Derivation of the mass due to the elementary electric charge and Newton's constant (sqr [(+-e)^2/Gn)]) from the uncertainty principle extended to 26 dimensions, the entropic uncertainty and the first non-trivial zero of the Riemann zeta function

Angel Garcés Doz

angel1056510@gmail.com

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Abstract

The first string theory was a purely 26-dimensional bosonic theory. He did not implement fermions. But there is a notable empirical fact

that seems to indicate that these twenty-six dimensions could refer to the number of elementary particles of the standard model on the energy scale of the Higgs vacuum. Or maybe that there really are 26 dimensions, 22 of them compacted into circles. Perhaps there is some ingredient that can convert the original 26-dimensional purely bosonic string theory into a string theory with bosons and fermions. A mass that could be either the scale of the unification energy or even the mass of gravitino, and even that of the magnetic monopole. We do not know. In this work we obtain the value of a mass in the way indicated in the title of this article. The Gaussian system of units is used to obtain the dimensions of the electric charge as a function of mass, length and time.

1 Introduction

In one of our previous works we already obtained this unification equation of electromagnetism and gravitation, since the square of the electric charge has, in a dimensional analysis, the following dimensional value by using the Gaussian system of units : M x L^3 x T^-2. And having Newton's constant, in dimensional analysis, the following value: L^3 x T^-2/M. Then the following equation gives us a mass:

For the calculations we will use the scientific E unit of the calculators.

Inverse Fine structure constant =137.035999084= $\alpha^{-1}(0)$

$$\sqrt{\frac{(\pm e)}{G_N}} = m\left(\pm e, G_N\right)$$

$G_N = 6.67430E - 11\, m3\, kg^{-1}\, s^{-2} \quad , \pm e = 1.602176634E - 19\, C$

1.1 Particle in a spherically symmetric potential

In one of our works we discovered how the mass of the Higgs boson in relation to the mass of the electron could be expressed by the Heisenberg uncertainty principle extended to seven dimensions, counting on the existence of seven Higgs bosons and making an interaction matrix between them of 49 elements. This was expressed by the well-known equation of the generalization of the uncertainty principle to d dimensions and given by the following equation [4] (see bibliography) (adopting the minimum uncertainty value) :

$$min\left(\frac{\hbar}{\triangle x_{D=7} \cdot \triangle p_{D=7}}\right)^2 = \frac{4 \cdot (2\pi)^{7-1}}{7^2}$$

$$m_e \cdot 4 \cdot (2\pi)^{7-1} = 125.76483\, Gev$$

The radial equation derived from the one-dimensional Schrödinger equation for the vacuum (Particle in a spherically symmetric potential) is (and not taking into account the spins) :

$$E_{eff} = \frac{\hbar^2}{2 \cdot m_0 \cdot r^2} \longrightarrow 2 \cdot m_0 \cdot r^2 \cdot E_{eff} = \hbar^2$$

If we change the term $2 \cdot m_0 \cdot r^2 \cdot E_{eff} = (\triangle p \cdot \triangle x)^2$as a function of momentum and position, we have, using Heisenberg's uncertainty principle the following inverse and dimensionless uncertainty:

$$\frac{\hbar^2}{(\triangle p \cdot \triangle x)^2} = \left(\frac{\hbar}{\triangle p \cdot \triangle x}\right)^2 \geq 4 = \frac{4 \cdot (2\pi)^{1-1}}{1^2}$$

Therefore, empirically, it seems that physical reality uses the inverse of the square of the dimensionless uncertainty to establish some key ratios in particle physics. In this case the Higgs boson/electron ratio.This shows that there are indeed 7 compacted dimensions and given this compactness by: $4 \cdot (2\pi)^{7-1}$,

And generalizing: $\frac{4 \cdot (2\pi)^{d-1}}{d^2} = min \left(\frac{\hbar}{\triangle x_D \cdot \triangle p_D}\right)^2$

1.2 The value of the vacuum and the uncertainty principle in seven dimensions

Physicists have been trying for many years to understand the reason for the enormous numerical discrepancy between the value of the vacuum predicted by quantum mechanics and the experimental value observed by cosmological measurements and that is [16] $2.52E - 47\,Gev^4$

It is very logical to think that being the Higgs field the one that gives the mass to the particles, it should also have an essential role in the mass-energy of the vacuum.

