Generating Mass from Nothing

By J.A.J. van Leunen

Last modified: 31 March 2018

Abstract

Having mass stands for having the capability to deform the living space of the owner of the mass. This description makes mass a very transient property that recurrently must be regenerated because deformations spread over the living space. Consequently, deformations quickly fade away. It looks as if mass generates out of nothing and then dilutes into nothing.

1 Origin of mass

The universe must expand. Otherwise temporary local deformations would not perceive as attractive. The same mechanism that locally pumps volume into the field will expand that field. The local addition starts spreading over the field. Spherical pulse responses implement the result of the mechanism [1].

Stochastic processes generate the pulses. They create mass out of nothing. Here mass stands for local deformation of the living space. The living space is a field that is always and everywhere present in the universe. The deformation caused by the spherical pulse response quickly fades away. The processes produce a continuous stream of massive objects that dilute into the increasing volume of the universe. This fact means that mass is a very transient property. That property must recurrently be regenerated. That is why the recurrent regeneration of the constituents, which are spherical pulse responses, keeps regenerating all elementary particles.

The embedding of the separate Hilbert spaces in which the elementary particles reside, into a non-separable Hilbert space drives the stochastic processes. Thus, the volume stream comes from the discrete content of the separable Hilbert spaces that is added to a field in the non-separable Hilbert space.

2 Recurrent regeneration

If all elementary particles are recurrently regenerated, then the conservation of mass is not at risk. Only the mass density decreases.
At every progression instant, a private stochastic process generates a new hop landing location for each elementary particle. The hop landing locations form a coherent swarm. A location density distribution describes that swarm and equals the squared modulus of what physicists call the wavefunction of the elementary particle. This fact does not forbid that also spurious spherical pulse responses are generated that do not become part of the swarm of an elementary particle.
If at each separate infusion the inserted volume is always the same, then a mass conservation rule requires that the number of volume infusions must stay constant. Otherwise, the infused volume stream must stay constant such that the generated deformation compensates the dilution of the deformation by the spreading of the inserted volume over the complete field.

The actuator of the spherical pulse must be isotropic. The embedding of a hopping location must cause a dynamic isotropic symmetry breaking or a chiral discrepancy. This effect can only occur when the two involved Hilbert spaces apply different versions of the quaternionic number system that cause the required symmetry breaking or chiral discrepancy. Separable Hilbert spaces that represent electrons automatically implement an isotropic symmetry breaking. Separable Hilbert spaces that represent neutrinos do not cause a symmetry break, but instead, they may cause a chiral discrepancy. Quarks pose a problem. They cause a symmetry break, but that is not isotropic. This fact is quite probably the reason that quarks cannot be perceived in isolation. Instead, they appear combined in mesons and baryons. These hadrons possess an isotropic symmetry. Besides of that possess these particles mass. This fact indicates that the concerned stochastic processes cooperate to install the correct isotropic dynamic chiral symmetry breaking such that spherical pulse responses are generated. This cooperation installs the color confinement mechanism.

3 Modules

The elementary particles are elementary modules. Composite modules own private stochastic processes that possess a characteristic function, which equals the superposition of the characteristic functions of the stochastic processes that generate the components. The superposition coefficients act as displacement generators, which determine the internal positions of the components. This fact may cause internal oscillations of the components. Perhaps this procedure can also install the proper symmetry breaking for the quarks, such that the module obtains its mass.

4 Generation rate

The generation rate of the constituents of an electron follows from the mass of the electron and from the mass-energy equivalence.

$$E = m\,c^2 = h\,\nu$$

The annihilation of the electron produces a photon that has a frequency, which equals the ***generation rate*** of the constituents of the electron.

$$\nu = \frac{m\,c^2}{h}$$

This is in correspondence with the Compton wavelength λ

$$\lambda = \frac{h}{mc}$$

m = $9.10938356 \times 10^{-31}$ kilograms
c = 299792458 m / s
h = $6.62607004 \times 10^{-34}$ m^2 kg / s
ν = $1.235589965126603 \times 10^{20}$
The period $\lambda = c/\nu = 2.42631 \times 10^{-12}$

$E = 8,187105649650028 \times 10^{-6}\ m^2\ kg / s^2$

The number of constituents of the electron follows from the length of the photon. All photons share the same spatial length and the same emission duration. This equals the regeneration rate of the electron.

Since electrons do not encounter problems with their symmetry breaking, the generation rate of their constituents might indicate the ***clock frequency at which the universe steps***.

References

The Hilbert Book Model Project [2] explores the mathematical foundation of physical reality. An e-print archive [3] contains documents that highlight certain aspects of this project.

[1] http://www.physics.iitm.ac.in/~labs/dynamical/pedagogy/vb/3dpart2.pdf

[2] https://en.wikiversity.org/wiki/Hilbert_Book_Model_Project

[3] http://vixra.org/author/j_a_j_van_leunen