

Electrical Moonshine

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Abstract. The electrical constant a and its Eddington approximation 137 are both 10 ppb connected with the dimension $d = 26$ of bosonic string theory and the 'moonshine entropy' $\ln D$. Direct connection between a , 137, d and $D = 196883$, reveals the string central number 496, about the 20th root of the Monster order, whose square corresponds to 125.6 GeV (BEH Boson), and directly tied to the Monster order entropy via the tau and muon masses. This mass correlates with canonical economic numbers, leading to a value for the tau mass compatible with the Koide relation in the 10 ppb range, and confirming the BIPM value for G , at 4σ the tabulated value. The fifth power of the Monster order is directly connected to D and d via the number 24 of transverse dimensions, entering the economic number $3^{(24^2+1)}$. This confirms the arithmetical character of Physical laws.

A bridge was established between two very different mathematical domains : the group theory and the conformal field one, which is related to the string theory [1]. The starting common point is the dimension of the Monster group $D = 196883$. In its treatment of the bosonic string theory, of dimension $d = 26$, Witten [2] considers the corresponding entropy $\ln D$, and compare it with the natural term 4π . But there are two 10^{-8} precise relations implying 137 and the electric constant [3] $a \approx 137.035999138(31)$.

$$6d \ln D \approx (137/\pi_1)^2 \approx (a/\pi)^2 - 1$$

π_1 being the classical approximation $355/113$, *confirming the arithmetical character* of Physics revealed by the Monster Group [4], Topological Axis [5], and the Eddington number 137 [6][7].

Detailed analysis shows that, in the ppb range :

$$D = 12d(136 + 496 - 1) + 11 \approx 12d(a + 496 - 2) - u \approx H(8H/a - 1/12)$$

where H is the Hydrogen/electron mass ratio, $u \approx 0.23129(5)$ is the weak-mixing angle [3] and 496 the third perfect number, central in string theory [8], whose square is very close to s , the 10th root of the Monster order, corresponding, by respect to the electron energy, to 125.6 GeV, nearly compatible with the BEH mass 125.09(24) GeV [3].

Also the mass ratio Muon/Electron μ and Tau/Electron τ appear in

the entropy of the Monster order \mathbf{M} :

$$\ln \mathbf{M}/137 \approx e/3 \approx \ln \tau/9 \approx 10\mu \ln D/8\tau$$

involving $\ln \mathbf{M}/10 = \ln s$:

$$137/8 \approx \tau \ln s / \mu \ln D$$

Also τ is tied to the cube of the 'economic number' $e^{(2)} = e^e$. In fact the measured value 3477.22(23) is compatible with the following value, involving : $e^{(3)} = e^{(e^e)}$:

$$\tau \approx 137^2 e^{(3)}/(2a)^3 \approx 3477.439674$$

This value is compatible with the 2.2×10^{-8} precise μ value $\approx 206.7682836(47)$, in the Koide relation [9], prolonged with the term $4\pi(apH)^{1/4}$:

$$(1+\mu+\tau)/2 \approx (1+\sqrt{\mu}+\sqrt{\tau})^2/3 \approx 4\pi(apH)^{1/4}$$

It is significant that the best determined particle mass is that of the tau. *Albeit the Koide formula have corrected a 3 tau deviation for tau mass measurement, it is not taken seriously.* This shows how the standard model of particle is disconnected from the profound mathematical physics behind.

The economic numbers play also a decisive role in the *incredible* connexion (0.2 ppm) of the Monster groupe order with that of the pariah group J_3 [4] :

$$\mathbf{M} \approx J_3^7 d_e \sqrt{(p/6\pi^5)}$$

where $d_e \approx 1.001159652$ is the electron magnetic factor and p the mass ratio proton/electron, $6\pi^5$ being its famous Lenz-Wyler approximation.

Also, the economic numbers appears in :

$$e^{(3)}/e^{(2)} \approx e^7 \times e^{(2)^2} \approx 137 \times 8 \times e^{(2)^2} \approx a \sqrt{(pH)} \approx \sqrt{(\pi/3)} sa/137 \approx a^{13} \sqrt{(d_e(H-p))}/P$$

where P is the mass ratio Planck/electron. This corresponds to a value for G both compatible with the Coherent Cosmology one [4] and BIPM measurement, at 4σ the tabulated value [3].

The following relation may be useful, since 24 is the number of transverse dimensions, and $D+1$ appears in the moonshine

correlation :

$$(D+1)^{2 \times 26} \approx 3^{24^2 + 1} \approx (e^3 M/\sqrt{2})^5$$

precise to 5×10^{-5} and 9×10^{-6} on a number of 275 decimal digits. The term $M/\sqrt{2}$ appears directly in c-free dimensional analysis [4], as well in the relation :

$$M/\sqrt{2} \approx (a/137)^{3aW^2/4\pi F}$$

inside the imprecision on W , the charged weak boson mass, by respect to the electron one, while F is the Fermi mass, while in the ppb range :

$$a/137 \approx 3^{a/F} \approx (P\sqrt{(3/2)})^{1/(D+11)}$$

This confirms that $a/137$ is a mathematical ratio.

As well as mathematicians take profit of computer, they could be guided also by those formula, obtained by the *physical approach method* i.e. to look for direct connexions between pertinent numbers.

References

[1] I. B. Frenkel, J. Lepowsky, and A. Meurman, “A *Natural Representation of the Fischer-Griess Monster With the Modular Function J As Character*,” Proc. Natl. Acad. Sci. USA 81 (1984) 3256-3260.

[2] Witten E., *Three-Dimensional Gravity Revisited*
arxiv.org/abs/0706.3359

[3] C. Patrignani et al. (Particle Data Group), Chin. Phys. C, 40, p. 119,100001 (2016) and 2017 update.

[4] Sanchez F.M., Bizourd C., Veigel D. and Veyseyre R, *Appearances of the Monster Group in Physics*, vixra.org/abs/1712.0367

[5] Sanchez F.M. *A Rehabilitation of String theory : from Grandcosmos to Massive gluon*, viXra:1601.0011

[6] Eddington A.S., *The Fundamental Theory* (Cambridge, 1946). Durham I.T. 2006, Sir Arthur Eddington and the Foundations of Modern Physics [arXiv:quant-ph/0603146v1](https://arxiv.org/abs/quant-ph/0603146v1).

[7] Sanchez F.M. *Remarkable Properties of the Eddington Number 137 and the Electrical Parameter 137.036 excluding the Multiverse Hypothesis*, viXra:1502.0147v7

[8] Polchinski J., *String Theory*, Cambridge University Press, 1998, 2005)

[9] Koide Y., *Lett. Nuovo Cimento*, 34, 201 (1982)