

Calculate Universe 2

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Abstract. This article is about relations between fundamental physical constants.

Srpski

English

Uvod

Ovaj rad je nastavak rada [2], u kome su date relacije između fundamentalnih masa. Na isti način, sa istim bezdimenzionalnim vrednostima ovde su dodati radijusi u odnosu na radijus univerzuma.

Rezultati su prikazani u tabeli 1 tako da sve vrednosti proističu iz predhodnih.

Zadate su matematičke konstante i još samo dve fizičke konstante ($\hat{\alpha}$, $\hat{\mu}$), a zatim su svi odnosi računati pomoću njih.

Pošto su masa i veličina Univerzuma konačne vrednosti to im možemo pripisati bilo koju brojnu vrednost (sistem jedinica mera). Postoji nekoliko „prirodnih sistema“ u kojima su masa i radijus univerzuma po definiciji jednaka „1“. Zatim se pojedinim fundamentalnim konstantama takođe zadaje vrednost „1“. Ja sam izabrao da trajanju univerzuma pripišem „1“ te da sve ostale vrednosti, uključujući i fundamentalne konstante izvodim iz njih.

Naše poimanje vremena je neraskidivo vezano za masu i dužinu. Kao što se masa i radijus univerzuma ne mogu potrošiti tako to važi i za trajanje Univerzuma. Uvek će sve tri gornje vrednosti imati vrednost „1“ ili vreme izraženo u godinama, 13.7 milijardi godina, što je najčešće pominjana vrednost u literaturi. Zato umesto termina trajanje univerzuma upotrebljavam „Ciklus Univerzuma“, za koji smatram da je prikladniji.

Introduction

This article is the continuation of article [2] which features relations between fundamental masses. In the same manner, using the same dimensionless values, radiuses in relation to the radius of the universe are added here.

Results in Table 1 are presented in such a way that all the values derive from the previous ones.

Mathematical constants and only two physical constants ($\hat{\alpha}$, $\hat{\mu}$) are the knowns and all the relations are calculated using them.

As the mass and size of the universe are finite values, we can assign them any numerical value (units of measurement system). There are many "natural systems" in which the mass and radius of the universe by definition equal one "1". Then, certain fundamental constants also get the value "1". I chose to assign the duration of the universe value "1" and to derive all the other values, including the fundamental constants from these three „1“.

Our perception of time is inextricably related to the mass and length. Just as the mass and radius of the universe cannot be exhausted, the same is true for the duration of the universe. The three values will always equal "1" or the time presented in years, 13.7 billion years, the most frequently mentioned value in the literature. Therefore, instead of the duration of the universe, I am using the term "Cycle of the Universe", as I consider it more appropriate.

Constants	Value	Value
natural logarithm base e=	2.71828182846	2.71828182846
π =	3.14159265359	3.14159265359
two pi π' =	6.28318530718	6.28318530718
Cycle $c=\exp(\pi')$ =	535.49165552477	535.49165552477
Half Cycle $z=c/2$ =	267.74582776238	267.74582776238
inverse fine structure constant $\acute{\alpha}$ =	137.03599907400	137.03599907400
proton-electron mass ratio μ =	1836.15267245006	1836.15267245006
ratio $\beta=\mu/(\pi'\acute{\alpha})$ =	2.13252558500	2.13252558500

