THE DEFINITION AND OVERVIEW OF THE COHERENT HELMHOLTZ PHASE SPACE OF TIME

More for physicists/quadratic interval home

In hindsight it is pretty straight forward, the laws of nature in our cosmos are the consequence of two four dimensional space time intervals opposing each other. Following the symmetry of the equilateral pyramid frame as momentum flux frame for a virtual 3D phase space of time, the fundamental idea of the crossing event cones according to this pyramid symmetry can be understood. The onset of the opposing events or crossing generates a 3D phase space called Helmholtz phase space at first consideration a static phase space of which the internal properties of the particles define its symmetry and due to the main property of internal acceleration in a particle this phase becomes a phase pace of virtual time, just because any particle writes away its momentum caused by labor, internal acceleration in a coherent direction of time. All particles randomized existing in a Newtonian 3D spatial space generate parallel time direction for their virtual labor. As is shown in chap 1 all baryonic matter and dark matter have absolute Newtonian internal properties.

For instance, say the two intervals S_1 and S_2 are independent from each other on its own merits. The difference of S_1 and S_2 may not be zero but multiplying the difference with S_1 and S_2 separately gives an equality. For the equality is valid that if $S_1S_2 = 0$ then $(S_1^2 + S_2^2 = 0)$. The sum determines that there exists a class of infinite S_3 intervals that can be a linear combination of both S_1 and S_2 (or either of these) provided $S_1S_2 = 0$. In that case the roots have to be real in the sum of $S_1^2 + S_2^2 = 0$. By using a Helmholtz kind of treatment for these intervals and expressing these in complex variables with $c^2 = 1$ the product of S_1S_2 must be evaluated firstly.

$$\{(x_1^2 + y_1^2 + z_1^2 - it_1^2)\,(x_2^2 + y_2^2 + z_2^2 + it_2^2)\} = 0$$

Simplified to spherical spatial symmetry it converts to:

$(\pm A_1^2 \pm it_1^2)\,(\pm A_2^2 \pm it_2^2) = 0$ giving 16 sets of equations due to the complex variables. These reduce to 4 sets if $A_1^2 = A_2^2 = A^2$

$$A^4 \pm 2A^2 it^2 \pm t^4 = 0$$

Two sets reduce to $t^4 + A^4 = 0$ having no real roots $t_1^2, t_2^2 = \pm A^2 i$.
The sum state of one reduces to

$$t^4 \pm 2A^2 it^2 - A^4 = 0 \quad \text{having roots } t_1^2, t_2^2 = \pm A^2 i \pm 0 \qquad (2.1)$$

The difference state of the other

$$t^4 \pm 2A^2 it^2 + A^4 = 0 \quad \text{having roots } t_1^2, t_2^2 = \pm A^2(1 \pm \sqrt{2})i \qquad (2.2)$$

Working out the sum of $S_1^2 + S_2^2 = 0$ for 16 sets: $A^4 - t^4 = 0$

So $t_1^2(r), t_2^2(r) = \pm A^2, (r) =$ real. (2.3)

There is a mixture of roots t_1^2 and t_2^2, one real and two different complex roots. These zero points have to be sorted out, which is not possible without some additional knowledge.

The terms A^2 and c^2 can be related by taking $A^2 = 1/c^2$. Because the $\sqrt{2}c^2$ is always greater than one making the vector velocity of c ($2^{1/4} > 1$). In other words only by inverting the roots the summation of all possible roots can be an option. The normalization $(1 + \sqrt{2})(1 - \sqrt{2}) = -1$ and multiplying by a factor of ½ the roots as combinations will be:

$$t_1^2, t_2^2 = \{\pm\tfrac{1}{2}(1 \pm \sqrt{2}) \pm i\}c^2 \quad \text{and} \quad t_1^2, t_2^2 = (\pm\tfrac{1}{2} \pm i)c^2 \qquad (2.4)$$

The summation of at least two terms of $\tfrac{1}{2}\sqrt{2}$ always gives sums greater than one with respect to c. So it is simplified that these terms have to be nullified. Secondly the root inversion can only be valid if the real and the complex part are split and maintained by a second system of paired S-intervals being perpendicular to the first paired set. Thirdly one has to realize that A^2 is the measure of a volume energy with respect to c^2 as a time vector or a direction. This points to the single t- root solution as the pseudo vector for the neutrino which has no complex terms. The vector has three normalized components of $(\tfrac{1}{2}\sqrt{2})$ c, the alternating energy states of $\tfrac{1}{2}c^2$ in exchange between pseudo vacuum and

particles. Sorting out the summation for the non equal constants in the real and complex part of the t-roots including the remark about √2 gives:

t_1^2 , $t_2^2 = ½(\pm 3 \pm i)c^2$ t_1^2, $t_2^2 = ½(\pm 2 \pm i)c^2$ as a real solution.
t_1^2, $t_2^2 = ½(\pm 1 \pm i)c^2$ not a valid solution.

