Newtonian quantum gravity and the derivation of the gravitational constant G and its fluctuations

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Abstract: The theory of gravity "Newtonian quantum gravity" (NQG) is an ingeniously simple theory, because it precisely predicts so-called "general relativistic phenomena," as, for example, that observed at the binary pulsar PSR B1913 + 16, by just applying Kepler's second law on quantized gravitational fields. It is an irony of fate that the unsuspecting relativistic physicists still have to effort with the tensor calculations of an imaginary four-dimensional space-time. Everybody can understand that a mass that moves through space must meet more "gravitational quanta" emitted by a certain mass, if it moves faster than if it moves slower or rests against a certain mass, which must cause additional gravitational effects that must be added to the results of Newton's theory of gravity. However, today's physicists cannot recognize this because they are caught in Einstein's relativistic thinking and as general relativity can coincidentally also predict these quantum effects by a mathematically defined four-dimensional curvature of space-time. Advanced NQG is also able to derive the gravitational constant G and explains why G must fluctuate. The "string theory" tries to unify quantum physics with general relativity, but as the so-called "general relativistic" phenomena are quantum physical effects, it cannot be a realistic theory. The "energy wave theory" is lead to absurdity by the author. © *2020 Physics Essays Publication*.
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Résumé: La théorie de la gravité quantique de Newton est à la fois simple et ingénieuse, elle prédit en effet avec précision le phénomène relativiste général, observé par exemple au niveau du pulsar binaire PSR B1913 + 16, en appliquant seulement la deuxième loi de Kepler sur les champs gravitationnels quantiques. Quelle ironie du sort que les physiciens relativistes doivent encore se battre avec les calculs tensoriels d'un espace-temps en quatre dimensions imaginaires. Il est facile à comprendre qu'une masse qui se déplace dans l'espace rencontre davantage de gravitation quantique émise par une certaine masse si elle se déplace plus rapidement que si elle se déplace plus lentement ou si elle s'appuie contre une certaine masse, ce qui cause des effets gravitationnels supplémentaires qui doivent être ajoutés aux résultats de la théorie de la gravité de Newton. Les physiciens d'aujourd'hui ne peuvent cependant reconnaître cela, ils sont en effet prisonniers de la réflexion relativiste d'Einstein. La relativité générale peut également prédire ces effets quantiques grâce à une courbe de l'espace-temps en quatre dimensions définie de manière mathématique. La théorie avancée de la gravité quantique de Newton peut également dériver la constante G gravitationnelle et expliquer la raison pour laquelle G doit fluctuer. La théorie des cordes tente d'unifier physique quantique et relativité générale. Cependant, les phénomènes relativistes généraux étant des effets de la physique quantique, il ne s'agit pas d'une théorie réaliste. La théorie des ondes énergétiques (EWT) est absurde selon l'auteur.

Key words: Gravitational Constant G; Newtonian Quantum Gravity (NQG); Unification of the Fundamental Forces of Physics; General Relativity; Newton's Theory of Gravity; String Theory' Binary Quantum Model; Le Sage's Theory of Gravitation; Energy Wave Theory (EWT); Dynamic Universe (DU).

I. INTRODUCTION

A theory of gravitation that represents our physical reality must be able to explain and derive the gravitational constant G. The Newtonian theory of gravity cannot be completely wrong, but must be incomplete, because it cannot explain the gravitational constant G and it cannot predict so-called "general relativistic phenomena." The advanced "Newtonian quantum gravity" (NQG),[1] which is based on the "binary quantum model,"[2] succeeds in deriving the gravitational constant G by very simple and generally understandable considerations, as well as in explaining the measured fluctuations of G. By advanced NQG, we can also calculate so-called general relativistic phenomena, which are actually quantum physical phenomena, more precisely and much simpler than by General Relativity. The advanced NQG and the underlying binary quantum theory (BQT) thus have a strong evidence. It is made clear in this article why the gravitational spread must be instantaneous and why Einstein's theory of general relativity cannot be a realistic competing theory of

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gravity. Alternative theories, such as Le Sage's theory of gravitation, the "energy wave theory" (EWT) and the "dynamic universe" (DU) are judged.

II. THE BASIC POSTULATIONS OF THE BINARY QUANTUM MODEL AND NQG

For better understanding, the basic postulations of the binary quantum model and the NQG, based on the binary quantum model, are briefly explained: Accordingly, all physical phenomena are caused by only two basic structures. I called the two basic structures in my article: "Unification of the four fundamental forces of nature by a binary quantum model"[2] the two "basic space particles," whereby I differentiated between free basic space particles that move disordered through space with the velocity c, and bound basic space particles that build up elemental particles. Later I called the basic space particles just "basic quanta," as in my article NQG,[1] whereby also the distinction is made between the free basic quanta of space and bound basic quanta that build up elemental particles.

