Mass Spectrum of the Higgs Boson 125 GeV

Sylwester Kornowski

Abstract: Within the Everlasting Theory I described mass spectrum of the Higgs boson 125.00 GeV. Due to the quadrupole symmetry characteristic for the weak interactions and due to the interactions of the Higgs-boson pairs with the dominant gluon balls 3.30 GeV, there appear two masses $M_1 = 126.65 \pm 0.31$ GeV and $M_2 = 123.35 \pm 0.31$ GeV. The Higgs-boson pairs can decay into 4 photons or 4 leptons but into two Z-bosons as well. Due to the same symmetry, the Higgs boson should decay into two photons twice as often as it should.

1. Introduction and calculations

The internal structure of the core of baryons and the confinement (the confinement follows from the weak interactions) of the Einstein spacetime components produced by electromagnetic energy, lead to the mass of the Higgs boson 125.00 GeV [1] (see Chapter “Electroweak Interactions, Non-Abelian Gauge Theories and Origin of $E = mc^2$”). On the other hand, from the formulae (214)-(216) derived within the reformulated QCD [1] (see Chapter “Reformulated Quantum Chromodynamics”) follows that there is an amplification for the energy of gluon balls equal to 3.304 GeV. Just such gluon balls produce identical gluon balls. Such gluon ball I will refer to as the amplifier. The unified formula of the formulae (214)-(216) is as follows

$$M[\text{GeV}] = (C/E_N[\text{GeV}] + D)^{10}, \quad (1)$$

C = 0.52294,
D = 0.96868,
E_N is the energy of collision per nucleon,
M is the energy of produced gluon ball.

Due to the internal structure of the cores of baryons (there is torus and ball in its centre composed of the Einstein spacetime components) there is valid the quadrupole symmetry for the weak interactions [1] (see Chapter “Neutrino Speed”). This means that we should observe the decays into 4 leptons or 4 photons but such decays should be characteristic for Higgs-boson pairs, not for single Higgs bosons. The Higgs-boson pairs can decay into two Z bosons as well. The decays of the Higgs-boson pairs into 4 photons cause that the decays into two photons are twice as often as it should.

But the components of a Higgs-boson pair cannot be in the same state. Because there dominate the amplifiers 3.304 GeV, so such mass can be absorbed by one of the two components and then the mean central mass of the components in a Higgs-boson pair is 126.65 GeV. But some amplifier can force emission of amplifier by one of the two components of a Higgs-boson pair. Then the mean central mass is 123.35 GeV. It looks as a

Gluon Amplification by Stimulated Emission (the GASE). There is a broadening of mass of the amplifier 3.304 GeV which follows from the decays inside the baryons [1] (see the description below the formulae (214)-(216)). The upper limit for the broadened mass we obtain multiplying the mass 3.304 GeV by $2^{1/4} = 1.1892$ so we obtain 3.929 GeV. This means that we can write the broadened mass as follows: 3.304 ± 0.313 [GeV]. The two modified mean masses of the Higgs bosons detected in the LHC experiments should be as follows

$M_1 = 126.654 \pm 0.313$ GeV and $M_2 = 123.350 \pm 0.313$ GeV.

We can see that the real mass of the Higgs boson is indeed 125.00 GeV because the observed mass distance 3.304 GeV is due to the interactions of the Higgs-boson pairs with the amplifiers.

3. Summary

Within the Everlasting Theory I described mass spectrum of the Higgs boson 125.00 GeV. Due to the quadrupole symmetry characteristic for the weak interactions and due to the interactions of the Higgs-boson pairs with the dominant gluon balls carrying mass 3.30 GeV, there appear two different masses $M_1 = 126.65 \pm 0.31$ GeV and $M_2 = 123.35 \pm 0.31$ GeV. But the real mass of the Higgs boson is 125.00 GeV. The Higgs-boson pairs can decay into 4 photons or 4 leptons but into two Z-bosons as well.

Due to the quadrupole symmetry, the Higgs bosons decays into two photons twice as often as it should.

References

[1] S. Kornowski (2012). “The Everlasting Theory and Special Number Theory”. http://www.rxiv.org/abs/1203.0021 [v2].

[2] https://atlas.web.cern.ch/Atlas/GROUPS/PHYSICS/CONFNOTES/ATLAS-CONF-2012-170/ (2012).