Some parities of physical constants of vacuum

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In many appendices of physics the physical constants of vacuum are used: speed of light, dielectric and magnetic permeabilities. In the paper the formal table of ratioes of the indicated constants on basis of of laws of a Newton and Coulomb is constructed. It is supplemented by the formulas of connections of constants with constants of Plank, thin structure and speed of light and outside of direct relation to the laws of a Newton, Coulomb. It makes novelty in ratioes of physical constants of vacuum. The examples of the appendices of physics using a constants of the table are demonstrated.

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In physics the concepts of speed of light in vacuum, permittivity and permeability of vacuum are well known. Usually it is perceived as paradox of a choice of system of units. But it is completely clear, that these values are necessary, for example, in the laws Coulomb. To them we shall attach the law of Newton.

$$f = \gamma \frac{m_1 m_2}{R^2}, \qquad f = \xi \frac{q_1 q_2}{R^2}, \qquad f = \nu \frac{м_1 м_2}{R^2} \tag{1}$$

Where

γ - constant of gravitation, , $\nu = \frac{1}{\mu}$ - magnetic constant of vacuum, equal to inverse value of permittivity of vacuum,

$\xi = \frac{1}{\varepsilon}$ - electrical constant of vacuum, equal to inverse value of permeability.

We have some formalism in record of the laws (1), using concepts of constants of gravitation, electricity and magnetism, which values are referred to vacuum. The following logic step - in modern physics is concept of physical vacuum (PV), which can be refereed to vacuum in sense of the formulas (1). Contra-indications to this logic step it is not found out. Let's act further again purely formally- we shall make the table 1, but at once in the most complete kind with the purpose of reduction of volume of paper.

Table 1

№	Para-meter	The formula	PV the formulas	Size	The name	Dimension
1	2	3	4	5	6	7
1	γ	$f R^2/m^2$	$\ell_{pl}^2 c^3/\hbar$	$6{,}67259 \cdot 10^{-11}$	constant of gravitation	$[м^3 kg^{-1} s^{-2}]$
2	ξ	$f R^2/q^2$	$\alpha c\hbar/e_0^2$	$8{,}987551 \cdot 10^{9}$	electrical constant	$[a^{-2} м^3 kg\, s^{-4}]$
3	ν	$f R^2/м^2$	$e_0^2 c/\hbar\alpha$	$1{,}00000031 \cdot 10^{7}$	magnetic constant	$[a^2 kg^{-1} м^{-1} s^2]$
4	ρ	$\sqrt{\gamma/\xi}$	$c\ell_{pl} e_0/\hbar\sqrt{\alpha}$	$8{,}6164 \cdot 10^{-11}$	Specific gravitational charge of mass	$[a\, s\, kg^{-1}]$
5	r_q	$\sqrt{\xi/\nu}$	$\alpha\hbar/e_0^2$	29,97924	Specific magnetic weight of a charge	$[a^{-1} м^2 kg\, s^{-2}/q]$
6	r_m	$\sqrt{\gamma/\nu}$	$c\ell_{pl}/e_0\sqrt{\alpha}$	$2{,}5826 \cdot 10^{-9}$	Specific magnetic mass of substance	$[a^{-1} м^2 kg\, s^{-2}/кг]$
7	k	$\nu\xi/\gamma$	$\hbar/c\ell_{pl}^2$	$1{,}3475 \cdot 10^{27}$	Density of inertia moment or mass on length	$[kg\, м^2/м^3]$
8	c	$\sqrt{\nu\xi}$	c	$2{,}99792458 \cdot 10^{8}$	Speed of light	$[м\, s^{-1}]$
9	P	$\sqrt{\nu\gamma}$	$c\rho$	0,0258	Specific quantity of an electromovement	$[q\ м\, s^{-1}/kg]$
10	E_σ	$\sqrt{\gamma\xi}$	$c^2\ell_{pl}\sqrt{\alpha}/e_0$	0,7744	Specific surface electrical intensity	$[a^{-1} kg\, м^3 s^{-3}/kg]$

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In column 2 the variants of designations of sizes for macroworld, following line to the right are shown. The third column in lines 1-3 - is simply the formulas (1), and the variants of their combinations are lower -, that is all parameters 1 - 10 - are derivative of the laws of Newton and Coulomb.

