

Neutron, proton and electron mass ratios

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Abstract. Relation between the three dimensionless physical constants, related to masses of neutron, proton and electron, is presented.

The CODATA recommended constants published in 2010 [1] are:

Proton-electron mass ratio: $\mu=1836.152\ 672\ 45\ (75)$

Neutron-proton mass ratio: $\gamma =1.001\ 378\ 419\ 17\ (45)$

Inverse value of fine structure constant: $\acute{\alpha}=137.035\ 999\ 074\ (44)$

Mathematical constants: $e=2.71828$ and $\pi'=6.283185$

Integers **1** and **2**, in this paper can also be considered as a mathematical constant.

Using the above constants, we can calculate:

$$\begin{aligned}c &= e^{\pi'} = 535.4916555248 \\p &= c/2 - (\mu/\acute{\alpha} + 1)/(\mu/\acute{\alpha} + 2) - 1 = 265.81076682 \\b &= \ln \pi' / \ln 2 = 2.6514961295 \\m &= \ln \mu / \ln 2 = 10.8424703056 \\q &= c/2 + p/2 + 3b/2 = 404.6284553660\end{aligned}$$

Let us call **c** – cycle constant, **p** – proton constant and **q** – photon constant. The meaning of **b** and **m** is clear from the very equation. The following relation is valid:

$$\gamma = 2^q / (1 + \alpha'^2 m) = 1.0013784192 \quad (1)$$

If we consider only the denominator of the above relation exponent, we get:

$$N = 2^q = 6.387077 * 10^{121} \quad (2)$$

Which is a large number with a value in [2], $N \approx 6.3 * 10^{121}$ or in [3], $N \approx 10^{120}$ or in [4], $N \approx 6.38708 * 10^{120}$. Given that (1) contains only three dimensionless physical quantities μ , γ and $\acute{\alpha}$, it follows that if we know two, we can determine the third. Also, the relation is valid in any system of units of measurement.

Relation (1) is obtained by considering the whole universe and its connection to basic mathematical and physical constants. Explaining the methodological approach in obtaining the relation (1), to a great extent would overcome the purpose of this article. Postulates that preceded the execution of the relation (1) have proved to be meaningful.

The relation could be seen as speculative, not sufficiently substantiated or that its physical meaning has not been proven, therefore, it is open for further consideration.

1. CODATA *internationally recommended values of the Fundamental Physical Constants, (2010) values of the constants.*
2. Scott Funkhouser - *A New Large-Number Coincidence and a Scaling Law for the Cosmological Constant*, Proc. R. Soc. A464 No. 2093, pp 1345-1353 (2008)
3. Lloyd, S., Phys. Rev. Lett. 88 (2002) 237901
4. Branko Zivlak - *Relation between dimensionless physical constants*, viXra: 1210.0076