To distinguish between the two types of basic quanta, I called the basic quanta "positive and negative," but in this context the different algebraic signs have for the moment nothing to do with the idea of electric charge. Each basic quantum has a long binding structure and a short binding structure, both having opposite algebraic signs, see Fig. 1. Negative and positive long binding structures can bind strongly to other long binding structures with the same algebraic sign, so that in this case the basic quanta of one sort bind to each other. But the long binding structures can also bind weaker to the short binding structures with the same algebraic sign of basic quanta with the opposite algebraic sign, so that in this case the two different sorts basic quanta bind to each other. The term "negative or positive" basic quantum gets its definition according to the algebraic sign of the long binding structure of one sort of basic quantum.

The real appearance of the basic quanta we cannot know, but it should be a three-dimensional structure. The illustrated central circle is only for a better differentiation of the two kinds of particles and could have been named differently, as, for example, "green and red." Charged elemental particles, such as electrons, or charged structures on larger elemental particles, such as protons, only consist of one type

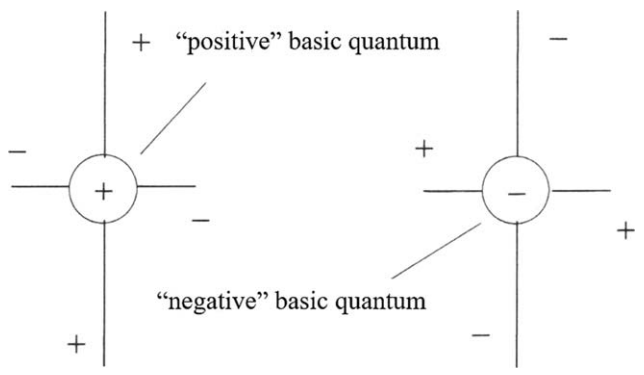
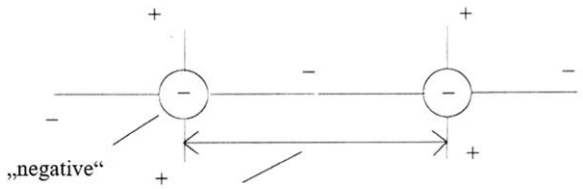


FIG. 1. The two different kinds of basic quanta simplified described as two-dimensional structures.



Strong binding between the long binding structures of the same algebraic sign of the same kind of basic quanta.

FIG. 2. Charged elemental particles, such as electrons, or charged structures on larger elemental particles, only consist of one type of basic quanta. Here, a small section of a positron with short positive binding structures on its surface, which enables the positron to cause a positive charged electric field.

of basic quanta, which are bound strongly to each other by their long binding structures, so that they are very stable and only have the short binding structures on their surface, which can only bind weakly to long binding structures of the same algebraic sign of basic quanta with the opposite algebraic sign, see Fig. 2.

After a certain time, the attached basic quanta from space leave the charged particle radially with the velocity c again and cause a quantized electric field from just one type of basic quanta. These basic quanta move away from the charged particles radially in the direction of their long binding structure. For more details, see my article. "Unification of the four fundamental forces of nature by a binary quantum model,"[2] as well as my article: "Unification of gravity and electromagnetic force, verified by the derivation of the elemental charge by the gravitational constant G according to the binary quantum model," probably published 2021 in *Physics Essays*. "Neutral parts" of elementary particles consist of a network of both types of basic quanta, so that no electrical field can result to the outside, but only the gravitational effect. The neutral portion of a mass has long binding structures of both types of basic quanta on its surface and also short binding structures of both types of basic quanta, see Fig. 3.

Free basic quanta of space, which can temporarily bind to the corresponding structures on the surface of a mass, bind with their long binding components more strongly and therefore longer to the long binding structures of the same algebraic sign of basic quanta with the same algebraic sign, than the long binding structures bind to the short binding structures of the same algebraic sign to basic quanta with the opposite algebraic sign. Therefore, some of the long binding structures on the surface of a mass are always blocked for the short binding structures of basic quanta of space. For this reason, a mass emits a larger amount of basic quanta that had been bound weakly with their long binding structures to the short binding structures of the same algebraic sign on the surface of the mass, which leave the mass radially with the velocity c in the direction of their long binding structures. Less basic quanta that were able to bind with their short binding structures to the long binding structures of the same algebraic sign on the surface of a mass leave the mass radially with the velocity c in the direction of their short binding

