THE FUNDAMENTAL PHYSICAL CONSTANTS

by
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1. ABSTRACT

We start from the idea that there is only one particle, the graviton, which is the basis of all matter and all other known particles are nothing but various forms of association or interaction between them. Using this reasoning, then all other known constants such as the value of the gravitational constant "G", the value of the elementary charge "e" or the fundamental force fields should be able to be expressed according to the physical characteristics obtained for graviton. We demonstrate that the characteristics of graviton check and express these constants correctly and conclude that graviton characteristics are itselves the fundamental physical constants and can be used to express other known physical constants. We offer a common basis of expression for the gravitational field, the electromagnetic field and the field of nuclear forces.

2. THE UNIVERSAL CONSTANT OF GRAVITY

Are known for graviton, as the primary structure unit of matter and responsible for the existence of gravitational interactions, the below characteristics noted with the index "φ"[1][3][4]. These characteristics were calculated using the communicated values for certain particles and constants [2]:

The mass of graviton: $m_\varphi = 1,8492 \cdot 10^{-46}$ g

The radius of graviton: $r_\varphi = 1.3733 \cdot 10^{-74}$ cm

The density of graviton: $\rho_\varphi = 1,7046 \cdot 10^{175}$ g/cm³

The pulsating frequence of the graviton: $v_\varphi = 2,1896 \cdot 10^{84}$ s⁻¹

The vibrating energy of graviton: $W_{\omega v} = 1,7409 \cdot 10^{-29}$ eV

The internal energy of the graviton: $W_\varphi = 1,0342 \cdot 10^{-13}$ eV

The width of potential well: $l_\varphi = 2,4267 \cdot 10^{-74}$ cm.

We can observe this value, $l_\varphi \cong 2r_\varphi$, that is similar with the diameter of the graviton.

The lifetime of the graviton: $\tau_\varphi = 4,567 \cdot 10^{10^{37}}$ s, that is the graviton it is a very stabile basic-particle.

Expressing the universal constant of gravity "G"[1][5] according to graviton's characteristics, the exact value of this can be calculated and verified as follows:

$$G = c^2 \frac{r_\varphi}{m_\varphi} = 6{,}674 \cdot 10^{-8} \frac{cm^3}{g\,s^2} \qquad (1)$$

Equation (1) reduces the calculation of the universal constant of gravity to the attributes of graviton and to the value of speed of light.

3. THE ELEMENTARY CHARGE

By analogy with electrical charges, we define the concept of „gravitonic charge unit"[1][3][7], noted with q_{φ}:

$$q_{\varphi} = c\sqrt{m_{\varphi} r_{\varphi}} \tag{2}$$

with the value: $q_{\varphi} = 4{,}763 \cdot 10^{-50}$ gcu ($g^{1/2}s^{-1}cm^{3/2}$).

This gravitonic charge unit can be considered the indivisible unit of charge which can be associated to a primary structure of matter.

Expressing the elementary charge „e" [2] we find that its value can be calculated using the characteristics of graviton[7] as:

$$e = \sqrt{n_p R_p} \cdot \sqrt{\frac{G m_{\varphi}}{r_{\varphi}}} = 4{,}80325 \cdot 10^{-10} \text{ esu CGS} \tag{3}$$

In equation (3) the term n_p represents the number of gravitons in the electron mass[6] and R_p is the electron radius, that is:

$n_p = 4{,}9407 \cdot 10^{18}$ gravitons

$R_p = 2{,}818 \cdot 10^{-13}$ cm

Equation (3) reduce also the calculation of the fundamental measure unit of electricity to the graviton characteristics: m_{φ}, r_{φ}, and G - the universal constant of gravitation. This indicates that the electron can be viewed like a condensate of gravitons. Equation (3) create a link between electric and gravitational constants.

The universal constant of gravity can be expressed also as:

$$G = \frac{q_{\varphi}^2}{m_{\varphi}^2} \tag{4}$$

which represents a direct connection with the graviton's characteristics, the mass and its charge unit.

4. THE FIELDS OF FUNDAMENTAL FORCES

For all types of interactions, the interacting element is the field of these types of interactions. As was already proved[3], these fields are constituted in all cases by a corresponding number of gravitons noted with n_{1-6}.

