Editorial

On Matti Pitkänen's Topological Geometrodynamics From Particle Physics Perspective

Dainis Zeps*

Abstract

In four articles [1,2,3,4] of current issue of Prespacetime Journal ("PSTJ"), we present Matti Pitkänen's work devoted to his new physical results after the first experimental results at Large Hadron Collider are made public. We discuss here some of Pitkanen's insights in these papers and note his excessive use of mathematical innovations as main tools in way of development of his TGD universe.

Key words: topological geometrodynamics, particle physics, mathematical physics, LHC, Higgs boson.

Introduction

Matti Pitkänen's work in the four papers of this focus issue [1,2,3,4] appears in a time when hunt after Higgs boson at LHC makes its concluding stage with expectance of not finding this boson at all. Moreover, Pitkänen's work arise as direct response to all what goes on at LHC, in the same time serving as early prediction on what we are to expect further both at LHC and physics at all.

All what go on at LHC is reflected well at PSTJ in series of articles and news issues by Philip Gibbs, e.g. [5], see [6] too. PSTJ has published already some papers concerning results of LHC hunt after Higgs boson. See e.g. Lawrence Crowell's paper [7]. Whole issue [8] is devoted to success of LHC, where in paper [9] authors give new perspectives in particle physics in the era after first fundamental results on LHC.

LHC experiments suggest higher level energy involvement in particle physics experiments, 7 TeV, that mean new phenomena in particle physics and new discoveries. And what we see does not deceive us, no Higgs particle finding up to now being only one of them. This time is not only for gathering of fruits for experimental physicists. It is time for theoreticians too, time for new theories which are to appear in direct future. In this focus issue we give word to theoretician Matti Pitkänen, whose works sufficiently often appear at PSTJ. Last year we already issued focus edition devoted to works of Matti Pitkänen "The Miracle of Existence According to Theoretical Physicist Matti Pitkänen", edited by Philip E. Gibbs, Arkadiusz Jadczyk, Dainis Zeps [10]. In editorial [11] we discussed problems we had to encounter with this work there.

On Matti Pitkänen's TGD universe

Not long time before, some half of year, before LHC started to give first results, we were used to situation that Standard Model in particle physics was main theoretical model

* Dainis Zeps, PhD, Senior Researcher, Institute of Mathematics and Computer Science, University of Latvia, Raiņa bulvāris 29, Rīga, Latvija, LV – 1459. E-Mail: dainize@mii.lu.lv

that enjoyed best experimental and theoretic-physical support. Now something has changed. Standard Model start to suffers from lack of explanation "where from masses of particles arise" and we are to look around where from new explanations could come. One of such provider of original theories is Matti Pitkänen who is ready always to give new explanations and new solutions. How he works, or how his TGD universe does work? Let us take insight in there.

Matti Pitkänen's TGD universe is mathematical theory that is developed in enormous amount of papers, part of references of which may be found in references of here presented papers [1,2,3,4]. His only published book devoted to this subject is [12], some mathematical background may be found in [13]. Here we present papers [1,2,3,4] that are devoted to newest results concerning his particle physics predictions just after getting first results from LHC experiments.
Let us take insight there.

Matti Pitkänen's TGD universe and new predictions of mass calculations and new physics emergence

Matti Pitkänen bases his mass calculations mainly on three points. Firstly, conformal symmetries are most essential there. As mass squared operator essentially infinitesimal conformal scaling operator is applied. Mass spectrum before thermalization is obtained from conformal symmetry. Besides mass states and extremely heavy states as in string models are suggested and maintained there. Secondly, mass squared is p-adic thermal expectation of conformal weight in p-adic thermodynamics. Thirdly, TGD universe supports p-adic length scale hypothesis stating that p-adic primes near powers of two are of specific physical importance. Mersenne primes are applied there too.

Mass predictions main criterion according Pitkänen sounds like this. Masses may be predicted correctly within accuracy of percent in the case that they are known. Otherwise mass prediction might be highly non-trivial since mass scales are exponentially sensitive to the integer in by defining p-adic length scale. No fitting is possible.

Besides, in all his TGD universe suggestions, volens nolens new physics emergence is heavily stressed. Among all, new space-time concept is suggested, where traditional Standard Model quantum numbers application is replaced with the use of imbedding space geometry. Generalized Feynman graphs with new space-time topology and geometry are introduced and developed. Setting all this to work in TGD universe, one assumingly reaches desirable goal in theoretical physics: space-time is no more fixed arena of physics but dynamical object in all scales.

Among the problems cured like this are hot topics in LHC verifiable physics e.g. issues of SUSY and Higgs: TGD is at a point to predict light sneutrinos and 250 GeV selectron. TGD universe suggests Higgs field replacement by use of gauge boson where photon develops small mass too with effective compensations of all masses in total. According this model no whatever Higgs-like boson should be fixed by LHC, that supposedly should be confirmed already within this year.

Further, well know problem of proton stability solves in TGD universe as not being at all. Proton is stable. The problem becomes solved applying separate conservation rules for quarks and leptons, i.e., not using grand unified gauge symmetry to both as by Standard Model, according which quark and lepton belong to the same multiplet of grand unifying gauge group.

