

## A Preon Model from Manasson's Theory II

Fabrizio Vassallo  
 Via Magellano 1  
 San Giovanni alla Vena - Vicopisano 56010 Pisa (Italy)  
[facebook.com/fabrizio.vassallo.98](https://facebook.com/fabrizio.vassallo.98)

In this short note I resubmit the model presented in [vixra.org/abs/1002.0054](https://vixra.org/abs/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 the 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  $\alpha$  with Feigenbaum constant  $\delta$ :

$$\alpha = (2\pi\delta^2)^{-1}$$

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  $\frac{1}{4}$  and  $\frac{1}{8}$ , respectively.

### Proposed schema of particles

	spin	charge	strong	weak	dim (s,t)	mass
<b>graviton</b>					<b>1 (1,0)</b>	
<b>photon</b>	<b>1</b>				<b>2 (2,0)</b>	
<b>electron</b>	$\frac{1}{2}$	<b>1</b>			<b>4 (3,1)</b>	<b>me = 0.511 MeV</b>
<b>mark</b>	$\frac{1}{4}$	$\frac{1}{2}$	<b>1</b>		<b>8 (6,2)</b>	<b>me/4<math>\alpha</math> = 17.5 MeV</b>
<b>supermark</b>	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	<b>1</b>	<b>16 (12,4)</b>	<b>me/(4<math>\alpha</math>)<sup>2</sup> = 586.5 MeV</b>

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]

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.

Next doubling is related with space-time as we know it: if we assume a quaternionic structure, time could be the real dimension and irreversibility of time could be in relation with non-commutativity

of quaternions.

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.

### **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:

$$\mathbf{W} \quad 136 = 17 \times 8$$

$$\mathbf{Z} \quad 152 = 19 \times 8$$

$$\mathbf{Top} \quad 288 = 36 \times 8$$

$$\mathbf{Higgs} \quad 424 = 53 \times 8$$

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.

### **Neutrino masses**

Thinking of neutrinos as composite particles [4], 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 the 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 could be 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.

### 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  $17 \times 8$  supermarks, we try to sketch an explanation of neutron decay, making use of the concepts of vectorial mass and of hypothetical rotational operators, which act during the production of supermarks from marks, and in the subsequent rearrangement in one electron (from four supermarks) and one antineutrino.

### Dedication

To Marilinda, my love.

### References

[1] Vladimir A. Manasson [Are Particles Self-Organized Systems?](#) 2008

[2] Vladimir A. Manasson [Self-Interacting Electron as a Nonlinear Dynamical System](#) 2006

[3] Frank Tony Smith [From Sets to Quarks](#) 1997

“The three representations for spacetime, fermion particles, and fermion antiparticles are EACH 8-dimensional with Octonionic structure. They are ALL isomorphic by the Spin(8) Triality Automorphism, which can be represented by rotating or interchanging the 3 arms of the Dynkin diagram of Spin(8). The Triality isomorphism between spacetime and fermion particles and fermion antiparticles constitutes a SUBTLE SUPERSYMMETRY between fermions and spacetime.

Frank Tony Smith [Spinor Doubling and Evolution of Our Universe](#) 2013

[4] P. Kovtun, A. Zee [A schematic model of neutrinos](#) 2006

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“Schultz [6] who found exact quaternionic solutions to Maxwell's equations that indicated that the speed of propagation in the inbound and outbound directions would be different for such waves. This result was in agreement with the ring laser experiments of Sanders.”

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