Because of their particularities, all fundamental forces: nuclear, electromagnetic and gravitational have different distances of action. Following the same principle, considering the graviton as the primary particle at the origin of all types of fields, we will use the same previous notations, that is q_{φ} for graviton charge, r_{φ} for graviton radius etc.

We will write the graviton equations for the interaction energies for the three types of fields of physical phenomena: the nuclear, electromagnetic and gravitational[8] (considered for vacuum: $\varepsilon = \mu = 1$).

The interaction energies of the fields can be written according to the characteristics of the graviton as follows:

4.1. The field of Nuclear Forces[1][8]:

$$W_1 = n_1 \cdot \frac{q_{\varphi}^2}{r_{\varphi}} e^{-\gamma} \tag{5}$$

4.2. The field of electrostatic forces[1][9]:

$$W_2 = n_2 \frac{q_\varphi^2}{r_\varphi} \tag{6}$$

4.3. The field of electric current[1][9]:

$$W_3 = n_3 \frac{q_\varphi^2}{r_\varphi} \tag{7}$$

4.4. The constant electromagnetic field of electric currents[1][9]:

$$W_4 = C n_4 \frac{q_\varphi^2}{r_\varphi} \tag{8}$$

4.5. The variable electromagnetic field (photons and electromagnetic waves)[1][9]:

$$W_5 = n_5 \frac{q_\varphi^2}{r_\varphi} \tag{9}$$

4.6. The field of gravitational forces[1][10]:

$$W_6 = D . n_6 \frac{q_\varphi^2}{r_\varphi}. \tag{10}$$

All six equations are very similar to each other. The explanation is that each of the fields can be reduced to a base unit and can be expressed according to it, The terms of the equations are:

W_{1-6} : the energy of the field

$n_1 - n_6$: the number of gravitons of the field at a distance of interaction

C, D: characteristic factors of the field's propagation environment

$e^{-\gamma}$: characteristic factor of nuclear forces ($\gamma = \pi$)

G, q_φ, r_φ: are the characteristics of graviton

The groups of equations (5 - 10) represent the connection between the three types of fields: the nuclear, electromagnetic and gravitational[11], respectively related to their common element the gravitonic charge unit and graviton radius.

We demonstrate that the physical values identified for the graviton are correct and represents in fact the ufundamental physical constants as follows:

$$W_\varphi = m_\varphi c^2 = 1{,}0342 \cdot 10^{-13} \text{ eV : represents the internal energy of a graviton}$$

Multiplying with the component number of gravitons „n_p" of any other particle, it results:

$n_p W_\varphi = W_p = n_p . m_\varphi . c^2 = m_p . c^2$, where m_p is the mass of any other particle

The equation: $m_p = n_p m_\varphi$ is a form of matter quantification, where: $m_\varphi = 1{,}8492 \cdot 10^{-46}$ g.

The sizes: W_φ and m_φ become the lowest known physical constants and can be named the **quanta of internal energy and mass**[12].

The radius of the graviton r_φ is the smallest physical constant related to distance and represents a quantification of space in form: $L = n_p . r_\varphi$

Where: L is any length, n_p is a round number and $r_\varphi = 1.3733 \cdot 10^{-74}$ cm can be named the **quanta of space**[12].

The shortest known physical constant event is the vibration of a graviton, therefore the elementary time is $t_\varphi = \frac{1}{\nu_\varphi}$ where: ν_φ is the pulsating frequency of the graviton $\nu_\varphi = 2,1896 \cdot 10^{84} s^{-1}$.

The time of one event can be write in quantified form $t = n_t t_\varphi$ where n_t is a variable round number and $t_\varphi = 4,567 \cdot 10^{-85}$ s can be named a **quanta of time**[12].

5. CONCLUSIONS

Considering that all particles known so far can be seen as condensates of gravitons, the graviton becoming a common basis for them, then the fundamental constants "G", "e" and force fields can be expressed according to the graviton's characteristics, this becoming a common element.

Looking in this way we make a connection between the other particles or fields, and more, we can offer explanations regarding the organization and evolution of matter at the cosmological level regarding the birth of the universe, black holes or "dark" matter[13][3].

References

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