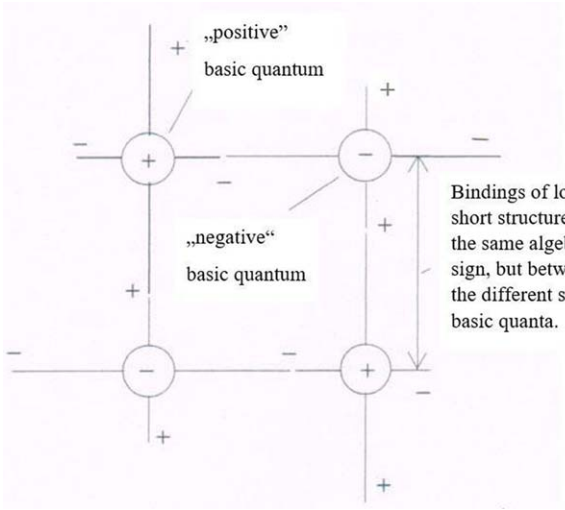


FIG. 3. (Color online) Negative and positive basic quanta building up the neutral part of a mass. For simplification, only a two-dimensional model is depicted.

structures. This reduces the effective cross section of the sum of the basic quanta that leave a mass radially, compared with the effective cross section of the sum of the free basic quanta that move randomly through space. In other words, a lower quantum pressure of space results in the area of the mass, while a stronger quantum pressure of space arises from opposite side, so that a mass is pressed against another mass by the increased quantum pressure of space, what we call gravitation.

According to the advanced NQG, which integrates the binary quantum model, respectively, the BQT of the author, gravitation is caused by a reduced pressure of basic quanta of space in the surrounding of a mass and an increased pressure of basic quanta of space in the opposite direction. This causes that a mass is pressed toward another mass, which until today is wrongly considered to be an attraction between masses. It is psychologically understandable, why we speak of gravity as an attraction. Although we perceive the pressure of basic quanta of space indirectly as gravity, we cannot see the basic quanta of space. Because we only see the mass on which we live, namely, the Earth, we assume that the mass of the Earth attracts us. The origin of the pressure from above is invisible to us. Asserting that something invisible pushes us onto the Earth, we psychologically experience as strange. According to the advanced NQG, the gravitational effect results by an indirectly caused higher "quantum pressure" from the opposite side than that of the mass that causes gravity. This explains the instantaneous spread of gravity: Imagine the universe without any mass. Then imagine that suddenly a large single mass is emerging somewhere in the universe. If this mass is able to cause a "lower quantum pressure" in its surroundings, this lower quantum pressure at the position of the mass instantaneously results in a "higher quantum pressure" of basic space-particles in the other regions of the whole universe. The position of the mass does not matter in this context. This explains, why gravity must act instantaneously. Due to the changed arrangement of the basic quanta, the basic quanta moving away from a mass have on the average a smaller cross section than the basic quanta that continue to fly through space disorderly, which results in a difference of the quantum pressure. There results in a lower quantum pressure at the position of a mass and a higher quantum pressure wherever there is no mass.

Although we will never be able to exactly know the real shape of the basic quanta, the binary quantum model is able to clear that gravity must consist of two components: 1. The described indirect gravitational effect caused by the reduction of the quantum pressure of space at the location of a mass that results in a higher quantum pressure of space everywhere else, which presses masses toward each other. 2. The indirect gravitational effect is triggered by a temporary adherence of basic quanta of space at masses, which leave the mass after a certain time again with the velocity c with respect to the emitting mass. The gravitational effect therefore must depend on the speed of another mass in relation to the basic quanta that leave a mass with the velocity c. A planet like Mercury that moves around the Sun encounters a larger amount of basic quanta by its movement around the Sun, than if it were at rest with the Sun. This causes the additional gravitational effects compared with Newton's theory of gravity, which are today called general relativistic phenomena, that can more precisely and much simpler be calculated by NQG in usual three-dimensional space by just applying Kepler's second law on quantized gravitational fields.[1] Gravitation is actually a very simple process: Masses cause at their position in space an order of previously disordered basic quanta of space that move through space at the speed of light. The ordered basic quanta move radially away from the masses with the velocity c, so that the velocity c of the basic quanta gets related to the mass, from which the basic quanta originate. Nevertheless, gravity acts instantaneously because of its indirect effect.