The term (± 1 ± i) cannot be explained away. Only with the aid of power series for terms of $(\pm 1 \pm i)^4 + (\pm 1 \pm i)^{16} + ...$ etc., one can show that the terms (±3 ± i) and (± 2 ± i) are the important ones confirming the statement below. See power series below.

It is stated because of the understanding of the physics in chap 2 that $(3/2\ c^2)$ and $(1/2c^2)$ are respectively the spin symmetries of the quark cell and leptons in the phase space representing the trigonal and diagonal symmetries of the particles then distinguishing between these.

Having demonstrated in a simplified manner the opening statement, it is not too difficult to guess the follow up consequences. Apparently the existence of a class of curved 4D-space time intervals is separated from the class of particles in equilibrium to the dynamics of the pseudo neutrino vacuum. It determines that the total energy of our cosmos cannot be derived from particle parameters solely as neutrinos and leptons and quarks. However secondly, the infinitesimal of the differences of paired S-intervals in summation gives an overall 4D-time space interval locally and apparently overall as relativistic Lorentz space. The last statement is indirectly proven in par 5 and the essence of chap 1.

The spectacular results in the previous paragraph show a dimensionless relation of ratios between Higgs and the electron mass being a 4th root and the number of vector cells for the entire universe based on m_e only. Namely the above derivation, apart from the existence of a 3D-phase space of time or not, determines absolute symmetry in parity, charge and time. In that case the existence of a matter universe and an antimatter universe should have been generated from dimensionless parameters. .

Par2.1 Complex calculation for the N dimensional phase space .
Note the following shows the conserved relations between Plank's and electron parameters

Introduction
This exercise is a trial to express a particle in general, consisting of a complex part representing charge and a real part which is the rest mass of the particle. The last can also be defined as a length due to the uncertainty principle. It is this length which is suited for the substitution summation of the inverted the particle parameters giving the four phase appearances of $(\pm 1 \pm i)\ \lambda$
The reciprocal determines the interaction for the four states of the particle due to summation of all possibilities for identical particles. The results are three independent series of the 4th power which could be identified as one series for the photons, one for the leptons and one for the quarks, Apparently a cut off between the three series is possible around the terms of 28th and the 32nd power giving the ratio for Planck's constant to Compton's length as mentioned in chap 1 par 3 and worked out as a confirmation of the theory in chap 1.
In the sense of physics the complex part for the electric charge is a generalized condition. It means that diagonal symmetry is maintained by the perpendicular crossing of the time axes in the phase space of time which is difficult to explore mathematically without additional information.

The universal principle of substitution inversion

The statement is that a vector of n-dimensions in a n-dimensional phase space generates k = (n/4) +1 congruent universes due to substitution inversion for n as integers. A vector is defined as a complex number.

The assumptions are as follows:

1. Due to symmetry of any phase space, a vector can be represented by simplified representation
   $(\pm 1 \pm i)^n\ \lambda$ or the reciprocal $(\pm 1 \pm i)^n / \lambda$
   where λ is the length or proportional to the modulus of the vector.

Multiplication by conjugated terms in the denominator gives the inversion of the vectors equivalent to the original ones determined apart from a constant.

2. Any phase space of, say n-dimensions, can be summed from the phase spaces of reduced dimensions, say of four dimensions.

From a 4D-phase space onwards to higher dimensions one can derive two principal series and no others for any of the n-dimensions. This is sufficiently shown in ref 1 but not proven exhaustively in the sense of mathematics as the necessary condition. The overview table gives the results:

SUMMARY OF 4TH POWER SERIES

Table 2

Substitution summation λ_s for reciprocal of $1/\lambda$ maintains dimension of the parameter λ if inverted.

