Relation between dimensionless physical constants

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Abstract. Dirac [1] discusses relations between numbers of the order of 10^{40}. Authors after him [2-7] introduced the relation of the order of 10^{121}, the subject of this article.

If we denote the inverse fine-structure constant by **ά**, proton-electron mass ratio by **μ**, neutron-proton mass ratio by **γ**, and the biggest-smallest mass ratio in the universe by N [2], the following formula applies:

$$N = \gamma^{1+\alpha'^2 \ln(\mu)/\ln(2)} \qquad \textbf{1}$$

Mathematical constant ln(2) appeared during the calculation of the relation, as the computation ability of the universe was presumed [7].

CODATA recommended values [8] for constants in relation (1) are:

ά=137.035 999 074 (44), μ= 1836.152 672 45 (75), γ=1.001 378 41917 (45)

Then, if we apply the following values:

ά=137.035 999 074, μ= 1836.152 672 45, γ=1.001 378 4192

Relation (1) gives the following value for **N**:

N=6.387 08E+121

Certain numerical instability of the relation is a consequence of the fact that it connects values that differ in about 120 orders of magnitude. Close value to N can be found in [2, p 2].

This relation does not include the second and third generation of elementary particles, which makes the relation (1) approximate (even though these particles can affect only the several dozen orders of magnitude less than the first generation).

Relation (1) determines the ratio of four dimensionless physical constants γ, μ, ά and N. The relation is defined based on the original insight into the universe as a whole and the universe's relations to basic mathematical and physical constants. The calculations and tests of the relation proved its compliance with numerous physical constants. Whether relation (1) is a coincidence, approximate relation or just a curiosity, will be proven over time. Experimental physics can confirm it or deny it by ever more precise measurements, theoretical physics can determine its physical meaning, while mathematics can determine its mathematical fundaments.

References:

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