III. THE RELATIVE STRENGTH OF THE GRAVITATIONAL FORCE COMPARED WITH THE STRONG FORCE

By the binary quantum model[2] of the author, it was possible to unify the four fundamental forces of physics and to derive the so-called fine-structure constant α and the Planck constant from experimental results. By the derivation of the relative strength of the gravitational force by the BQT, compared with the relative strength of the strong force, we obtained

$$\alpha_g = 1 \times 10^{-38}. \tag{1}$$

The absolute strength of the gravitational force, represented by the gravitational constant G, we obtain from the relative strength of the gravitational force by the following considerations. According to advanced NQG, gravitational force depends on the amount of gravitational quanta (called basic space quanta or just basic quanta) that are emitted by masses, so that we can derive the gravitational constant G by multiplying the relative strength of the gravitational force by the amount of gravitational quanta

$$\alpha_g = 1 \times 10^{-38} \times \text{gravitational quanta}. \tag{2}$$

As the relative strength of the gravitational force in comparison with the strong force must not change by the introduction of gravitational quanta, the amount of these emitted basic quanta (called, for example, "gravitons") must have the relative value 1

$$\alpha_g = 1 \times 10^{-38} \times \text{gravitational quanta} = 1 \times 10^{-38} \times 1. \tag{3}$$

IV. DERIVATION OF THE ABSOLUTE VALUE OF THE GRAVITATIONAL CONSTANT G FROM THE RELATIVE STRENGTH OF THE GRAVITATIONAL FORCE COMPARED WITH THE STRONG FORCE

To derive the absolute value of the gravitational constant G from the relative strength of the gravitational force, the gravitational force must be related to the unit of mass (per kg)

$$\mathrm{G} \rightarrow 1 \times 10^{-38} \times \frac{\text{gravitational quanta}}{\mathrm{kg}}. \tag{4}$$

The gravitational force depends according to advanced NQG on the velocity c, of which the gravitational quanta move away from masses

$$\mathrm{G} \rightarrow 1 \times 10^{-38} \times \frac{\text{gravitational quanta} \times c}{\mathrm{kg}}. \tag{5}$$

Considering that the gravitational quanta emitted by **two** interacting masses cause the gravity represented by the so-called gravitational mass, we have double the value in the numerator

$$\mathrm{G} \rightarrow 1 \times 10^{-38} \times \frac{2 \times \text{gravitational quanta} \times c}{\mathrm{kg}}. \tag{6}$$

The gravitational force depends according to advanced NQG on the relative value of the cross section of the masses with the relative radius of 1 ($r^2 \times \pi = 1^2 \times \pi = \pi$), so that we have to multiply the numerator with π

$$\mathrm{G} \rightarrow 1 \times 10^{-38} \times \frac{\pi \times 2 \times \text{gravitational quanta} \times c}{\mathrm{kg}}. \tag{7}$$

As the indirectly caused higher "quantum pressure" of space by masses is a spatial force, we have to cube the numerator

$$\mathrm{G} \rightarrow 1 \times 10^{-38} \times \frac{(\pi \times 2 \times \text{gravitational quanta} \times c)^3}{\mathrm{kg}}. \tag{8}$$

As the gravitational constant G must also depend on the time the basic quanta ("gravitational quanta") act with masses, we have to multiply the numerator by time

$$\mathrm{G} \rightarrow 1 \times 10^{-38} \times \frac{(\pi \times 2 \times \text{gravitational quanta} \times c)^3 \times t}{\mathrm{kg}}. \tag{9}$$

Inserting now for the amount of gravitational quanta the relative value 1, for time the absolute value of a second and the velocity c, we get

$$\mathrm{G} = 1 \times 10^{-38} \times \frac{(\pi \times 2 \times 1 \times c)^3 \times t}{\mathrm{kg}},$$

$$\mathrm{G} = 1 \times 10^{-38} \times \frac{\left(\pi \times 2 \times 299792458 \times \frac{\mathrm{m}}{\mathrm{s}}\right)^3 \times \mathrm{s}}{\mathrm{kg}},$$

$$\mathrm{G} = 1 \times 10^{-38} \times \frac{(\pi \times 2 \times 299792458)^3 \times \frac{\mathrm{m}^3}{\mathrm{s}^2}}{\mathrm{kg}},$$

$$\mathrm{G} = 1 \times 10^{-38} \times \frac{(1.88365 \times 10^9)^3 \times \mathrm{m}^3}{\mathrm{kg} \times \mathrm{s}^2},$$

$$\mathrm{G} = 6.68345 \times 10^{-11} \times \frac{\mathrm{m}^3}{\mathrm{kg} \times \mathrm{s}^2}. \tag{10}$$

