two weak points of Newton's gravity, the question is now distinguished from the research on gravity and becomes a cosmological issue concerning the creation of matter. On the issue of the creation of matter, I study on a new independent work titled, "The Creation of Matter and Antimatter", which I believe that will be completed very soon.

References

[1] V. Talios, "*The Real Grand Unification*", Laplambert Academic Publishing (2016).