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The mistery of gravity simple

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Abstract

Every time you jump, you experience gravity, It pulls you back down to the ground, without gravity you'd float off into the atmosphere. We see gravity at work in our lives every day and we see the evidence, but the mystery is still there. Even with several well-received theories attempting to explain why a book falls to the ground they're still just theories and the mystery of gravity is still unexplained.

Maybe the song recurring in internet is wrong, maybe we do not want to change our mind or may be the confidence of living on the same Earth and the attitude of looking at the same sky produced a hindrance to follow the intuitions of our best masters, to perceive the suggestions derived by their unexplained experiments and to make use of available data.

In the present paper we start from the free fall Galileo experiment joined with Plank black body model and thanks to available nuclear data and to Fermi radioactive beta decay theory, we prove that it is possible to build a new theory for Gravity that is consistent with Newton model, does not suffer the complexity of Einstein in the description of the gravitational field and can explain some of the question marks present in natural phenomena and in books of physics.

Keywords: Gravity; Grand Unified Theory; Nuclear Physics; Particle Physics

1. Introduction

From the earliest times people have been asking the question of why do things fall to earth.

Aristotle (384 -324 B.C.) was the first writer to attempt a quantitative description of falling motion: he wrote that an object fell at a constant speed, attained shortly after being released, and heavier things fell faster in proportion to their mass. Of course, this is nonsense and, only many centuries after, Galileo (1564-1642) was able to get this problem right. He made the crucial observation that, if air resistance and buoyancy can be neglected, all bodies fall with the same acceleration, bodies of different weights and material dropped together reach the ground at the same time. From these experiments now we realize that the gravitational force is not acting on a cannon balls, or on a bird feather, or whatever else you choose to drop; it is acting on the subatomic particles that make up those objects that are common to all objects.

In other words, we must consider the action of neutrons and protons, common to all substances, to promote gravitational effects.

We have to wait Newton (1642-1727) to get a general law for gravity starting from Keplero (1571 - 1630) empirical observations and laws that unfortunately Galileo did not consider, having refused a meeting with him for a discussion.

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In spite the success of the universal gravitation law, Newton was obsessed with the question why gravity obeyed so simple laws.

Apart from religious justifications, he made the hypothesis of interaction on the smaller particles composing a body, but refused to consider the effect of occult quantities and strongly sustained that speaking of an occult matter producing a manifest effect, is to tell us nothing.

This habit of using unknown entities to explain natural phenomena was in vogue among the Aristotelians but unfortunately permeates science even today.

Newton equation is the only one used today for astronomic calculations but presents numerical difficulties for the computation of three and multibody systems.

Einstein (1879-1955) with general relativity offered a theory attempting to explain what gravity is: he was able to write a field equation in a similar way Maxwell (1831-1979) did with electromagnetic field.

In simple words Einstein stated that gravity was simply a curvature in space-time created by a mass object, pretty much in the same way a piece of cloth would be curved if it was stretched out and a heft object was placed on it. This curvature in space, created by an object with greater mass than the objects surrounding, would cause these objects of lesser mass to fall toward the more massive object.

Unfortunately, also Einstein equation cannot be used for three body calculations and in practice does not substitute Newton equation that is simple, accurate and presents less mathematical complexities.

While Einstein was trying to change our concept of space and time, Planck (1858 - 1947) began a revolution in our understanding of atomic and subatomic processes with his quantum theory.

The phenomenon of emission of radiating energy from the surface of hot bodies was known at the times of Newton who believed that light was made up of corpuscles of different colors in a long controversy with Huygens (1629 - 1695) with his wave theory of light.

Planck faced the problem of the electromagnetic radiation emitted by a black body (a perfect emitter and absorber) and how it depends on the frequency of the radiation (i.e., the color of the light) and the temperature of the body.

The black body represents all bodies because the quantity of radiation emitted is independent from the nature of the emitter, similarly to the Galileo time of fall that is independent of composition of the falling object.

Quantum physics introduced the existence of even smaller particles than neutrons, electrons, and protons to describe the strong and weak interactions on the micro scale. Quantum physics proposed a theoretical particle called the graviton that controls gravity whose nature and behavior is unknown.

The graviton does not fit with the standard particle theory, has not been isolated and its presence is supposed to be rare while the neutrino is recognized and everybody believes that a dense stream of neutrino fills the Universe.

In what follows we will show that on the basis of experimental evidence and nuclear data we can join the neutrino and the graviton in a single invisible particle emitted by solid bodies and integrating and competing with the Planck radiation from the surfaces.