This value is only valid, if the basic quanta of space, which cause the higher quantum pressure on masses (called gravity), had the medium velocity c against the Earth or against masses that are used to determine the gravitational constant G. Because Earth is moving in different directions on its way around the Sun, this is of course not possible and we have to postulate that the value of G that we try to measure varies a little bit. According to the advanced NQG , gravitation is described as an indirect quantum pressure effect of basic quanta moving through space with the velocity c, which is caused by the emission of gravitational quanta by masses, whereas these gravitational quanta leave the emitting mass with the velocity c. As masses cause a lower quantum pressure of space at their position, this causes instantaneously a higher quantum pressure in all other regions of the universe, which can explain the instantaneous "spread" of gravity. The velocity c of the "emitted gravitational quanta" is well defined and refers to the emitting masses. But with respect to the basic quanta that fill space, which cause an indirect higher quantum pressure (called gravity) from the opposite direction than the emission of the gravitational quanta, we cannot know the velocity with respect to us, as Earth is moving through space, which means that the velocity of the basic quanta of space might differ somewhat from the velocity c with respect to us. With other words the value we calculated for the gravitational constant G in Eq. (10) is the value, which would be valid, if the Earth was at absolute rest with respect to space. This also means that the result of experiments to determine the gravitational constant G will differ during the rotation of the Earth around the Sun. This is the reason why the measurements of the gravitational constant G fluctuate, which cannot be explained by established physics. The calculated value of Eq. (10) corresponds very well with the today's accepted value for the gravitational constant G, which cannot be a coincidental result

$$\mathrm{G} = 6.6743 \times 10^{-11} \times \frac{\mathrm{m}^3}{\mathrm{kg} \times \mathrm{s}^2}. \tag{11}$$

Using todays accepted value of the gravitational constant G, we can calculate the medium velocity of the basic quanta of

space, with which they move against the masses that are used to determinate the gravitational constant G

$$1 \times 10^{-38} \times \frac{(\pi \times 2 \times 1 \times v)^3 \times \mathrm{s}}{\mathrm{kg}} = 6.6743 \times 10^{-11} \times \frac{\mathrm{m}^3}{\mathrm{kg} \times \mathrm{s}^2},$$

$$(\pi \times 2 \times 1 \times v)^3 = \frac{6.6743 \times 10^{-11}}{1 \times 10^{-38}} \times \frac{\mathrm{m}^3}{\mathrm{s}^3},$$

$$\sqrt[3]{(\pi \times 2 \times 1 \times v)^3} = \sqrt[3]{\frac{6.6743 \times 10^{-11}}{1 \times 10^{-38}} \times \frac{\mathrm{m}^3}{\mathrm{s}^3}},$$

$$v = \frac{\sqrt[3]{\frac{6.6743 \times 10^{-11}}{1 \times 10^{-38}} \times \frac{\mathrm{m}^3}{\mathrm{s}^3}}}{2 \times \pi} = 299655352 \times \frac{\mathrm{m}}{s} \approx c. \quad (12)$$

As mentioned above, the measured value for the gravitational constant G must fluctuate during the movement of the Earth around the Sun. Even Terry Quinn, president of the Bureau "International des Poids et Mesures" in Paris and practically head of all units, published 2013 a value that deviated by 0.241 per thousand from the value of the CODATA level of 2010.[3] According to our considerations, we get in this case for the medium velocity of v in Eq. (12)

$$v = \frac{\sqrt[3]{\frac{6.6743 \times 10^{-11} \times 1.000241}{1 \times 10^{-38}} \times \frac{\mathrm{m}^3}{\mathrm{s}^3}}}{2 \times \pi} = 299679423 \times \frac{\mathrm{m}}{\mathrm{s}} \approx c. \quad (13)$$

The difference of 0.241 per thousand represents a difference of the medium velocity of the basic quanta of space against the masses that are used to determinate the gravitational constant G of about 24 km/s. The fluctuations of the gravitational constant G prove that gravity must be an indirect gravitational effect not caused directly by the interaction between two masses. That G depends on the position of the Earth's movement around the Sun could easily be checked by determining G at certain positions of Earth's orbit in different years. If the gravity was caused directly by masses, the gravitational effect would have to move to other masses at finite speed, regardless of whether due to emitted quanta or a change in space-time. But the spread of gravity is instantaneous. Because masses move at very different speeds through space, in the case of a direct gravitational effect by masses, this would mean that the gravitational effect would depend much more on the speed of masses than it is observed. Because the average speed of the quanta of the space is relevant for the indirect gravitational effect, there are only very slight fluctuations of the gravitational effect by the movement of masses, which corresponds with the observations. It would be conceivable that the movement of the Earth around the Sun leads to larger fluctuations in the average speed of the basic quanta in space than the otherwise existing fluctuations, then one would see a dependence of G from the movement of the Earth around the Sun. But the general fluctuations of the average speed of the basic quanta in space are probably stronger, so that no dependence of the gravitational constants on the movement of the Earth around the Sun can be determined. To find out, with the same method, the constant G would have to be measured at the same positions of Earth's orbits during several years.

