# The Origin of New LHC Scalar Resonance with a Mass of 742 GeV

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**Abstract:** On Tuesday, 15 December 2015, physicists from CERN published the results from Run 2. There is an excess of pairs of photons for total energy about 750 GeV. Here, applying the Scale-Symmetric Theory (SST), we present the origin of new LHC scalar resonance with a mass of 742 GeV. This mass follows from structure of baryonic plasma and Einstein spacetime and from the four-fermion symmetry (the quadrupole symmetry). The main mechanism is the same as for production of the composite Higgs boson with a mass of 125 GeV described within SST.

## 1. Introduction and calculations

On Tuesday, 15 December 2015, physicists from CERN published the results from Run 2 [1]. There is an excess of pairs of photons for total energy about 750 GeV. Here, applying the Scale-Symmetric Theory (SST), [2] we present the origin of new LHC scalar resonance with a mass of $742\ \mathrm{GeV}$. This mass follows from structure of baryonic plasma and Einstein spacetime and from the four-fermion symmetry (the quadrupole symmetry). The main mechanism is the same as for production of the composite Higgs boson with a mass of $125\ \mathrm{GeV}$ described within SST.

The General Relativity leads to the non-gravitating Higgs field composed of tachyons [2A]. On the other hand, SST shows that the succeeding phase transitions of such Higgs field lead to the different scales of sizes [2A]. Due to the saturation of interactions via the Higgs field and due to the law of conservation of the half-integral spin that is obligatory for all scales, there consequently appear the superluminal binary systems of closed strings (the entanglons) responsible for the quantum entanglement, stable neutrinos and luminal neutrino-antineutrino pairs which are the components of the luminal Einstein spacetime (it is the Planck scale), cores of baryons, and the cosmic structures that evolution leads to the dark matter, dark energy and expanding universes [2A], [2B]. The non-gravitating tachyons have infinitesimal spin so all listed structures have internal helicity (helicities) which distinguish particles from their antiparticles [2A].

During the inflation, the liquid-like inflation field transformed partially into the luminal Einstein spacetime. In our Cosmos, the two-component spacetime is surrounded by timeless wall – it causes that the fundamental constants are invariant [2A], [2B].

Due to the symmetrical decays of bosons on the equator of the core of baryons, there appears the atom-like structure of baryons described by the Titius-Bode orbits for the nuclear strong interactions [2A].

The coupling constant for the two shortest-distance quantum entanglement is very big (about $3 \cdot 10^{92}$) so the core of the baryons is practically indestructible. It causes that the liquid-like nuclear plasma consists of the cores [2A]. In such plasma, there are produced first of all pions, kaons and relativistic electrons in the $d = 0$ ground state which is tangent to the equator of the cores [2A]. Relativistic mass of the $d = 0$ electrons is about $F = 9.00362$ times higher than their bare mass ($m_{bare(electron)} = 0.510407011$ MeV) [2A].

Fermions have spin and internal helicity. To obtain objects with total spin and helicity simultaneously equal to zero, there must appear the four-fermion symmetry (the quadrupole symmetry). When fermions are created as groups of four particles then in the Einstein spacetime do not appear turbulences. It leads to conclusion that in the nuclear plasma, in the $d = 0$ state are produced relativistic quadrupoles composed of two electrons and two positrons.

Mass of the Einstein spacetime corresponding to electromagnetic energy equal to $E$ is $f = 40{,}362.942$ times higher [2A].

The above remarks lead to conclusion that there can be produced scalar condensates with following mass

$$M = 4\, m_{bare(electron)}\, F\, f = 742 \text{ GeV}. \tag{1}$$

Such a scalar condensate can decay into two photons. It is the new LHC scalar resonance.

**References**

[1] http://indico.cern.ch/event/442432/ (15 December 2015)
[2] Sylwester Kornowski (2015). *Scale-Symmetric Theory*
[2A]: http://vixra.org/abs/1511.0188 (Particle Physics)
[2B]: http://vixra.org/abs/1511.0223 (Cosmology)
[2C]: http://vixra.org/abs/1511.0284 (Chaos Theory)
[2D]: http://vixra.org/abs/1512.0020 (Reformulated QCD)