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An almost unlimited energy source potentially hidden behind the “weak” gravity force

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Abstract

Although the gravitational force is well known for its extremely weak value in the framework of ordinary macroscopic objects at our scale, the generally discredited framework of pushing gravity might lead us to discover a huge source of energy which is mostly lost during the action of the gravific force due to the large distances between nucleons compared with the size of atoms. In case this energy is identified and partially diverted from its role in gravity, we would benefit from a gigantic reservoir of energy reminiscent of Nikola Tesla's dream of a free unlimited energy source .

Key words: gravitation, gravitons, energy

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1 Introduction

It is quite instructive to compare the intensity of the gravitational force between two protons situated at a unit distance $d = 1$meter from each other with the attractive force between a proton and an electron in the same situation (or the repulsive force between two isolated protons). In practice, of course, both forces are too small to be measured and at such a distance, huge objects compared with the particles could interfere and modify the result. But in theory these forces can be computed using the Newton and Coulomb's formulas: for the gravitational force one obtains $F \sim 1,9.10^{-64}N$ and for the electrostatic force $F \sim 2,3.10^{-28}N$. The electrostatic force overpasses the gravitational action by a factor greater than 10^{36}. This is why physicists say that the gravitational force is extremely weak. And many scientists tried to find an explanation for this surprising fact.

The weakness of the gravitational force has motivated some modern theories in which it would be some kind of trace or projection of a much larger force operating essentially in hidden additional dimensions. In the past, Nikola Tesla thought that the origin of that force is actually electromagnetic and gravity is not a fundamental force, just a secondary effect of something else.

Another possible explanation was suggested by the conjecture of Fatio de Duillier, and then Lesage, cf .e.g.[1, 2] according to which gravity might be the result of interaction of matter with tiny unseen very fast moving particles, coming from all directions and called"ultra-mundane", pushing, as a consequence of a mutual 3D shield effect, any pair of massive objects towards each other. The"ultra-mundane corpuscles" (sometimes called gravitons, cf. eg. [8]) can be thought as forming a gas of immaterial particles (like photons) possessing however a linear momentum which can be transferred partially to material particles after a shock. Then the gravitational force can be thought as a pressure, the difference with usual gases that we meet in physics being that the graviton gas can cross the matter and the force is proportional to the volume of matter struck by gravitons rather than any kind of surface. And actually this is only approximative (cf. e.g.[2]) since, among other complicated phenomena, successive layers of matter reduce the number of incoming particles by a small proportion. In this model, the gravitational constant G can be seen as representing a local pressure per volume of space. And the final formula for the gravitational force will coincide sharply with Newton's law only when a large number of nuclei are involved and the distances are sufficiently large, but not enough to imply a (possible and not excluded a priori) big variation of the gravitational pressure, a circumstance which is usual in our macroscopic but not extra galactic familiar world.

In the last 3 centuries, many well qualified experts tended to disqualify Lesage's theory, cf. eg. the sample (non exhaustive) list of [5], so that the theory is generally considered unrealistic. However, the idea of "pushing gravity" might provide an explanation for the weakness of the gravific force, since the gravitons would interact solely with the nuclei and matter is essentially made of vacuum separating extremely tiny corpuscles.

In this short note, we show that if a variant of Lesage's theory describes properly the origin of gravitational forces, the kinetic energy travelling during a second inside a unit volume of space under the form of gravitons is extremely large. Would we be able to divert even an

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infinitesimal portion of it, then the energy problems of our societies would be solved for a very long time, if not forever.

2 Where does our energy come from?

The question of course also arises concerning our matter, which is equivalent to a form of energy via the celebrated formula $E = Mc^2$. At this level, the present scientific consensus is that both come from the stars, and concerning energy, most of it from the sun. But another scientific consensus is that stars are the result of a long and complex collapsing process in which all the energy comes from gravitational forces. In giant stars which produced larger atoms during another complex physical process, the driving energy is also gravitational. So here we can see that, given a sufficiently long time, the "weak" gravitational force has accumulated enough energy to produce all visible activity on our planet and the solar system. In a sense, all our energy comes from gravity. From this perspective, the origin of gravitational forces is, following Albert Einstein, a major one (if not the only one) among basic questions of fundamental physics.