V. LE SAGE'S THEORY OF GRAVITATION, WHICH ALSO POSTULATES THAT MASSES ARE PUSHED TOWARD EACH OTHER BY GRAVITY, CANNOT CORRESPOND WITH REALITY

Already in the 18th century Georges-Luis Le Sage described gravity as a result of a lower space pressure.[4] The Le Sage's theory of gravitation proposed a mechanical explanation for gravity by streams of tiny unseen particles within space (which Le Sage called ultramundane corpuscles), impacting all material objects from all directions. According to this model, any two masses partially shield each other from the impinging corpuscles, resulting in a lower pressure between the two masses, so that they are pushed toward each other. But the theory of Le Sage cannot explain the instantaneous gravitational effect because the "shadow" of the unseen particles within space that is caused by each mass must travel by some finite velocity toward another distant mass. Van Flandern correctly concludes in his article from the year 1998 *The Speed of Gravity* – What the experiments say "that gravity cannot have a finite velocity like c because else the obits of planets and stars would be instable."[5]

Whether Le Sage's theory of gravity corresponds with reality can easily be checked, let us assume that the Earth and the Sun are gravitationally pushed to each other via the mechanism proposed by Le Sage. Because of the large mass of the Sun, the Sun must cause a strong shielding effect of the unseen particle streams of space in the direction of the Earth. When the moon is between the Sun and the Earth, the moon will be reached by less "ultramundane corpuscles," impacting the moon from the direction of the Sun than from other directions, which must result in a lesser shielding effect by the moon in the direction of the Earth. This means that the gravitational effect of the moon in the direction of the Earth must be weaker, than if the moon is at other positions, not between the Sun and the Earth. However, during a spring tide that results, when the moon is in a line with the Sun with respect to the Earth, an adding up of the gravitational effects of the Sun and moon can be observed. The gravitational effect of the moon toward Earth is in this case not smaller compared with the gravitational effect of the moon at other positions. Imagine, for example, ten planets of exactly the same mass in a line with respect to the Earth. In this case, the gravitational effect of the planets against the Earth, compared with the situation, when the planets are not positioned in a line, would, according to Le Sage's gravitational theory, get smaller the nearer a planet is positioned toward the Earth. What we observe is that the gravitational effect of masses adds up exactly according to their mass, also if they are in a line toward another mass. Although Le Sage's already developed

the correct idea that the vacuum is filled with invisible particles that move through space, his theory of gravitation cannot correspond with reality. Latter problem does not result according to NQG, as low pressure areas caused by masses add up, no matter how many masses are gravitationally interacting with each other or are positioned in a line.

VI. WHY THE ENERGY WAVE THEORY (EWT) IS NOT A REASONABLE ALTERNATIVE THEORY TO EXPLAIN GRAVITY

Another theory that is able to derive the gravitational constant G and also other natural constants is the EWT of Jeff Yee.[6] The calculated value of G by his theory is 6.6741×10^{-11} without a variability of this value. EWT postulates that gravitation is not an attraction, but results from a difference in pressure of space energy, which causes that masses are pushed toward each other. The explanation of gravitation by the advanced NQG is similar, but much simpler. Also, the explanation of the gravitational force by a space energy shadow effect is in the case of distant masses like galaxies not understandable. According to the energy wave theory, space-time is a physical substance that occupies the universe. It is an impressive mathematical theory, but it is based on a fundamentally illogical assumption: The theory postulates that the structure of space-time at the smallest of levels is the quintessence of the universe, which he defines to be a material in a lattice structure of repeating unit cells, where each of the cells contain granules that vibrate in harmonic motion. This quintessence of all physical phenomena shall represent the smallest space-time cells that fill space and generate the four basic forces, energy and matter via wave functions. This mathematical theory thus raises "time" to a part of a fundamental "substance." Jeff Yee is a victim of the human psyche, which cannot think of things without time. We have the wrong feeling that time must have an own existence, but time is just an imagination of the duration of physical or biological processes. Time does not exist as an own physical entity. This can be explained by an example: With our eyes, we can see different colors. These colors have no own existence, but need a certain physical process to exist. If we take all electromagnetic waves away, there is no color anymore and we "see black," which is no color and no seeing in reality. Our brain just creates the impression and "seeing of a black color." The same is valid for time, which has no own existence, but requires a physical process to exist, whose duration can be recognized or can be felt. If we take all physical processes away, there cannot be any time anymore, because time results from the description, feeling or observation of physical processes. But nevertheless, if a human disembodied mind was left in the universe, this mind would still create the conception of time, even if time does not exist anymore, because all physical processes have vanished. Already Immanuel Kant recognized that time (and also space) is a necessary *a priori* representation that underlies all outer intuitions and that we cannot imagine that there is no time (and space).

