Dozen Coincidences?! One Rule

Abstract. The Dirac large numbers hypothesis LNH [2] is related to the ratios which constitute very large, dimensionless numbers: some 40 orders of magnitude. According to Dirac's hypothesis, the apparent equivalence of these ratios might not be a mere coincidence but instead could imply a cosmology with these unusual features. Mainstream physics consider those large numbers as mere coincidences more suited to numerology than physics. I will present the relations of macro and micro phenomena of the universe as immanent relations of the whole and parts. There are too many coincidences for them all to be coincidences.

Introduction

The rule is: **Parts are dependent on the whole (Universe) and are also an integral part of the whole, therefore, the whole is also dependent on the parts!**

Applying the above rule and methodological approach published in the essay [3], I obtained all the relations shown in Table 1, which are all related to the predetermined ratio, Classical electron radius/Proton-Compton wavelength, β=2.132525585013. All the other constants were then derived from it and written in blue italics in the second column of the second segment. The third segment of the table in the third column contains the values of physical quantities that are used, and the fourth column references where the values can be checked. The fourth segment in the second column contains important physical quantities obtained through constants from the second segment, i.e. by using exclusively β. I am not showing the calculation, but only the final result obtained by shortening and simplifying formulas. The fourth column of this segment shows the values identical to those in the third, as the ratio of physical quantities.

Formulas

For definitions of constants used below, see Table 1. Proton shift [5] **zp** shows the shift of the proton in relation to the half-cycle, cy/2, i.e. $zp=\log(M_u/m(cy/2),2)-\log(M_u/m_p,2)=2^{cy/2}-\log(M_u/m_p,2)$. In Table 1, zp=2-1/(2πβ+2)=1.935060943518. By applying this constant and other constants derived from β, we get very precise relations between important physical quantities. I would especially emphasize formula (1), because it did not appear in my previous articles.

$$k_T = 2\pi * q^2 * 2^q/9 = \left(T_{pl}/T_{BG}\right)^4 = 7.30049597E+126 \qquad \textbf{(1)}$$

This formula connects the Planck temperature and background temperature in an accurate ratio. Since q is the constant directly related to a proton, the ratio in (1) is also related to the existence of the proton. The relation of k_T and the corresponding relation for mass $n_2=M_u/m_{pl}$ is interesting. We have a simple and rational ratio:

$$k_T / N = 2\pi * q^2 / 9 = 1.14301045E+05 \qquad \textbf{(2)}$$

By applying only the constant β, here we can easily obtain the formula (3). This is in the literature often discussed relation between the gravitational and Coulomb force for the electron-proton pair and the validity of the results obtained here can be easily checked:

$$k_F = 2^{cy/4-3zp/2} * \beta/\sqrt{2\pi} = F_C / F_{Npe} = 2.26881936411E+39 \qquad \textbf{(3)}$$

Table 1 Formulas

Mathematical constants	$2\pi=$	6.283185307180	
	$cy=e^{\pi'}$	535.4916555248	
Classical electron rad./Proton Compton wav.	$\beta=r_e/\lambda_p$	2.132525585013	
$zp=2-1/(2\pi\beta+2)=$	*1.935060943518*	**Useful constants**	
$\sigma=2^{2zp/3}$	*2.445349420064*	**derived from β**	Codata [1]
$\xi=\sigma/\beta=$	*1.146691714861*		or other
$p=cy/2-zp=$	*265.8107668189*		references for
$q=cy/2+p/2+3\log(2\pi,2)/2=$	*404.6284553660*	**Used values**	cheking values
Speed of light	**c=**	**2.99792458E+08**	[1]
Planck constant	**h=**	**6.62606957E-34**	[1]
Classical electron radius	$r_e=$	**2.817940E-15**	[1]
proton rms charge radius	**pcr=**	**8.763902E-16**	[1]
Proton Compton wavelength	$\lambda_{p=}$	**1.32140986E-15**	[1]
Proton mass	$m_p=$	**1.67262178E-27**	[1]
Planck mass	$m_{pl}=$	**2.17650990E-08**	[1]
Planck length	$l_{pl}=$	**1.61619877E-35**	[1]
Planck Temperature	**Tpl=**	**1.4168336E+32**	[1]
Cycle of universe	$T_u(sec)=$	**4.3084906E+17**	[5], [6,p3], [9]
Radius of universe	$R_u(m)=$	**1.29165299E+26**	[5], [6,p3],
Mass of universe	$M_u(kg)=$	**1.73944912E+53**	[5], [6,p3],
Fundamental particle mass	$m_f=$	**1.088622E-28**	[5], [6,p3], [7,p619]
Hipotetical quantum of mass	$m_q=$	**2.723388E-69**	[5], [8,p5]
Background Temperature	$T_{BG}=$	**2.7257168712**	[7], [8]
$\xi^6=(\lambda_p/pcr)^2=$	*2.2734219446*	**2.2734219446**	
$2\pi=\lambda_p m_p/(m_{pl}l_{pl})=$	*6.2831853072*	**6.2831853072**	
$2\pi\beta=r_e m_p/(m_{pl}l_{pl})=$	*13.3990534229*	**13.3990534229**	
$2\pi\beta\xi^3=m_p*R_u^2/(M_u r_e^2)=$	*20.2029199287*	**20.2029199287**	
$2\pi\sigma^3=m_p r_u^2/m_u\lambda_p^2=$	*91.87611934740*	**91.87611934740**	
$(2\pi\sigma)^3=M_u m_p^3 m_{pl}^{-4}=$	*3627.1238074644*	**3627.1238074644**	
$2^{cy/8}*\pi'^{1/4}*\sigma^{-9/8}=\lambda_p/l_{pl}=$	*8.1760355116E+19*	**8.1760355116E+19**	
$k_T=(2\pi q^2*2^q/9)^{1/4}=T_{pl}/T_{BG}=$	*5.1980217381E+31*	**5.1980217381E+31**	
$k_F=2^{cy/4-3zp/2}*\beta/\sqrt{(2\pi)}=F_C/F_{Npe}=$	*2.2688193641E+39*	**2.2688193641E+39**	
$n_1=2^{q/3}=m_f/m_q=$	*3.9973059325E+40*	**3.9973059325E+40**	
$n_1=M_u/m_{pl}^{2/3}=$		**3.9973059325E+40**	
$n_1=(Mu/m_f)^{1/2}=$		**3.9973059325E+40**	
$n_1=(m_{pl}/m_f)^2=$		**3.9973059325E+40**	
$n_2=M_u/m_{pl}=$		**7.9919191586E+60**	
$N=2^q=R_u M_u c/\hbar=$	*6.3870771837E+121*	**6.3870771837E+121**	[9], [10], [11], [12]
$N=M_u/m_q=$		**6.3870771837E+121**	
$N=(M_u/m_{pl})^2=$		**6.3870771837E+121**	
$N=(m_f/m_q)^3=$		**6.3870771837E+121**	
$N=(m_{pl}/m_f)^6=$		**6.3870771837E+121**	
$N=(R_u/l_{pl})^2=$		**6.3870771837E+121**	
$N=(R_u/\lambda_p\sigma)^3=$		**6.3870771837E+121**	