The 4 column represents the new formulas 3 and 5, made outside of the laws of Newton and Coulomb, but with use of constants of the microworld, which by virtue of logic of the uniform table also can be referred to parameters PV:

$$\ell_{pl} = 1{,}6160505 \cdot 10^{-35}\ [м]$$ - Plank length,

$$e_0 = 1{,}60217733 \cdot 10^{-19}\ [q]$$ - Charge of electron or positron,

$$\hbar = h / 2\pi$$ и $$h = 6{,}6260755 \cdot 10^{-34}\ [дж\ с]$$ - Plank constant,

$$\alpha = 7{,}29735308 \cdot 10^{-3}$$ - Constant of thin structure,

Gravitational constant in column 4 it is easy to receive from the well known formulas:

$$\ell_{pl} = (\frac{h}{2\pi}\gamma c^{-3})^{0,5},\ \gamma = \frac{2\pi c^3}{h}\ell_{pl}^2,\ h = 2\pi r_q e_0^2\ \alpha^{-1}$$ и отсюда $$\gamma = \frac{\alpha}{\xi} c^4 (\frac{\ell_{pl}}{e_0})^2 \quad (2)$$

It is obvious that the connection of constant gravitation with structural and electrical constants well known in physics is received. Using experience of drawing up (2), it is easy to receive all other parities of a column 4.

It is important to emphasize, that all formulas of the fourth column based on parameters of the microworld, with large accuracy and in the complete consent with dimensions answer accordingly to columns 5 and 7. The comments to the table are given below. The purpose - to show its physical sense within the framework of accessible.

Most simply - speed of light in vacuum. There are no remarks to its existence in the table, except for one: if in column 3 it looks like an «ordinary» constant due to a way of its drawing up, in column 4 it dominates except for a constant 5. A constant 7 simply is next. It finds the place in radius of Schwarzschild:

$$R_g = 2\frac{\gamma}{c^2} M_{bh} = 2\frac{\gamma}{v\xi} M_{bh} = 2\frac{1}{k} M_{bh} \quad (3)$$

It's simply solved the problem with a unknown constant 5.

$$w = 2\pi e^2 r_q v_{rb} / \alpha = 1{,}6380 \cdot 10^{-13}\ дж, \quad (4)$$

Photon energy for red border of «photoeffect» in PV here is given. Here $$v_{rb} \geq \frac{w}{h} = 2{,}4147 \cdot 10^{20}$$ Hz - Photon frequency. What its name in column 6 means, remains by a physical riddle, probably, not having of sense.

It is easy to show, that the constant 10 enters into expression for definition of acceleration of force of mass for a body with mass M (Q - charge of mass):

$$g = E_\sigma \frac{Q}{R^2}$$ under condition of validity $$Q = \rho M,\ (5)$$

i.e. at presence of physical sense for a constant 4. Here table enters into a zone of hypotheses. Let's assume, that really there is an electrical charge of any mass, that is proportional to its value. This formula can be checked up with the help of definition of magnetic fields of planets of Solar system. If the planets have an electrical charge of the sphere of a planet, knowing speed of its rotation, it is possible to estimate a magnetic field of a planet on its axis of rotation under the formula

$$H = \frac{I}{2R} = \frac{q}{8\pi TR} = \frac{\rho M}{8\pi TR} [а / м]\ , \quad (6)$$

where M -mass, T - period of rotation, R - radius of a planet.

The data of account and their comparison with experimental data [1, Ксанфомалити Л.В] are shown in table 2.