The concept of time was developed in physics as a theoretical and mathematical construct to describe the duration of physical processes. Since Einstein raised the mathematical concept of time to a real physical phenomenon, the fourth dimension of space-time, the physicists are trained in the view that time must be an independent physical phenomenon. This led to a schizophrenic thinking among physicists: When physicists measure time by a physical process, like the vibrations of cesium atoms in atomic clocks, they postulate that they measure time, while the vibrations of the atoms are not allowed to change their velocity because basic processes, such as the speed of light must remain constant. Physicists state that they measure a changeable time, for example, in the case of the "gravitational time dilatation," by means of physical processes, but they do not attribute the change of time to a change of the physical processes, on which the measurement is based, but to a change of time itself. This is complete nonsense, even if it does not lead to mathematical contradictions. After all, mathematics is not reality. It could therefore be expected that the assumption that time is an independent physical phenomenon leads to further delusional theories among physicists, who are gifted with mathematics and fantasy. Jeff Yee goes one step further than Einstein and elevates the mathematical concept of time to a component of a substance, whereby the theoretical construct time together with the theoretical construct of "space" becomes energy and mass. This is like writing "5 kg" on a white paper and then claiming that this would result in 5 kg of mass and its energy equivalent. We can refute this assumption directly by lifting the paper and noting that it does not weigh 5 kg. With the mathematical theory of Jeff Yee this is not possible, because we cannot see measure or investigate the space-time cells from which all natural constants and physical phenomena are supposed to arise. The space-time cells are pure mathematics, the existence of which is, according to Jeff Yee, proved by the successful derivation of natural constants and physical phenomena. For the mentioned reasons, EWT is absurd and no reasonable alternative theory to explain gravity.[6]

VII. WHY EINSTEIN'S THEORY OF GENERAL RELATIVITY CANNOT BE A LEGITIMATE COMPETING THEORY OF GRAVITY

During the last years, there have been published many critical scientific articles that refuted Einstein's theory, only a few shall be mentioned here: In an article, Crothers considered the following two claims of Einstein:[7] 1. The speed of light is invariant. 2. An expanding spherical wave of light remains an expanding spherical wave of light under Lorentz transformation. Adhering to the first claim and then applying the Lorentz Transformation to Einstein's expanding spherical wave of light, Crothers proved that Einstein's expanding spherical wave of light is mapped into a translated expanding ellipsoidal wave of light. This means that Einstein mistook invariance of the theorem of Pythagoras under Lorentz transformation to also be invariance of the geometric form of his expanding spherical wave of light. Under Lorentz transformation, the distance from the origin of coordinates to the expanding wave front of light is always given by the theorem of Pythagoras, but

it is not true that this also means that Einstein's expanding spherical wave of light remains an expanding spherical wave of light. Thus, Crothers proved that Einstein's special theory of relativity is logically inconsistent and therefore invalid. Einstein's two claims above cannot both hold, except in the trivial case of the relative velocity between two systems being precisely zero.

In another article, Crothers criticizes that the Minkowski–Einstein space-time as an indefinite Riemannian metric four-dimensional space must have four independent coordinates, while his analyses show that the Minkowski–Einstein space-time has only three independent dimensional coordinates. As a result, he concludes that either physically or as a mathematical construct, Minkowski–Einstein space-time does not exist.[8] Master-Khodabakhsh uncovers confusing argumentations of Einstein, with which he justified his theories, and shows that special relativity is not able to explain the Michelson–Morley Experiment conclusively.[9] Lundberg impressively reveals the absurd velocity concept of modern physics, especially of relativistic physics.[10] Klinaku describes four basic errors of special relativity, which are all conditional for Einstein's theory.[11] Stephan J. G. Gift indicates that time dilation as a function of speed and gravity, as it is measured by GPS, contradicts the invariance of the speed of light because light travels faster to the west than to the east.[12]

As a further example, there shall be mentioned the criticism of Crothers of the pseudotensor that was introduced by Einstein to reconcile general relativity with the conservation laws of energy and momentum for a closed system.[13] Because Einstein's pseudotensor is not symmetric, Landau and Lifshitz proposed an alternative pseudotensor. Crothers points out that Einstein's, as well as the Landau–Lifshitz pseudotensor are invalid combinations of mathematical symbols and concludes that general relativity cannot comply with the conservation laws for a closed system.