If the neutrino /graviton flux can be computed and is independent, following Galileo and Planck, from the nature of the material, we can try to find an easy solution to the mistery of gravity.

2. The radiation from matter and the nuclear atom

To have a chance to understand what gravity is we have to peer into the nuclear atom, as the Galileo experiment on Pisa tower and quantum theory suggests.

The radiation emitted in the interior of matter is transferred and released on the surface of bodies and has the same origin, but before reaching the surface, photons are degraded to the level they do not interact with matter and can escape.

Einstein noticed the paradox of the calorimeter with a perfect adiabatic surface where molecules continue to move and to vibrate in an apparent perpetual motion and his curiosity led him to study the specific heat of solids at low temperature, using the low energy part of Planck blackbody distribution [1].

It is surprising how Einstein and Plack, working in opposite fields with different methods where able to cooperate and reinforce each other in their specific investigations.

Planck was able to model the experimentally observed black body spectrum and it was Planck's genius to realize that the only way his model could work perfectly was to incorporate the supposition that electromagnetic energy could be emitted only in "quantized" form (i.e. restricted to discrete values rather than to a continuous set of values). He concluded that the energy radiated from a black body could only be a multiple of an elementary unit, E, where E = hv (where h is the Planck constant, and v is the frequency of the radiation), that I like to couple with the other simple expression E = m c2 by Einstein.

The photoelectric effect for which Einstein had a Nobel Price was a proof that Planck was right, in a time when quantum theory had few followers.

Due to them we can associate the mass, energy and frequency of neutrino in the temperature region around 2 0K where Einstein was investigating the specific heat of solids.

In a previous work [1] we made the hypothesis that only a particle or a photon having the characteristics of the neutrino could escape without being detected, provide a solution to Einstein dilemma about the perpetual motion of atoms or molecules under thermal agitation and tried to solve the debate between Einstein and Debye regarding the model of the specific heat near the absolute zero.

The neutrino discovered by Fermi (1901 - 1954) to maintain the conservation of energy in beta decay, that can cross matter and even the entire Earth without interaction and, for our purpose, has the properties of the Plank graviton.

For such an elusive particle we give a temperature of 2,0362 °K and estimate a wavelength λ of 0,14232 cm, an energy of 1,39557E-15 erg or 8,71 E-04 ev and an equivalent mass μ = 1.55277 E- 36 g.

No information is available, at this point, about de flux Fo of neutrino emitted per second and per gram of matter but we know that it should be a constant in order to agree with Galileo experiment and Planck model.

When a flux of neutrino/graviton comes, for example, from the Sun M_1 to our Earth M_2, it impinges on the cross section of the nucleons of the Earth, sums up with the nucleon emitted flux in all directions, the result being a flux in the direction opposite to the Sun that gives rise to the attractive pull toward the Sun,

The neutrino flux around the mass appears shaped similarly to the deformed space of Einstein, with the difference that we have substituted a model with a physical phenomenon.

The neutrino flux per unit surface at distance R from the sun is:

$$F = Fo\ M_1 / (4 \pi R^2)$$

This flux travels with the speed of light c and impinges on the cross sections of nucleons of $M_2\ \pi\ r_{n\ 2}\ M_2 / m_n$ where r_n and m_n are the radius and the mass of the nucleon.

We can therefore write the Newton universal gravitational law in terms of nuclear parameters as

$$Fg = (Fo\ \mu\ c\ rn^2 / 4\ mn)\ M1\ M2/R^2 = G\ M1\ M2\ /\ R^2$$

where G=6,668E-08 is the Gauss constant ($cm^3\ s^{-2}\ g^{-1}$).

One can easily compute ($\mu\ c\ r_n\ 2\ /\ 4\ m_n$) = 1.E-28 ($cm_3\ s\text{-}1\ \upsilon\ \text{-}1$). and Fo = 6,668E+20 is the neutrino flux per gram per second ($\upsilon\ g\text{-}1\ s\text{-}1$).

This strictly relates gravitation to intrinsic properties of matter and is not surprising because gravity is a property of matter and more specifically of nuclei.

