The Significance of the Holographic and Non-Holographic Versions of the Cosmological Constant

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Abstract: The cosmological constant comes in holographic and non-holographic versions each of which supports friedmann's equations concerning the matter density of the universe in different ways and 8-fold supersymmetry and cyclic universe E8 symmetry theory in general.

We can apply the cosmological constant's latest experimental values[1] to Friedmann's matter density equation[2] for the universe to obtain a matter density value[3] which we then can compare to the matter density[4] supplied by 8-fold supersymmetry and cyclic universe E8 symmetry theory.

We first give the form of the density equation, for which it is assumed that the universe is flat (k=0) and Einstein's cosmological constant[5] (lambda) is included. The equation is then density (k_g/M^3) = density without lambda[6] = 8.6317937– (lambda) x c^2 /(8 x pi x G). This is then multiplied by the new density factor 1.7885/3 x 10^9 = 0.5961666 x 8.9875513 = Lambda x 5.3580779 x 10^25 (k_g/M^3) for the matter density of the universe including lambda.

We first try the holographic form of lambda in the above matter density equation: this[7] is 1.19 x 10^-52 M^-2. The result is matter density = 6.37611277 x 10^-27 (Kg/M^3). We note that this is close to the value of 6.36007743 x 10^-27 calculated in my next-to-last note[8]. This strongly indicates that this is the true density (We note that no negative intrinsic

energy Z (or H) matter is included using this version of lambda).

We next try the non-holographic[9] form of lambda = 1.501 x 10^-25 Kg/M^3: this gives 5.3580779 x 1.501 x Kg/M^3 = 8.0424749 x units, a large number close to 8: perhaps this is intended to alert us to the following axiom of cyclic universe E8 symmetry theory: a cosmic matter density greater than 8.0 x 10^-27 Kg/M^3 is not allowed.

Some further interesting facts can be found from study of cyclic universe E8 symmetry theory. The total positive energy intrinsic matter entering the new universe per second (as supersummetric matter) is 12 x mass energy top quark (GeV) = 12 x 173.34 = 2080.08 Gev. From this we must subtract the energy of entering supersummetric dark matter (negative energy intrinsic matter per second) = 4 x (H+Z) = 4 x 216.19 = 864.76. This is 2080.08 – 864.76 = 1215.32 GeV per second. To this we must add 4 x (H-Z) = 135.24 GeV per second annihilation energy, for a total energy of 1350.56 GeV per second to keep the cyclic universe cycling. This energy is supplied from gravitational collapse of the previous universe. It is interesting to note that this is almost exactly 10 X the annihilation energy. Of course it must be remembered that all the actual total energies are 10^27 times larger (the number of active galaxies).

It is important also to realize that the 4 x (H-Z) composite boson annihilation process effectively doubles[10] the number of negative intrinsic energy Z bosons in our epoch while it leads to elimination of the H bosons in the supermassive black holes (also in our epoch). This is why H bosons are scarce (and difficult to identify) at our place in the galaxy. On the other

hand, Z particles are numerous and have been known for a long time, albeit of positive energy type (not dark matter).

It is of interest to calculate the total density as equivalent number of monatomic hydrogen atoms (divide by 1.6998599) per cubic meter of space. This is 3.7415303, considerably less than 5 (often quoted) for example.

1. "Cosmological constant", Wikipedia, TheFreeDictionary, (2017)

2. "Friedmann's equations", Wikipedia, (2017)

3. George R. Briggs, "The latest value of the Hubble constant indicates a universe matter density higher than one hydrogen atom per cubic meter", ViXra 1704.0404, (2017)

4. See Ref. 3

5. "Cosmological constant", Wikipedia, (2017)

6. See Ref. 3

7. See Ref. 5

8. See Ref. 3

9. See Ref. 5

10. George R. Briggs, "Annihilating-H dark matter: spiral galaxies holes. Doubling –Z dark matter: spiral galaxies "bars", ViXra 1606.0057, (2016)