Relations / System of measure	natural($M_u, R_u, T_u = 1$)	kg-m-sec
Mass universe M_u =	1.0000000000E+00	1.73944911962E+53
Radius universe R_u =	1.0000000000E+00	1.29165299384E+26
Cycle of universe T_u =	1.0000000000E+00	4.30849062202E+17
Half Cycle mass $m_z = M_u * 2^{-z}$	2.5146331104E-81	4.37407634997E-28
proton shift $z_p = (\mu/\acute{\alpha} + 1) / (\mu/\acute{\alpha} + 2) + 1$	1.9350609435E+00	1.93506094352E+00
proton mass $m_p = M_u * 2^{-(z-z_p)}$	9.6158131798E-81	1.67262177700E-27
m_p/m_z =	3.8239428011E+00	3.82394280112E+00
$2^{z_p} = m_p/m_z$ =	3.8239428011E+00	3.82394280112E+00
$\zeta = (m_p/m_z)^{2/3} = 2^{2z_p/3}$ =	2.4453494201E+00	2.44534942006E+00
$\aleph = (m_p/m_z)^{1/3} = 2^{z_p/3} = \zeta^{1/2}$	1.5637613053E+00	1.56376130534E+00
$\zeta = \zeta/\beta$ =	1.1466917149E+00	1.14669171487E+00
electron mass $m_e = m_p/\mu$ =	5.2369355359E-84	9.10938290751E-31
speed of light $c = R_u/T_u$ =	1.0000000000E+00	2.99792458000E+08
Proton Compton w. $\lambda_c = R_u * \beta * 2^{-ci/4} \pi^{-1/2} \zeta^{-3/4}$	1.0230378148E-41	1.32140985624E-15
Planck constant $h = c m_p \lambda_c$	9.8373405025E-122	6.62606957316E-34
Planck mass $m_{pl} = M_u (\aleph / 2^z \pi')^{3/4}$	1.2512639082E-61	2.17650990345E-08
Planck length $r_{pl} = R_u (\aleph / 2^z \pi')^{3/4}$	1.2512639082E-61	1.61619877306E-35
Universal gravitational constant G =	1.0000000000E+00	6.67383601081E-11
Classical el. radius $r_e = R_u * \beta * 2^{-ci/4} \pi^{-1/2} \zeta^{-3/4}$	2.1816543144E-41	2.81794032671E-15
up quark mass $m_{up} = M_u * \pi^{-1} \acute{\alpha}^{-2/3} 2^{-z} \zeta^{1/2}$	2.3545546598E-83	4.09562803008E-30
ratio $\beta = r_e/\lambda_c$ =	2.1325255850E+00	2.13252558500E+00
Neutron/proton mass $\gamma = (\pi^2 2^c / \zeta)^{3/4(1+\acute{\alpha} \ln \mu / \ln 2)}$ =	1.0013784192E+00	1.00137841920E+00
Radius from literature		
$R = R_u^2 m_p / 2 \pi' \beta M_u \lambda_c$	3.5074397198E-41	4.53039501475E-15
$R = R_u \pi^{-1/2} 2^{-ci/4} \zeta^{9/4} \beta^{-1/2}$ =	3.5074397198E-41	4.53039501475E-15
Bohr radius $a_0 = \acute{\alpha}^2 r_e$	4.0968991939E-37	5.29177210923E-11
Rydberg constant $R_\infty = m_e c / \acute{\alpha}^2 2h$	1.4174253234E+33	1.09737315685E+07

Table 1. Relations

Relacije

Sve relacije i konstante koje su korišćene u radu [2] prikazane su i u tabeli 1 ovog rada. Neke nove konstante koje su dodate mogu izgledati kao višak jer proističu iz prethodnih. Njihova korist je u tome da su sa njima neke relacije jednostavnije i instruktivnije. Vrednosti u trećoj koloni dobijaju se jednostavnim konvertovanjem tako što se zadaju tri dobro poznate veličine koje sadrže m, kg i sec. Naravno na isti način se može konvertovati u bilo koji drugi sistem jedinica mera.

Termin ciklus upotrebljen je u dva značenja: kao matematički ciklus $c=\exp(2\pi)$ i kao ciklus trajanja Univerzuma $T_u=13.7$ milijardi godina. Takođe je i malo slovo "c" upotrebljeno dva puta: za ciklus i za brzinu svetlosti.

U tabeli 1. je prikazano dobijanje fundamentalnih masa i dužina.

Koristeći vrednosti iz tabele 1 mogu se dobiti sve druge fizičke veličine za koje su potrebni parametri izračunati u tabeli.

To važi i za električne pojave.

Zaključak

Ključna novina je uvođenje pojma Ciklusa i njegovo vezivanje za proton kao osnovu materijalnog sveta. S tim u vezi je pojava u radu matematičkih konstanti π' , $\exp(\pi')$, $\ln(2)$, i takođe **1/3**, **2/3**, **1/2**, **3/4**, **3/8**, **1/8**. Umesto π , što je polovina kruga, upotrebljava se $\pi'=2\pi$, pun krug, što je prirodija vrednost.