At this point we may consider Fo an adaptive parameter but if as Newton says, *Nature is confident with herself*, and Nature should come in our help,

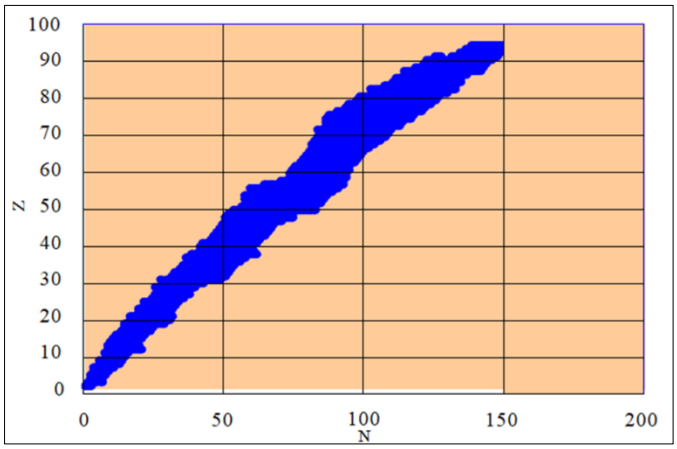

Figure 1 Proton - Neutron distribution of existing radioactive and stable nuclides

The neutron – proton distribution of existing nuclides as represented in Fig.1.descibes the shape of our Universe and has been considered for the nuclear stability but has been disregarded as far as gravity is considered.

Enrico Fermi in his theory of beta decay assumed the following nuclear dynamic transformations of protons p, neutron n and electrons/positrons :

β^- emission $n \underset{\leftrightarrow}{\overset{k_1}{}} p + \beta^- + \nu$

β^+ emission $p \underset{\leftrightarrow}{\overset{k_2}{}} n + \beta^+ + \nu$

Orbital electron capture $p + \beta^- \underset{\leftrightarrow}{\overset{k_3}{}} n + \nu$

If we assume that these reactions are valid for all nuclides and make a regression to fit the parameters k to the proton and neutron distribution of unstable and stable existing nuclides we find:

k1=0.0009625 k2=4.71554E-06 k3=0.00105382

The accuracy of the regression is so high, with a determination index over 99, 9 % , that we can think the constants k as being universal properties of matter.

We can compute the emission of neutrino for all existing nuclides using these constants k and relate it to their mass, obtaining a rate of emitted neutrino per gram and second almost constant for all nuclides with a mean value of Fo= 6.668E+20 (n/g s) and this value does not significantly change from light to heavy nuclides as shown in Fig.2.

The constancy of Fo is reinforced if we consider a matter made up with of different elements but throws some doubts on G being a universal constant.

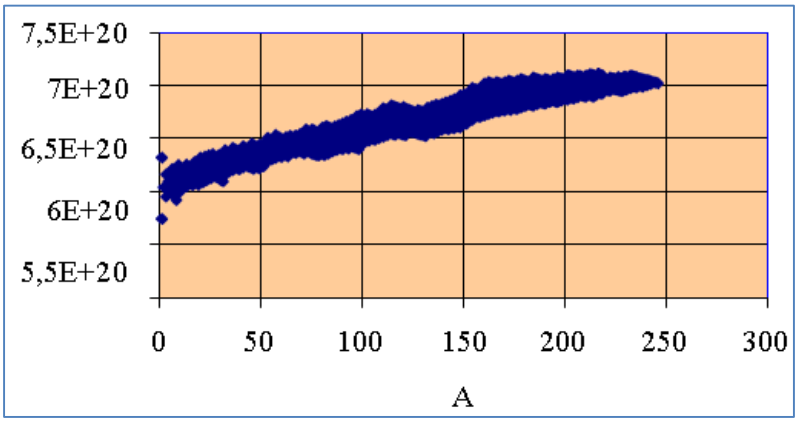

Figure 2 Neutrino emitted per g and s versus Atomic number A

This is surprising and we can apply this concept to every phenomena on the Earth and in the sky: the annual delay of the Earth in its trip around the Sun [2], the speed of light [3], the heat capacity of matter [1], the nature of the nuclear bond [4], the multibody motion o celestial bodies [5], the Galaxy dynamics [6], and even the earthquake generation [7].

This new approach does not change to much the Newton universal gravitational equation but allows an easy way for celestial bodies calculation and in general provides a key for interpreting the many question marks that ang up in the books of physics.

The more important results is the unification of our knowledge of the world from the events in the sky, to the experiments on the Earth and to the studies at the atomic scale.

3. Conclusion

We have shown how simple the action of Gravity can be if we change our view, from the macroscopic world of planetary motion and from the dynamics of objects on the Earth and look for its origin in the nuclear atom, common to all materials, as suggested by experiments and findings of past authors, and endorsed by the shape of the atomic nuclei distribution,

This new approach is coherent with the Newton gravitational model, explains the way gravity acts and can be easily used, and has been used, to compute and to understand many phenomena in different area of science.

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