The Disappearance of High Mass Photon Pairs

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Abstract: Here, applying the Scale-Symmetric Theory (SST), we explain the disappearance of high mass photon pairs that are the two-stage resonances. Their creation follows from the quantum entanglement. We suggest that the observed decrease in standard deviations results from increase in integral luminosity. Due to the four-object symmetry, instead production of, for example, the Higgs-like bosons with a mass of 750 GeV, due to the increase in the integral luminosity from 3.3 [1/fb] in 2015 to 12.9 [1/fb] in 2016, there are produced the Higgs-like bosons with a mass eight times higher. But such mass (about 6 TeV) lies outside the range of the CMS experiment. Moreover, probability of creation of the two-stage resonances is very, very low.

The Scale-Symmetric Theory (SST) shows that the succeeding phase transitions of the superluminal non-gravitating Higgs field during its inflation (the initial big bang) lead to the different scales of sizes/energies [1A]. Due to a few new symmetries, there consequently appear the superluminal binary systems of closed strings (entanglons) responsible for the quantum entanglement (it is the quantum-entanglement scale), stable neutrinos and luminal neutrino-antineutrino pairs which are the components of the luminal gravitating Einstein spacetime (it is the Planck scale), cores of baryons (it is the electric-charge scale), and the cosmic-structures/protoworlds (it is the cosmological scale) that evolution leads to the dark-matter structures (they are the loops and filaments composed of entangled non-rotating-spin neutrino-antineutrino pairs), dark energy (it consists of the additional non-rotating-spin neutrino-antineutrino pairs interacting gravitationally only) and expanding universes (the "soft" big bangs due to the inflows of the dark energy into protoworlds) [1A], [1B]. The electric-charge scale leads to the atom-like structure of baryons [1A].

Within SST, we described the four-neutrino/particle/object symmetry – number of entangled objects in a system is quantized [1B]

$$D_n = 4^d \text{ (for single objects)}, \tag{1a}$$

or

$$D_n = 2 \cdot 4^d \text{ (for binary systems)}, \tag{1b}$$

where $d = 0, 1, 2, 4, 8, \ldots = 0, 2^n$, where $n = 0, 1, 2, 3, 4, 5, \ldots$ Most important are objects containing four (it is due to the four-object symmetry) binary systems i.e. $D_{Typical} = 2 \cdot 4^1 = 8$ constituents [2], [3].

Probability of creation of resonances with entangled constituents increases with increasing integrated luminosity – it is because then number density of the constituents increases.

The above remarks show that in the CMS experiment in 2016, number density of the Higgs-like bosons with a mass of about $750\ \mathrm{GeV}$ was higher than in 2015 [4] but instead them, due to the quantum entanglement and the four-object symmetry, there were produced first of all the associations composed of 8 such resonances with a mass of about $6\ \mathrm{TeV}$. But such mass was outside the range of the CMS experiment [4].

SST shows that the 750-GeV resonances are the two-stage resonances [5] so probability of their creation is very low.

References

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