The deep relation of the non-trivial zeros of the Riemann zeta function with electromagnetism and gravity

Angel Garcés Doz

angel1056510@gmail.com

Abstract

In one of my previous articles (https://vixra.org/abs/1701.0042) I already demonstrated the deep relationship of this Riemann function (canonical partition function of the imaginary parts of the non-trivial zeros of the Riemann z function) with gravity and electromagnetism. In this work we recover it to show its deep connection with a new very simple function that uses the imaginary part of the first zero of the Riemann zeta function together with another well-known function of the non-trivial zeros of the zeta function.Its extraordinary simplicity, without random terms appearing, and that in both functions (the canonical partition function of the imaginary parts of the non-trivial zeros of the zeta function and the new one, derived from the imaginary part of the first zero of zeta) are present the Planck mass, Newton's gravitation constant and the elementary electric charge, implies that their coincidence is completely impossible. At the same time, and for some time now, both mathematicians and physicists have been trying to demonstrate the Riemann hypothesis from quantum mechanics, but so far this has not been achieved. Our work works in reverse and demonstrates that the Riemann zeta function for non-trivial zeros plays an essential role in quantum mechanics and in a possible unification theory, as will be observed by the equations that we will show. We even dare to conjecture that the Physical baryon density (value 2018,0.0224±0.0001) parameter is obtained with a function involved in this work (non-trivial zeros of the function z)

Introduction

As is well known, the quantum vacuum does not contain any real particles. This is due to the nature of virtual particles, which can appear in particle-amtiparticle pairs and exist ephemerally under the Heinsenberg uncertainty principle. In this work we will make a bold conjecture and suggest that this state of zero real particles of the quantum vacuum is related, in part, to the non-trivial zeros of the Riemann zeta function. Instance, a non-trivial zero of the Riemann zeta function can be related as follows:

In the following way : particle-antiparticle pair $p + \bar{p} = \varsigma(\frac{1}{2} + it_n) = 0$, where t_n is nth imaginary part of the non-trivial zero

It should be noted that the integer part (1/2) of these non-trivial zeros is mathematically related to the Heisenberg uncertainty principle with the following equation: $m\acute{a}x\left(\frac{\sigma_x \cdot \sigma_p}{\hbar} = \frac{1}{2}\right)$

Meaning com máx, the maximum possible uncertainty

1 The equation that unifies electromagnetism and gravity with a very simple equation that contains the canonical partition function of the imaginary parts of the non-trivial zeros of the Riemann z function, and assuming an integer part of 1/2

m_{PK} =Planck mass, m_e =electron mass, G_N =Newton's gravitation constant, $\pm e$ = elementary electric charge constant

Canonical partition function of the imaginary parts of the non-trivial zeros of the Riemann z function. $\varsigma\left(\frac{1}{2} + it_n\right)$ calculated with the first 1000 zeros

$$\left(\sum e^{-t_n}\right)_{n=1}^{\infty} = \frac{1}{1374617.454518844354}$$

$$\pi^2 \cdot (\pm e) \cdot \left[\left(\sum \exp^{-t_n}\right)_{n=1}^{\infty}\right] = \pm\sqrt{m_{PK} \cdot m_e \cdot G_N}$$

2 The equation that unifies electromagnetism and gravitation with the elementary electric charge, Planck's mass and Newton's constant of gravitation

Imaginary part of the first non-trivial zero of the Riemann z function (https://oeis.org/A058303). $\varsigma\left(\frac{1}{2} + i14,134725141734693790\cdots\right)$,$t_1 = 14,1347251417\cdots$

The Riemann zeta function can be factored over its nontrivial zeros rho as the Hadamard product zeta(s)=(e^([ln(2pi)-1-gamma/2]s))/(2(s-1)Gamma(1+1/2s))product_(rho)(1-s/rho)e^(s/rho) (2)

(Titchmarsh 1987, Voros 1987).

Let rho_k denote the kth nontrivial zero of zeta(s), and write the sums of the negative integer powers of such zeros as Z(n)=sum_(k)rho_k^(-n) (3)

(Lehmer 1988, Keiper 1992, Finch 2003, p. 168), sometimes also denoted sigma_n (e.g., Finch 2003, p. 168). But by the functional equation, the nontrivial zeros are paired as rho and 1-rho, so if the zeros with positive imaginary part are written as sigma_k+it_k, then the sums become Z(n)=sum_(k)[(sigma_k+it_k)^(-n)+(1-sigma_k-it_k)^(-n)].

https://mathworld.wolfram.com/RiemannZetaFunctionZeros.html

$$Z\left(n\right)=\sum\left[\left(\sigma_k+it_k\right)^{-n}+\left(1-\sigma_k-it_k\right)^{-n}\right]_k$$

$$Z\left(1\right)=\frac{1}{2}\left[2+\gamma-\ln\left(4\pi\right)\right]=0,023095708966121$$

$$\sqrt{2\cdot Z\left(1\right)}=T$$

W boson, Z boson, e electron, tau, muon, Weinberg angle

$$\frac{\sin\theta_W}{\frac{m_\tau+m_\mu+m_e}{m_e}}=S$$

$$\exp\left(t_1-T-S\right)=\frac{m_{PK}}{\sqrt{\frac{\left(\pm e\right)^2}{G_N}}}$$

Physical baryon density parameter $\Omega_b h^2 = 0.02230\pm0.00014 \sim Z\left(1\right) = 0,023095708966121$

Conclusion

The equations presented here are extremely simple and without random parameters. This leads us to the resounding statement that, indeed, the non-trivial zeros of Riemann's zeta function play an essential role in a future unification theory, and surely in quantum mechanics.

References

[1] https://en.wikipedia.org/wiki/Riemann_zeta_function

[2] https://en.wikipedia.org/wiki/Quantum_vacuum_state

[3] https://en.wikipedia.org/wiki/Uncertainty_principle

[4] https://en.wikipedia.org/wiki/Lambda-CDM_model

[5] https://mathworld.wolfram.com/RiemannZetaFunctionZeros.html

[6] https://en.wikipedia.org/wiki/Weinberg_angle

[7] Angel Garcés Doz, ¨Axiomatization of Unification Theories: the Fundamental Role of the Partition Function of Non-Trivial Zeros (Imaginary Parts) of Riemann's Zeta Function. Two Fundamental Equations that Unify Gravitation with Quantum Mechanics¨, https://vixra.org/pdf/1701.0042v1.pdf

[8] Particle Data Group, Physical Constants,https://pdg.lbl.gov/2022/reviews/rpp2022-rev-phys-constants.pdf