3 Tesla's dream of an unlimited free energy.

The great precursor of modern electric technology Nikola Tesla is known for having conjectured the existence of an almost unlimited source of free energy. At some point he was interested in the pushing gravity concept, but it seems that he was looking for an electromagnetic origin of the gravitational force. Tesla did not believe in the formulation of gravity as a local curvature property of space-time, as described by Einstein's equations, cf. [7] .

4 A lower bound for the energy carried by gravitons.

We claim that if the pushing gravity theory represents reality, the energy brought each second by gravitons inside a small volume of space is enormous. Why is it not perceived? This is a question about interaction of gravitons with matter which, in the framework of pushing gravity, is limited to shocks with the nuclei producing gravity effects as described in the introduction.

Computing the total kinetic energy travelling inside a given volume of space by time unit (in other words, the power of gravitons) most probably requires the knowledge of the gravitons velocity and their mass, in case the last consideration makes sense. But it is, on the other hand, easy to get a rough lower bound (probably very underestimated) of the gravitational power under very simple realistic hypotheses, taking account only of what was already measured on earth.

Let us simply consider a cube of matter with sides 10 cms and density one, so the mass is 1kg. A cube of ice can give a good approximate representation for this. Let us put this cube on a (very high) table and figure out the action of gravitons on it, having in mind a *lower estimate* of the total energy travelling inside the cube in one second. The reaction of the table prevents the cube from falling down, but let us imagine that we suppress the action of the table during one second.

Then the cube falls down and at time $t = 1$ the velocity is $g \sim 9,81 \sim 10m/s$. If the earth were not there, the flux of gravitons would be perfectly symmetric and the cube would not move. We shall grossly underestimate the action of gravitons and the speed which they communicate to our falling cube if we replace the earth by an absolute, unlimited, compact "graviton shield". Classical Newton's theory, since the mass becomes infinite, would give an infinite value for g, but in the framework of pushing gravity theory, it is not clear whether g can become infinite. Of course we would get a larger estimate if we use for instance the value of g on Jupiter, but that value seems to have been computed and not measured, and we want to rely only on proven facts.

Replacing the earth by that absolute shield, the motion of our ice cube is due to only the "upper" half of the gravitons, since nothing can come from below. We also forget the gravitons rebounding from the ground since they play against the free fall and their contribution would even reinforce our inequality. In addition, only the vertical part of the velocity of gravitons gives rise to a vertical push.

To understand what happens, we must realize that in whichever direction, the number of gravitons which actually interact with matter is the total number multiplied by the small number $\rho = (r/R)^2$ where r is the radius of the nuclei and R that of an atom. A rough estimate is $\rho \sim 10^{-10}$. Summarizing all the previous considerations, we end up with the result that, during an interval of time $[t_0, t_0 + \varepsilon]$, the total energy used to push the ice cube downwards is less than

$$\rho \frac{1}{\pi} E(\varepsilon)$$

where $E(\varepsilon)$ denotes the total energy "travelling" inside the cube during ε seconds. That energy is responsible for the increase of the falling velocity of the cube from value 0 to $v(\varepsilon) = g\varepsilon$.

We therefore end up with the inequality

$$\rho \frac{1}{\pi} E(\varepsilon) \geq \frac{1}{2} g^2 \varepsilon^2.$$

Here we make an hypothesis with seems to be realistic: we assume that the velocity of the free fall is much smaller than the velocity of gravitons. Then everything happens as if the cube, although in an accelerating process, was not moving at all from the point of view of gravitons. The inequality is certainly valid for $\varepsilon = 1$. So that we obtain

$$\rho \frac{1}{\pi} E(1) \geq \frac{1}{2} g^2.$$

This yields

$$P = E(1) \geq \frac{\pi}{2} \rho^{-1} g^2 > 10^{12}$$

Reducing the size of the cube by 10, **we conclude that the total power of gravitons travelling inside a volume of $1cm^3$ is above 1 gigawatt**, hence comparable to the power of a classical nuclear plant! And this seems to be a very low estimate for the following reasons: we could have taken ε much larger, getting a quadratic growth with respect to time instead of

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linear as long as we remain below the graviton's velocity, the effective gravitons do not convert all their energy to motion of the atoms, and we replaced the earth by an absolute graviton shield, moreover neglecting the effect of gravitons rebounding from the earth's surface.

