

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). 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 order 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 :

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

where H is the Hydrogen/electron mass ratio, $\sin^2 \theta \approx 0.23129(5)$ is the weak-mixing angle [3] and 496 the third perfect number, central in string theory [8], very close to the 20th root of the Monster order, whose square corresponds, by respect to the electron energy, to 125.6 GeV, nearly compatible with the BEH mass 125.09(24) GeV [3].

While 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. In particular, the following relation may be useful, since 24 is the number of transverse dimensions and $D+1$ appears in the moonshine correlation :

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

where M is the Monster order, 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].

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 Veysseyre 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)