Od suštinskog je značaja da delovi zavise od celine (Univerzuma), isto kao što su i sastavni deo celine.

Rezultati su onoliko tačni koliko su tačne dve ulazne bezdimenzionalne veličine \acute{a} , μ preuzete iz [1].

Interesantno je napomenuti da je u definisanom prirodnom sistemu jedinica mera:

$$\text{brzina svetlosti} = 1$$

Relations

All the relations and constants used in Article [2] are shown here in Table 1. Some new constants that are added may seem redundant, as they are derived from the previous constants. They are useful because with them some relations are more simple and instructive. Values in the third column are calculated by simple conversion, by taking three well-known quantities which contain m, kg and sec. Of course, the same method can be applied to conversions into any other system of units of measurement.

The term cycles is used in two meanings: as a mathematical cycle $c=\exp(2\pi)$ and as the cycle of the duration of the universe $T_u=13.7$ billion years. Moreover, the lower case "c" is used twice: for the cycle and for the speed of light.

Table 1 shows the calculation of fundamental masses and lengths.

Using the values from Table 1 many other physical values can be calculated.

The same is true for electrical phenomena.

Conclusion

The key innovation is the introduction of the notion of the Cycle and its connection to proton as the basis of the material world. Related to that is the appearance of mathematical constants π' , $\exp(\pi')$, $\ln(2)$, and also **1/3**, **2/3**, **1/2**, **3/4**, **3/8**, **1/8**. Instead of π , which is a half of a circle, full circle $\pi'=2\pi$ is used, which is a more natural value.

It is essential that parts are dependent on the whole (the universe), parallel to being its integral part.

Results are as accurate as the accuracy of two input dimensionless values \acute{a} , μ taken from [1].

It is interesting to note the values of natural units:

univerzalna gravitaciona konstanta = 1
Plankova konstanta = $9.83734050251 \times 10^{-122}$

te da je njena recipročna vrednost, pomnožena sa 2π brojno jednaka velikom broju:

$$N = 6.387077183693 \times 10^{121}. [3].$$

S obzirom da se „bog nije igrao sa kockicama“ (Einstein) onda su i zadate veličine (α , μ) u funkciji matematičkih konstanti. Možda po Godelovoj teoremi [4] mi ne možemo racionalnim putem da odredimo obe ove veličine, ali jednu možda možemo. Konstanta fine strukture nalazi se u najraznovrsnijim pojavama, a očekujem da se tek otkriju još mnoge nove pojave koje je uključuju. Sigurno je da ta konstanta zaslužuje opštiju definiciju nego što je sada, vezano samo za elektricitet. Navodim rad koji u ovom smislu može pomoći: [5].

Prilikom analize za ovaj rad odbacivani su svi rezultati koji nemaju barem 10 značajnih cifara tačnih. Takođe se svi rezultati precizno slažu sa CODATA vrednostima.

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speed of light = 1

universal gravitational constant = 1

Planck's constant = $9.83734050251 \times 10^{-122}$

and the fact that its reciprocal value, multiplied by 2π is numerically equal to the large number:

$$N = 6.387077183693 \times 10^{121}. [3].$$

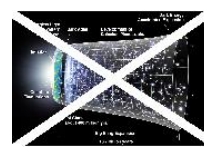
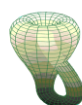
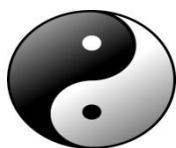
As "God does not play dice" (Einstein), the given values (α , μ) are in the function of mathematical constants. Maybe according to the Gödel's theorem [4] we cannot rationally determine both these values, but possibly we can determine one. The fine structure constant is present in a wide range of occurrences, and I expect many new occurrences that contain it to be discovered. It is certain that that constant deserves a more general definition than the current one, related only to the electricity. Here is an article that can help in this respect: [5].

During the analysis for this article, all the results lacking the minimum of 10 correct significant digits were rejected. Moreover, all the results are in precise compliance with the CODATA values.

Novi Sad, April 2013

References:

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