λ_s^4		λ_s^{16}		λ_s^{64}		λ_s^{256}		4th power of zero order
	λ_s^8		λ_s^{32}		λ_s^{128}			quadratic raise of 1st term
λ_s^7		λ_s^{28}		λ_s^{112}				4th power of 1st order

The quadratic rise of the first 4th power series consists of complex terms giving, if multiplied by the real 4th order in the summation, a zero sum.

The phase reduction of λ_s is the rotation of a phase increment. The 7th power series has an initial reduction of ⅓, a third, while the main 4th power has a reduction of ¼, a quarter. It determines the follow up of the other phases of the series in terms:

1/3 1/4 1/12 1/16 1/48 1/64 etc.

Consequently the self consisting groups from natural integers can be generated.

$(1/4)^4$	$(1/16)^{16}$	$(1/64)^{64}$	etc.		real zero order (photon series)
$(1/4)^8$	$(1/16)^{32}$	etc.			quadratic raise (lepton series)
$(1/3)^7$	$(1/12)^{28}$	$(1/48)^{112}$	etc.		real 1st order (quark series)

Substitution inversion of zero and 1st order terms generates a fractal for a point mass in conjunction to the electric charge similarly reduced to a point. Not in the same location and phase shifted nullifying the phase shift generated by a quark complex. Possibly the electric charge is the inversion substitution of the crossed powers of $(1/4)^7$ and $(1/3)^8$. It should be obvious that the photon series acts out in another phase plane, because the lepton and the quark series interact with it for charge formation to maintain the substitution inversion of each combination. See table 3.

The Planck length λ_{pl} is the inversion substitution of the crossed over power of 28th and 32nd exponent of

$(1/16)^{28}$ and $(1/12)^{32}$. See table 3 of the inversion substitution scaling for the actual calculation. Planck's length is the external criterion based on the continuum for vacuum of the infinitely small. The substitution is for the 12 phase group, the 1st terms of the two series, the terms 3^7 and 4^8 .

SUBSTITUTION INVERSION

Comment

Understanding of the substitution principle explains the majoring of the three divergent series.

Table 3

Majoring of Planck's length:

$(1/16)^{28}$	<	λ_{pl}	<	$(1/12)^{32}$ (table 3.1)
19.2593	<	4.051453	<	2.92550 times 10^{-35} meters

Subtraction substitution of the terms due to the (- ¼) phase term:

$16^{28} - 12^{32} = 1 / 3.449478\ 10^{-35}$ giving the ratio 4.051453 /3.4495 = 1.174511

The dimensional constant of 1.174511 is 17% deviated from the left and right hand ratios. To show this constant is dimensionless in the following. Take $\lambda_e = 2.426583\ 10^{-12}$ (m).

The 3rd power gives vector volume with induction length of $1.428846\ 10^{-35}$ (m)
The ratio: 4.051453/ 1.428846 = 1.002490 x $(\sqrt{2})^3$.
The second ratio: $(\sqrt{2})^3$ / 1.174511 = 2.408173.
Take the 3rd root of 2.408173 giving: 1.340382.

Majoring of the electron Compton length:

$(1/4)^7$	<	λ_e	<	$(1/3)^8$	(table 3.1)
0.6103515	<	λ_e	<	1.524158	times 10^{-4} unit

For the same reason the substitution in the subtraction gives:
16384 – 6561 = 9823 with 1/x =$1.018019\ 10^{-4}$

Compare this dimensionless constant with one of the massive boson energy range derived in the brochure, chap 1 par 5 of $1.316753\ 10^4$.
13167.53 /9823 = 1.340479 with deviation to 1.340382 = 1.000071.
It shows that the assumption of substitution inversion from dimensionless power series is correct. The majoring calculations of rel e1 and e2 are closely related.
Note: The ratio of 1.021138 gives $(1.021138)^{14}$ = 1.340238 compared to the mean of 1.340430.

The unexpected equality for the fine structure constant as mentioned. Apparently confirming the four coefficients for inversions of the different states of the pseudo vector vacuum.
1.010205 x 1.016140 x 1.021138 x 1.002490 = 1.050819 = 144 / 137.036

Acknowledgment
In appreciation to Dr W. Schuurman in checking out these calculations.

Details of the worked out of the calculations devoted to these theoretical considerations are available with the author.

home