A Preon Model from Manasson's Theory II

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In this short note I resubmit the model presented in vixra 1002.0054 with some corrections.
The mass of the Higgs boson has an integer relation with a particle of the model.
A conjecture is made about a possible internal structure of protons, neutrons, W bosons and neutrinos.

One questioned me, "Are you going to Dr. Stephen Albert's house?"

The Garden of Forking Paths
Jorge Luis Borges

In [1,2] Manasson applied dissipative chaos theory to particle physics, presenting a formula relating the fine structure constant α with Feigenbaum constant δ:
$\alpha = (2\pi\delta^2)^{-1}$

Following his schema we were led, assuming a principle of halving of the quantum number at every bifurcation, to conjecture the existence of the "mark" and of the "supermark", two particles with spin ¼ and ⅛, respectively.

Proposed schema of particles

	spin	charge	strong	weak	dim (s,t)	mass
graviton					**1 (1,0)**	
photon	**1**				**2 (2,0)**	
electron	**½**	**1**			**4 (3,1)**	**me = 0.511 MeV**
mark	**¼**	**½**	**1**		**8 (6,2)**	**me/4α = 17.5 MeV**
supermark	**⅛**	**¼**	**½**	**1**	**16 (12,4)**	**me/(4α)^2 = 586.5 MeV**

At every bifurcation a new quantum number springs up, and previous quantum numbers are halved. The four quantum numbers are spin, electric charge, "strong charge" and "weak charge".

It seems that the hypothetical dissipative nonlinear dynamical process underlying the production of particles creates also dimensions. The fabric of particles is the fabric of spacetimes. [3]

In [4] one can read: "The dimension of the space-time may also be a "dynamical" variable (...) If pregeometry is right, all the properties of the space-time may be attributed to those of the matters. In other words, "the matters come first and then the space-time does""

Particle evolution can be intuitively depicted in the following way: a spin zero graviton could live and be described in one dimension; the production of two photons from one graviton needs one more dimension, and permits the appearance of spin. [5]

Next doubling is related with space-time as we know it: if we assume a quaternionic structure, time could be the real dimension.

Next doubling produces an octonionic world: if we assume that the temporal dimension doubles, we have a real (linear) time and an imaginary (circular) time.

A "quaternion-valued time" is cited in "Quantum Mechanics and Gravity" by Mendel Sachs.

Exotic statistics in higher dimensions

Spin-statistics theorem affirms that in more than three spacetime dimensions statistics can be only bosonic or fermionic. As a fermion needs two rounds to restore its initial position and after one round it can be found at -1, a spin ¼ half-fermion after one round, in a certain sense, can be found at i, a fact of difficult interpretation.
It can also be noted that there are two possible paths:

$1 \rightarrow i \rightarrow -1 \rightarrow -i \rightarrow 1$ and $1 \rightarrow -i \rightarrow -1 \rightarrow i \rightarrow 1$

Anyway, our conjecture is that in 8D (and in 16D) the theorem can be circumvented. The appearance of imaginary numbers in this type of statistics could be related to other exotic phenomena, as e.g. a description of a possible internal structure of neutrinos. [6,7]

Relations between masses of particles

As two electrons form a Cooper pair, four marks should be necessary to form a stable and saturated configuration, a sort of Cooper quartet.

Eight supermarks, also, should be required to form a Cooper octet.

We observe the following relations between masses of particles and mass of the supermark:

W **136** = **17** x **8**

Z **152** = **19** x **8**

Top **288** = **36** x **8**

Higgs **212** = (**53** x **8**)/2

It can be noticed that **53** - **36** = **17** and **36** - **19** = **17**

In our first paper we observed that up and down quarks could be composed of **18** marks.
(18 is also the number of components of a molecular Borromean ring [8]).

It can be noted that the 750 GeV Diphoton Excess presents again an integer relation, being equal in mass to six Higgs. [9]

Neutrino masses

Thinking of neutrinos as composite particles [10], one can wonder why they are so light.
One explanation could be this: the mass of a particle could be not a scalar but a vectorial quantity the dimension of which is in relation with the dimension of the space-time the particle lives in. In the literature one can find the concept of "quaternionic mass" (A. I. Arbab, C. S. Lim).

So the measured neutrino mass could be like the little projection on the real axis of a vector big in modulus.

About a possible internal structure of protons, neutrons, W bosons and neutrinos

We have seen how W could be composed of 17 "Cooper octets" of supermarks.
In the proton 54 marks are arranged in a stable configuration.

The neutron could be composed of the same 54 marks of the proton plus a group of 4 "orthogonal" quarks: the difference between the proton mass and the neutron mass could be the projection of the "higher dimensional" mass of the 4 "orthogonal" quarks on the "real" mass.

When the neutron decays, the 4 x 18 marks lose their stability and undergo a process of bifurcation, giving rise to 8 x 18 supermarks, i.e. a W boson.

As said before, the W boson seems in reality to be composed by 8 x 17 supermarks: anyway, being 17 near 18, this hints for the plausibility of the scenario.

In the decay (i.e. in the transformation of the 4 "orthogonal" quarks into W) seems to be involved a mechanism of "rotation" of mass (a sort of Wick rotation), because W has fully "real" mass.

When W decays, four supermarks merge into an electron, other ones form an antineutrino, which lose its "real" mass by another mechanism of "rotation" of mass.

So we are led to consider a situation in which some particles have a very tiny mass: neutrinos and also the conjectured particles present in the neutron before it transforms into a proton.

In the literature one can found the statement that a tachyon has imaginary mass. One can imagine a particle that is at the same time superluminal and subluminal, gaining in this way an imaginary mass and a real mass, i.e. a complex mass.
This may seem contradictory, but an observer confined in 4D could perceive a superluminal 8D object as subluminal, due to a projection mechanism.
The real part of the mass is what the 4D observer perceive of the total mass. [11]

Conclusions

Starting from an application of chaos theory to theory of particles made by V. A. Manasson, we present in an intuitive way a preon model. Observing that in our model up and down quarks seem composed of 18 marks and W seems composed of 17 x 8 supermarks, we try to sketch an explanation of neutron decay, making use of the concepts of complex mass and of hypothetical rotational operators, which act during the production of supermarks from marks, and in the subsequent rearrangement of W in one electron (from four supermarks) and one antineutrino.

Dedication

To Marilinda, my love.

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