The connection of the imaginary parts of the non-trivial zeros (second, third and fourth) of the Riemann zeta function with the masses of the leptons

Angel Garcés Doz

angel1056510@gmail.com

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Abstract

In this work the connection of the non-trivial zeros of the Riemann zeta function and a unification theory appears again. From this hypothetical theory yet to be developed, we obtain equations that connect these non-trivaial zeros with the masses of the electron, tau and muon leptons. In this case the imaginary parts of the second, third and fourth non-trivial zeros are used.

1 Introduction

Despite the unquestionable success of the standard model, it suffers from the fact that it requires parameters for its calculations that the model itself cannot derive. This article deals with the masses of leptons: electron, tau and muon. Specifically, the entropies of equiprobable states are obtained in relation to the ratios of the masses of the leptons with respect to the mass of the electron. That is to say: In(tau mass/electron mass), In(muon mass/electron mass). Likewise, an equation is presented with the entropies of the ratio of the Planck mass and the masses of the electron, tau and muon leptons. These equations, even though they are purely empirical, we believe that they are not coincidental. Its non-chance derives from the fact that random terms do not appear. The elements of these equations are exclusively the imaginary parts of the non-trivial second, third and fourth zeros of the Riemann zeta function, the fine structure constant and the masses of the leptons themselves. We would say these characteristics of these equations demonstrate their self-consistency. As we have already shown in other articles, again the imaginary parts of the non-trivial zeros of the Riemann zeta function seem to be connected with a unification theory from which we extract pieces of its complete puzzle. Ultimately everyone can draw their own conclusions, of course.

Let us remember how the imaginary part of the first non-trivial zero of the Riemann zeta function is related to an equation that unified electromagnetism and gravitation.

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2 The imaginary parts of the non-trivial zeros of the Riemann zeta function used in this work

$z_2 = 21.022039639$,$z_3 = 25.01085758$, $z_4 = 30.424876126$

Inverse Fine structure constant =137.035999046= $\alpha^{-1}(0)$
Planck mass $= m_{PK}$

2.1 The entropy muon mass/electron mass

$$\frac{z_2}{\ln\ln(m_{PK}/m_e)} - \frac{1}{z_4^2} + \frac{1}{\alpha^{-2}(0)\cdot 2\pi} - \frac{1}{(m_\tau/m_e)^2} = \ln\left(\frac{m_\mu}{m_e}\right)$$

2.2 The entropy tau mass/electron mass

$$\frac{z_3}{\ln(z_2)} - \frac{1}{15\cdot\ln\pi} + \frac{1}{\left(\frac{m_\mu}{m_e}\right)^2 + 2\cdot\left(\frac{m_\mu}{m_e}\right)} + \frac{1}{(z_2+z_3)^4} = \ln\left(\frac{m_\tau}{m_e}\right)$$

2.3 Entropy of the sum of the masses of the three leptons/electron mass

$$\frac{z_3}{\ln(z_2)} - \frac{2}{z_2^2\cdot z_3} + \frac{1}{\left[\exp\left(\frac{z_3}{\ln(z_2)}\right)\right]^2} = \ln\left(\frac{m_\tau+m_\mu+m_e}{m_e}\right)$$

2.4 Entropy Planck mass/electron mass

$\frac{1+\sqrt{5}}{2} = \varphi$

$$2\cdot z_3 + \sqrt{2\pi} - 1 - \frac{\exp(\varphi-1)}{\left(\frac{m_\tau+m_\mu+m_e}{m_e}\right)} + \frac{1}{\left(\frac{z_2^2\cdot z_3}{2}\right)^2\cdot\ln\pi} = \ln\left(\frac{m_{PK}}{m_e}\right)$$

2.5 sum of z3+z2 as a function of the masses of the leptons, Planck mass, z2 and fine structure constant

$$\frac{\ln\left(\frac{m_{PK}}{m_e}\right) + \ln\left(\frac{m_{PK}}{m_\tau}\right) + \ln\left(\frac{m_{PK}}{m_\mu}\right)}{3} - 1 + \frac{m_e}{m_\tau+m_\mu+m_e} - \frac{1}{\alpha^{-2}(0)\cdot\ln(z_2)} = z_2 + z_3$$

2.6 z3 as a function of lepton masses, entropy, z2 and fine structure constant

$$\ln\left(\frac{m_\tau+m_\mu+m_e}{m_e}\right)\cdot\ln\left(z_2\right)+\frac{2\cdot m_e}{m_\tau+m_\mu+m_e}+\frac{2\pi}{10\cdot\alpha^{-2}\left(0\right)\cdot\ln\left[\alpha^{-1}\left(0\right)\right]}=z_3$$

2.7 The Monster group and z2?

Order Monster Group= $2^{46}\cdot 3^{20}\cdot 5^{9}\cdot 7^{6}\cdot 11^{2}\cdot 13^{3}\cdot 17\cdot 19\cdot 23\cdot 29\cdot 31\cdot 41\cdot 47\cdot 59\cdot 71 = O_r\left(M\right)$

"The minimal degree of a faithful complex representation is $47\times 59\times 71 =$ 196,883, hence is the product of the three largest prime divisors of the order of M"

$$\sqrt[4]{196883-\frac{196883}{\ln\left[O_r\left(M\right)\right]}}+\frac{1}{\exp\left(\pi^2\right)+\exp\left(2\pi\right)}+\frac{1}{\exp\left(15\cdot\ln\left(\pi\right)\right)}=21.0220396392674\simeq z_2$$

2.8 The product of the first four non-trivial zeros of the Riemann zeta function and the Higss boson mass/electron mass ratio

$z_1 = 14.134725142$

$$\left(\frac{2}{e}\right)^2\cdot 2\cdot z_1\cdot z_2\cdot z_3\cdot z_4 = 244805.202790003$$

$$\frac{\left(\frac{2}{e}\right)^2\cdot 2\cdot z_1\cdot z_2\cdot z_3\cdot z_4\cdot m_e}{c^2\cdot 1,602176634\times 10^{-19}\cdot 1000000000}=12.0952\ Gev$$

3 Conclusions

As you can see, the equations have a number of terms less than or equal to five. That is to say: they are quite simple. At the same time they are self-consistent as mentioned in the introduction. There are very few ad hoc elements. Only the number ten, fifteen, and perhaps the golden constant could be considered ad hoc elements. We have no doubt that once again a deep connection is shown between the non-trivial zeros of the Riemann zeta function and an emerging unification theory. And we are also increasingly certain that there must even be a physical-mathematical connection between the monster group and the Riemann zeta function and the non-trivial zeros of it.

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