5 Discussion 1.

In our calculation, we used the earth, replaced by an absolute gravity shield, because on earth a measure of g is available. Nothing prevents us to replace it by a much larger planet on which g would be at least as large, even far from the surface, allowing our cube to fall down freely until it reaches a very high speed. For instance if we assume that the gravitons are superluminic, which is usually supposed, the mathematical calculation is essentially valid as long as $v = gt \leq c/3$. This corresponds to $\varepsilon = 10000000s = 10^7 s$. In that case, we get $E(10000000) \geq 10^{26}$ and

$$P \geq 10^{19}$$

corresponding to a power of 10 billions of nuclear plants: one for each human being, using only the energy inside a small cube...But here we might be faced with the main difference between Maths and Physics. Such a speed of $c/3$ has never been observed for a macroscopic material object, which might mean that our calculation is not justified in this framework. Then our reinforced estimate is no longer valid.

6 Discussion 2.

We already knew that the "weak" gravity force, acting during millions or billions of years, resulted in the accumulation of huge quantities of energy, however scattered in very small regions of our universe, since at least visible matter is concentrated near lower dimensional manifolds such as bubbles or filaments. But the previous calculations suggest that the vacuum is filled with quantities of energy many orders of magnitude above what we observe in real life. After such an incredible result, several attitudes are possible, among which the following two extremes.

Attitude n°1. This simply shows that gravitons are a myth and confirms the negative conclusions of most experts.

Attitude n°2. Even if the probability is infinitesimal, if gravitons exist we should find them and try to exploit their existence, because then all our energy needs would be easily fulfilled.

For those who are ready to follow the most crazy research tracks, we could add

Attitude n°3. Who knows how much energy we shall need in 1000 years from now? If the gravitational energy becomes too small for us, we should look for an electromagnetic analogue. Because electro-magnetic forces are 36 orders of magnitude above gravity, electromagnetic energy should be even more gigantic. Except if the huge value of the graviton's energy was in fact due to a velocity much above the speed of light, which was among the hypotheses formulated in the Fatio De Duillier-Lesage original theory.

Maybe, Nikola Tesla was already involved in Attitude n°3...

7 Conclusion.

We concluded the paper [6] by saying that the (initial) origin of energy might be the ultimate problem that physical science will never be able to solve, the final axiom of natural philosophy, and the "supreme being" of physicists! In technology, we do not need to solve the problem of origins, but to find new sources of energy which will make human life easier. It will be funny for our successors on this planet if, in a presumably rather distant future, a somewhat forbidden theory of the past finally solves their energy problem when all classical solutions connected with renewable energy found their limits.

References

[1] H. Chabot, Georges-Louis Lesage (1724–1803): a theoretician of gravitation in search of legitimacy, *Arch. Internat. Hist. Sci.* 53 (2003), no. 150-151, 157–183.

[2] H. Chabot, Nombres et approximations dans la théorie de la gravitation de Lesage, d'alembert.academie-sciences.fr.

[3] M.R. Edwards, Pushing gravity: New perspectives on Lesage's theory of gravitation *Apeiron*, 2002, In: Revue d'histoire des sciences, tome 58, n°2, 2005. pp. 519–520.

[4] M.R. Edwards, Photon-graviton recycling as cause of gravitation *Apeiron.* ***14***, 3 (2007), 214–230 .

[5] A. Haraux, About Dark Matter and Gravitation, *Preprints* **2020**, 2020070198 (doi: 10.20944/preprints202007.0198.v1).

[6] A. Haraux, A Surprising Potential Connection between Newton's Fundamental Principles and the Dynamical Aether of Pushing Gravity. *Preprints* **2022**, 2022020168 (doi: 10.20944/preprints202202.0168.v1).

[7] A.M. Rovayo Martínez, G. C. Jon Tay, Nikola Tesla: The Great Truth About Gravity, Published November 30, 2020

[8] T. Van Flandern, The Structure of Matter in the Meta Model (An extension of the gravity model into quantum physics), Meta Research Bulletin of 2003/12/15.