And indeed it does, since the following entropy derived from the uncertainty principle in seven dimensions allows us to calculate the vacuum energy in the following simple way:

$E_{PK} =\ Planck\ Energy$

$$\ln \left(E_{PK}/E_{vac}\right) = \sqrt{\frac{4 \cdot (2\pi)^{7-1}}{7^2}} = 70.871489554971$$

$$\left(\frac{E_{PK}}{\exp \left(70.871489554971\right) \cdot 1.602176634E - 19 \cdot E9}\right)^4 = 1.6994914212920002E{-}47Gev^4$$

$$1.6994914212920002E{-}47Gev^4 \cdot \left(1+\sin\hat{\theta}\left(M_Z\right)\left(\bar{MS}\right)\right) = 2.51685669218968E{-}47Gev^4$$

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

$z_1 = 14.134725142$

1.4 The uncertainty principle in 26 dimensions, the entropic uncertainty, the imaginary part of the first non-trivial zero of the Riemann zeta function, the cosine of the graviton spin: the equation of the title of this article.

There are 26 particles that exist on the scale of the Higgs vacuum, which is the energy scale of the observed standard model. And they are, counting with the existence of the axion that would solve the CP problem of the strong force, 6 leptons+6 quarks+8 gluons+ 1 W boson+ 1 Z boson, + 1 photon, + 1 Higgs boson+1 axion+1 graviton. In total there are, effectively, 26 elementary particles.

$$\frac{\left(\frac{\left(4\cdot(2\pi)^{26-1}\right)}{26^2}\right)\cdot m_e}{\ln\left(\pi e\right)\cdot z_1\cdot\cos\left(spin\,2=2/\sqrt{6}\right)}\cdot\left(1+\frac{1}{\alpha^{-2}\left(0\right)}\right)=\sqrt{\frac{(\pm e)}{G_N}}=m\left(\pm e,G_N\right)$$

1.5 The 15 dimensions (26-15=11) and the Higgs boson

It is easy to observe by pure algebraic manipulation that this is true:

$$\frac{m_e\cdot\sqrt{4\cdot(2\pi)^{15-1}}}{\pi}=125.76483\,Gev$$

Spin projection z axis, quantum number and multiplicity: $\sum_s 2s+1=15$, spin 0, spin 1/2, spin 1, spin 2, spin 3/2 (gravitino)

1.6 The Planck mass ratio $/m\,(\pm e, G_N)$ and the Higgs boson

$$\frac{\left(\frac{m_{PK}}{\sqrt{\frac{(\pm e)}{G_N}}}\right)\cdot \ln 2}{\pi} = 244857.621477502$$

$$\frac{m_e \cdot c^2 \cdot 244857.621477502}{1.602176634E-19\cdot E9} = 125.121918747\,Gev$$

1.7 The uncertainty principle in three dimensions and its possible relation to the "totally" stable hadron, or proton

As is well known, the proton is made up of two u quarks and one d quak. In this brief exposition a precise relationship appears with the uncertainty principle in three dimensions and the sum of the masses of the two u quarks and the d quark. Let us remember that there are three colors of the strong force and the group of mediating gluons is the SU(3) group.

$$\frac{m_e \cdot c^2 \cdot \frac{4\cdot(2\pi)^{3-1}}{3^2}}{1.602176634E-19\cdot E6} = 8.965968863702Mev \simeq 2\cdot 2.16Mev(quark\ u)+4,67Mev\ (quark\ d) = 8.99Mev$$

1.8 Conjecture: possible scales of SUSY unification and the uncertainty principle in 11 dimensions

$$\frac{m_e \cdot c^2 \cdot \frac{4\cdot(2\pi)^{11-1}}{11^2}}{1.602176634E-19\cdot E9} = 1619.9190491\,Gev$$

$$\frac{m_e \cdot c^2 \cdot 4\cdot(2\pi)^{11-1}}{1.602176634E-19\cdot E9} = 196010.20494701\,Gev$$

2 Conclusions

What is well established in this article is that the uncertainty principle extended to d dimensions is fundamental as for example in the calculation of the mass of the Higgs boson. Calculated in seven dimensions it would seem that indeed the physical reality resides in eleven dimensions, seven compactified and four non-compactified. But surprisingly, the original 26 dimensions of the bosonic string theory appear. Is it purely by chance that the 26 particles of the standard model at the scale of the Higgs vacuum act as degrees of freedom in the form of dimensions, or perhaps there really are 26 dimensions which are reduced to 11 by the sum of the multiplicity of the projection of all the spins, including the gravitino, which gives 15 dimensions? We hope that in some way this work can contribute something to these fundamental questions. Note also the derived calculation for the vacuum energy.

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