There is no doubt that Einstein's special and general theories of relativity are in many respects founded on illogical and inconclusive assumptions and mathematical constructions. Nevertheless, Einstein's theories deliver usable predictions in the end. Why can Einstein's General Relativity deliver correct predictions, although it is obviously inconclusive? Because gravity depends on the velocity of the emitted basic quanta, which have the same velocity c, as the speed of light with respect to the emitting mass ("mass" corresponds here with "observer" in relativistic terms), the same changes of planetary of stellar orbits can also be obtained by postulating that the velocity of the emitted basic quanta ("gravitons") is invariant. Instead of the variance of the velocity c of the emitted basic quanta against masses (observers), which move against the emitted basic quanta, there must then be introduced a curvature of a four-dimensional space-time, so that artificially the same changes of planetary of stellar orbits result, which can then be observed and measured in three-dimensional space.

It is actually only by chance that Einstein's theory of general relativity achieves correct results, because the basic quanta move away from masses at the velocity c, so that gravity enables a relation to the relativistic invariance dogma concerning the velocity of light. Generations of physicists have been led astray to this day by this coincidence.

By summarizing, it must be realized that general relativity cannot be a legitimate competing theory of gravity. A competing theory might be the DU of Tuomo Suntola.[14] In an article, Styrman compares general relativity and the DU with respect to absolute simultaneity. He writes: "Absolute simultaneity is implicit in basic human conceptualization where houses, trees, mountains, star systems, planets and galaxies are wholes, whose parts exist at exactly the same time." Regarding, for example, a house: According to general relativity, the roof and the cellar of the house cannot exist simultaneously at the same time because time passes different on the roof (faster passing time) than in the cellar (slower passing time). As GR violates the absolute simultaneity the relativistic world-view is nonunderstandable. DU has been developed as a resolution to the problems' relativistic physics. In DU space is studied as a closed energy system, the three-dimensional "surface" of a four-dimensional sphere. According to DU, the velocity of light is not a natural constant, but is determined by the velocity of space in the fourth dimension, while the velocity of space in the fourth dimension is determined by the zero-energy balance. I do not want to analyze DU in this context, but I am always very skeptical, if more than three dimensions are postulated to explain our physical reality. Also, the imagination that three-dimensional space is traveling in the fourth dimension, determining the velocity of electromagnetic radiation, sounds strange to me, so that I am inclined to judge DU to be another artificial mathematical construct that does not correspond with reality.

Here, I would also like to refer to my articles that prove that Einstein's relativity does not withstand an epistemological criticism, because it is illogical, inconclusive, and in some aspects even absurd.[15–17]

VIII. CONSIDERATIONS

The advanced NQG unifies quantum physics with Newton's theory of gravity and calculates so-called general relativistic phenomena more precisely and much simpler than general relativity, whose complicated theoretical construct is no longer needed.[1] In this article, I could show that it is possible to derive the gravitational constant G by advanced NQG, which bases on the BQT, from the relative value of the strength of the gravitational force in comparison to the relative value of the strength of the strong force. That there must result differences in the measurements of the gravitational constant G is explained by advanced NQG. These differences prove that gravity must be an indirect quantum physical effect and no direct effect based on the interaction between masses, as it is postulated by Newton. The different values of G that are measured also prove that gravity cannot be a change in space-time, as it is postulated by Einstein's theory of general relativity, because it is founded on the invariance dogma of relativistic physics, which can therefore not be real, despite its success.

The derivation of the gravitational constant G and the explanation of its fluctuations, as presented in this article, are

a strong indication for the correctness of the advanced NQG, as well as for the correctness of the binary quantum model, respectively, the BQT, by which it was also possible to derive the so-called fine-structure constant α and the Planck constant from experimental results.

IX. FINAL REMARKS

During the international conference "Physics beyond relativity" in Prague in October 2019,[18] initiated by Professor Jan Rak from the Jyväskylä University in Finland, who is also head of the Finnish group at CERN, I introduced advanced Newtonian quantum gravity (NQG). At that time, I still did not know that it is also possible to derive the gravitational constant G and its fluctuations, which refute the relativistic invariance dogma, by NQG on the basis of the binary quantum model. Einstein's theory of relativity eludes our experience and makes us believe that mathematics is superior to our experience in terms of the detection of physical processes. This led to a mathematically induced collective illusion called "Einstein's relativity." How time traveling has to be judged in this context, which is thought to be possible by physicists (such as Brian Cox), should everyone decide himself. The mathematical "obsession" that today's physics suffers from appears to be chronic and therefore incurable. New mathematical delusions followed, such as the "string theory" and the Higgs mechanism. Once most of the physicists have accepted a new mathematically justified delusion represented by a physical theory, it can no longer be corrected because there is no longer any willingness to question the theory. Critics are denounced and excluded, alternative explanations are rejected or ignored. Modern theories like the string theory or the energy wave theory (EWT) show how today's mathematically dominated "successful" physics is departing more and more from reality. This does not result in a better understanding of nature at all, and it blurs the distinction between a purely mathematical theory and a theory based on real physical phenomena.

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