Using partonic 2-surfaces of different genera mass scaling in wide difference may be effectively covered by appropriate gauge symmetry relating different families of particles, thus solving mass scaling differences for electrons, muons, tau particles, neutrinos and quarks. New view on Cabibbo-Kobayashi-Maskawa mixing of quarks by reduction to mixing of topologies of partonic 2-surfaces is suggested.

New view on color quantum numbers suggested there too. According TGD universe, color angular momentum should be treated like quantum number in degrees of freedom rather than spin-like as in QCD.

As it is predicted by author of TGD universe, successful application of fractality to effect to get scaled copies of hadron physics may be expected, i.e., elementary particles , in particular quarks, could appear in several p-adic length scales. Here M. Pitkänen appeals to p-adic length scale hypothesis and fractally scaled variants of hadron physics. He asks – "Will LHC find scaled variant of hadron physics in TeV range? Is 145 GeV bump there or not?" This might be good indications for M. Pitkänen's new M_{89} hadron physics.

TGD universe as mathematical world

Behind all outer innovations stands M. Pitkänen's view on how new physics should work. The main tools are appropriate choices of mathematical instruments and conditions that serve as constraints for mathematical model that should stand as good description for physical world as precisely as possible. What distinguishes Pitkänen from other theoretical physicist is the range of innovations how these tools should be found and applied. If scientific community mainly tend to keep to more or less conventional traditions how physical phenomena should be treated, or which are these physical entities that should be kept as unchanged, say, space, time, or already settled as fixed to some convenient model, say, Standard Model, or at least stay to the point that all at once can't be changed in a moment at such a serious thing as physics, Pitkänen takes another position: if physical entities are so changing and unsafe for what may serve as ground notions for good description for experimental results, let us choose something that may stand for all this.

By view of Pitkänen this place should be taken by mathematics. The difference what makes Pitkänen's approach new is that he uses prevalence of mathematics without exception everywhere to everything. All is made by mathematics and before all stands mathematics. In order to reach the goals in such settlement mathematical tools should be chosen as powerful as possible. Because of that so excessive use of mathematical tools like conformal invariance and symmetries, prime numeric theoretical concepts, fractals and whatever else what we find in contemporary mathematics. Besides of this no constraints of how to apply all this in new physical innovations, the only concern of physicist is to build mathematically conditioned world of only one option for world that were modeled by theory. Mathematical definiteness should be as dense as to give place only to the world detected by experimental physics. In this respect M. Pitkänen uses to say: -- Number theory is extremely powerful constraint. Because of this so many instruments in TGD universe are taken from number theory, say, p-adic applications, infinite primes, Mersenne primes and so on.

Of course, this is used and applied by Pitkänen with some confinement on his own resources too, and this is his developed TGD universe. What he is not ready to change as easy as physical entities is his ground assumptions that are laid in the ground of TGD universe as a mathematical model. In other words Pitkänen is ready to replace particles with partonic surfaces or whatever mathematical construction with more easy than to change somewhat in his TGD universe that he had laid there some twenty or thirty years before. It may have some explanation. If someone works in solitude he has to economize his recourses after all. One more thing everyone who visits TGD universe would like to see could be presence of more proofs that all mathematics involved there works properly.

References

1. Matti Pitkänen, Overall View About TGD from Particle Physics Perspective. Prespacetime Journal, V2(10): pp. 1457-1528.
2. Matti Pitkänen, New Particle Physics Predicted by TGD: Part I. Prespacetime Journal, V2(10): pp. 1529-1604.
3. Matti Pitkänen, New Particle Physics Predicted by TGD: Part II. Prespacetime Journal, V2(10): pp. 1605-1647.
4. Matti Pitkänen, Particle Massivation in TGD Universe. Prespacetime Journal, V2(10): pp. 1648-1723.
5. Philip E. Gibbs, Exciting New Era of Particle Physics, Vol 2, No 7 (2011), pp. 940-945.
6. Philip E. Gibbs, http://blog.vixra.org/
7. *Lawrence B. Crowell,* Physics in a Higgsless World, Prespacetime Journal, July 2011, Vol. 2, Issue 7, pp. 953-955
8. Huping Hu, Philip E. Gibbs (editors), Great Success of LHC & Tevatron & a Brave New World of Particle Physics, Prespacetime Journal | July 2011, Vol 2, No 7 (2011), pp. 940-1183
9. *Huping Hu, Maoxin Wu,* The Dawn of a Brave New World in Particle Physics, Vol 2, No 7 (2011), pp. 946-952
10. Matti Pitkänen, The Miracle of Existence According to Theoretical Physicist Matti Pitkänen, ed. by Philip E. Gibbs, Arkadiusz Jadczyk, Dainis Zeps, PSTJ, 2010, Vol 1,No 4, 519-722
11. Philip E. Gibbs, Arkadiusz Jadczyk, Dainis Zeps "The Miracle of Existence According to Theoretical Physicist Matti Pitkänen" Editorial Comment, *PSTJ, 2010, Vol 1,No 4, 516-518*
12. Matti Pitkänen, Topological Geometrodynamics, Luniver Press, 2006, 824 pp.
13. M. Pitkänen, The Geometry of CP2 and its Relationship to Standard Mode, PSTJ, 2010, Vol 1, No 4, pp. 713-722