Table 2

Planet	Intensity,а/м		The basic parameters		
	Measurement	Account	mass, kg	Period	Radius, м
The sun	80	4450	$1.984x10^{30}$	25д., 9.1h	$6.96x10^{9}$
Mercury	0.7	0.09	$3.31x10^{23}$	58,644 д.	$2.5x10^{6}$
Venus	0.05	0.12	$4.87x10^{24}$	243 д.	$6.2x10^{6}$
The Earth	50	37.4	$6x10^{24}$	23 h, 56 min	$6.373x10^{6}$
The moon	0.024, h=55 km.	0.061	$7.35x10^{22}$	27,321 д.	$1.739x10^{6}$
Mars	0.052	7.34	$6.44x10^{23}$	24 h, 37 min	$3.391x10^{6}$
The Jupiter	1140	2560	$1.89x10^{27}$	9h, 55 min	$7.14x10^{7}$
Saturn	84	880	$5.69x10^{26}$	10 h, 14 min	$5.95x10^{7}$
Uranium	228	300	$8.77x10^{25}$	10 h, 45 min	$2.507x10^{7}$
Neptun	13,3	250	$1.03x10^{26}$	15 h, 48 min	$2.49x10^{7}$

The table shows an ambiguous picture. For example, for the Earth, Jupiter, Uranium, Moon and Venus values lays practically within the limits of deviations in 2 times, the worst comparison turns out (in 100 - 10 - 7 times) accordingly for a Mars, Saturn and Mercury.

If at interpretation of these results to take into account other probable sources of a magnetic field (« magnetic dinamo», solar wind etc.), for the majority of planets the result is rather optimistical from the point of view of concurrence of accounts and given observations. The Earth, for which the magnetic observations to be carried out not for one century as against other planets, even more emphasizes the importance of comparison. Certainly, it is impossible to exclude and simple concurrence, which in physics plenty . The example of a Venus with a period of rotation 243 24-hours and Earth with a period of rotation almost 24 hours is characteristic. The magnetic fields of these planets precisely follow the law of dependence from speed of rotation: slow rotation of a Venus - small field, fast rotation of the Earth - large field.

At once there can be questions on polarity of a charge and their interactions among set of gravitating objects. On the first question on a mark of a charge an orientation of a magnetic field of the Earth and direction of its rotation give the unequivocal answer - Earth has a negative electrical charge. The second question on volume and on tasks leaves for frameworks of given clause and is discussed in [2, *Рыков А.В.*].

To constant ρ it is possible to apply the more general approach. The expression for gravitational «running» constant $\alpha_g = \gamma \frac{2\pi m^2}{hc}$ is known. Its name «running» arising from some arbitrariness in a choice m, which can be, for example, mass of a proton or electron .

Let's take the relation gravitational alfa to electrical alfa $\frac{\alpha_g}{\alpha_e} = \frac{\gamma}{r_q c}(\frac{m}{e_o})^2$. In the relation the Plank constant was reduced. The transformation of the formula results to $\frac{\alpha_g}{\alpha_e} = (\rho \frac{m}{e_o})^2$ And accordingly in dependence of a specific charge of mass is $\rho = \frac{e_o}{m}\sqrt{\frac{\alpha_g}{\alpha_e}}$. It is easy to notice, that the specific charge of mass does not depend from m. And $\rho = e_o\sqrt{\frac{2\pi}{ch}\frac{\gamma}{\alpha_e}} = 8{,}616400 \cdot 10^{-11}[Kl/kg]$ is not connected to mass. It testifies that gravitational alfa, determined mass, is not fundamental in gravitational interaction. Fundamentals in gravitation it is necessary to consider an elementary charge, constant gravitation, speed of light, Plank constant and constant of thin structure (electrical alfa). All above mentioned indirectly and cleanly theoretically confirms an electrical nature of gravitation and thus conclusion about reduction of the 4-th known interactions up to 3-rd arises: Weak, electromagnetic, strong, available on a degree of

growth of forces. The given conclusion also corresponds to the connection among themselves macro and micro of PV parameters, given in table 1.

In a nature there is a minimal mass equal to the electron mass. Its gravitational electrical charge is equal $e_q = \rho m_e = 7{,}8490 \cdot 10^{-41} [Kl]$. For minimal mass there is this minimal quantum of a gravitational charge. In electron there are $n = \frac{e_o}{e_q} = 2{,}041241 \cdot 10^{21}$ pieces if to consider that the nature of a gravitational charge does not differ basically from usual electrical charges. Iits expression through micro parameters $e_q = \frac{2\pi}{h} c \ell_{pl} e_o m_e \alpha^{-1} = \frac{1}{n} e_o = 4{,}8990 \cdot 10^{-22} e_o \ Kl$.

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