There have been many attempts to explain and quantitatively present the relations that give large numbers of order 10^{40}, but without success. The main reason was that most authors were searching for relations by using only the masses of neutron, proton and electron. Here the greater importance was given to the virtual fundamental particle, the importance of which was first referred to by Weinberg [7]. Another reason was giving too much importance to gravity, i.e. not taking into account that repulsion, as well as attraction, are equally important, as explained by Ruđer Bošković [4] as early as in the 18th century.

The mass of the fundamental particle and its relations with other masses are shown in [5, fig1]. The approximate values from [6] for the quantities of the universe are: mass of the Universe (M_u~5.10^{56}gr.), age (T_u~5.10^{17}sec.), Radius $cT_u=10^{28}$ cm. The more precise value from [9] for the cycle (age) is $T_u=4.3\times10^{17}$. If we apply these values, we obtain the mass of the fundamental particle:

$$m_f = \sqrt[3]{\hbar^2/(T_u G c)} = 1.088622E-28 \quad \textbf{(4)}$$

See [5], [6, p3], [7, P619], where ħ is the reduced Planck constant, G is the universal gravitational constant and c is the speed of light. Applying the fundamental and Planck mass, mass of the universe and the hypothetical quantum mass we get formulas with the identical value of the large number n_1 of the order of 10^{40} (Table 1). The relation of n_1 to the ratio of gravitational and Coulomb force for the electron-proton pair is interesting:

$$n_1 / k_F = 2\pi\beta\xi^2 = 2\pi\sigma\xi = 17.61844066 \quad \textbf{(5)}$$

The large number N or the number of oscillators, an often used term in literature, has the value: **N≈6.3*10^{121}** [12], **N≈10^{122}** [13] or N≈**6.38708*10^{121}** [14]. This value can be obtained in different ways, as shown in Table 1. The formula (6) shows the relations with the large number N.

$$N = 2^q = R_u M_u c/\hbar = M_u / m_q = (M_u / m_{pl})^2 = (m_f / m_q)^3 = (m_{pl} / m_f)^6 = (R_u / l_{pl})^2 = (R_u / \lambda_p \sigma)^3 \quad \textbf{(6)}$$

The same large number N can be obtained through other values. Let's for example point out the case when it is obtained via the Planck mass and the mass of the proton (7), because the two values can be easily checked since they were exactly determined experimentally.

$$N = (2\pi\sigma m_{pl} / m_p)^6 \quad \textbf{(7)}$$

In (7) we used $m_f=m_p/(2\pi\sigma)$. Cases where this number is obtained by using the fine-structure constant are also not included, because this article is limited to the use of the beta constant β.

Conclusion

The article shows the unsustainability of the term "coincidence" in relation to the large numbers of orders of magnitude 10^{40}, 10^{60} and 10^{122}. These numbers are not a coincidence and they appear as dimensionless relations that characterize relationships in nature. The role of proton is crucial, since the constant β is derived from the relations relating to the proton. We can accept the attitude that one relation providing a result with 12 correct significant digits is a coincidence, but we cannot accept that dozens of such results are coincidences. Here we can see as many as fitted one page, while there are many more, including the electromagnetic phenomena.

Why is the proton shift as big as it is? It is a difficult task to solve. We can also pose the following questions:

• Why does the mass of the proton have the value that it has?
• Why does the ratio of the mass of proton and electron have the value that it has?
• What is the relationship between the fine-structure constant and β?
The answer to one of the above questions is at the same time the answer to them all.

References:

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