The Origin of Hyperspace

Sylwester Kornowski

Abstract: We cannot travel in a hyperspace because it is not a spacetime containing higher spatial dimensions. Hyperspace "acts" in the 4-dimensional spacetime and defines the degrees of freedom of different size scales obtained because of the succeeding phase transitions of the Higgs field - it is described within the Scale-Symmetric Theory (SST). Hyperspace described within SST leads to the origin of the base of the natural logarithm in physics, to masses of the three heaviest quarks and to the sums of squared charges of baryon components and energy thresholds that are consistent with experimental data. Emphasize that structures described within the SST hyperspace lead to the Chaos Theory also.

The Scale-Symmetric Theory, [1], shows that hyperspace is not a spacetime containing more than 4 dimensions. In reality, hyperspace defines number of different linear and rotational motions in a system. Such different motions are the degrees of freedom in the phase space of a system.

Consider a loop/thin-torus composed of the Einstein-spacetime components i.e. of the neutrino-antineutrino pairs. It can move along three orthogonal/perpendicular directions so there are 3 degrees of freedom (the three spatial dimensions) but the linear speed can change so there appears the fourth degree of freedom i.e. the time dimension. When energy increases then the two sizes of the loop/thin-torus can change (i.e. the radius of the torus and its thickness) so there appear two additional speeds. The torus has a spin speed that can change and the torus can have internal helicity so there appear next two degrees of freedom. The spin of the torus can rotate in two perpendicular planes one perpendicular to linear velocity and the second overlapping with the linear velocity so there appear two additional angular velocities. We can see that phase space of the torus contains 10 elements i.e. it has the 10 degrees of freedom. When energy of collision increases then energy of a virtual loop/thin-torus is distributed over all degrees of freedom evenly. Notice as well that when spin of a loop/thin-torus does not rotate then it has 8 degrees of freedom.

The SST shows that the General Relativity leads to the superluminal Higgs field [1A]. Next, there are possible the succeeding phase transitions of such Higgs field that lead to different size scales described by phase spaces containing different number of elements i.e. the different size scales have different numbers of degrees of freedom. SST shows that a field as a

whole has one degree of freedom defined by its mass density whereas the degrees of freedom of the components of the fields defines following formula [1A]

$$N = (d - 1) \cdot 8 + 2, \qquad (1)$$

where $d = 0, 1, 2, 4, 8, 16$ (16 is the upper limit that follows from size of our Cosmos [1B]. We obtain following series $S_1 = -6$ (for tachyons), 2 (for rotational energies), 10 (for entanglons responsible for quantum entanglement), 26 (for neutrinos and neutrino-antineutrino pairs), 58 (for cores of baryons and electrons), 122 (for cosmic structures). The spinning of tachyons is eternal so the absolute value of -6, i.e. 6, represents their ground state. The sign "$-$" means that free tachyons have broken contact with other objects (they do not produce any field) i.e. they are the imaginary objects. Rotational energies, i.e. photons and gluons, are eternal so the 2 represents the ground state of photons and gluons. In the ground states, the neutrinos, cores of baryons and cosmic objects do not rotate so instead $26, 58, 122$ we have $24, 56, 120$.

Formula (1) leads to a number very close to the base of the natural logarithm i.e. SST shows the origin of this number in physics [2].

We can define hypervolume as directly proportional to a radius to the power equal to number of degrees of freedom of a system i.e. to the power equal to number of elements in the phase space of the system. Hypermass of created a loop/torus should be directly proportional to its hypervolume. Applying the Scale-Symmetric Theory, in such a way we calculated hypermasses of the three heaviest quarks [1A], [1D]. Emphasize as well that the virtual dark-matter loops lead to the Chaos Theory also [1C].

The obtained formula looks as follows

$$M_{Loop} \text{ [GeV]} = a \, (b \, / \, m_{condensate} \text{ [MeV]} + A \text{ [fm]})^{10}, \qquad (2)$$

where a, b and A are some constants resulting from the atom-like structure of baryons described within SST.

Hypervolume as well leads to the essential part of the curve $R(s) = f(s^{1/2})$ for electron-positron collisions [1D].

$$sqrt(s) \, [GeV] = (m_{kaon(o)} - m_{kaon(+,)}) \, [MeV] \, R(s)^5 \, / \, 1000. \qquad (3)$$

Applying formula (3) we obtained the sums of squared charges of baryon components and energy thresholds that are consistent with experimental data [1D].

As some recapitulation we can say that we cannot travel in a hyperspace because it is not a spacetime containing higher spatial dimensions. Hyperspace "acts" in the 4-dimensional spacetime and defines the degrees of freedom of different size scales obtained because of the succeeding phase transitions of the Higgs field – it is described within the Scale-Symmetric Theory.

References

[1] Sylwester Kornowski (2015). *Scale-Symmetric Theory*
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   [1B]: http://vixra.org/abs/1511.0223 (Cosmology)
   [1C]: http://vixra.org/abs/1511.0284 (Chaos Theory)
   [1D]: http://vixra.org/abs/1512.0020 (Reformulated QCD)
[2] Sylwester Kornowski (6 December 2015). "Mathematical Constants in Physics"
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