The Critical Fermion Density of the Universe Revisited: Role of Holography in MHCE8S Theory

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Abstract: A MHCE8S theory value for the critical fermion density of the universe is found in better agreement with that published thanks to holography

Using mc^2 4(**H-Z**) x t "quanta of the universe[1]", where **H-Z = 125-91.19 = 33.81** GeV is the quite small positive energy of the quanta, and t is the age of our broken E8 symmetry universe in seconds, one can in theory calculate the critical fermion density[2] of the universe. The "quanta of the universe" (provided as supersymmetric gamma radiation from the centers of our galaxies) are utilized to obtain the number of dark negative mass Z particles needed to shield ordinary positive mass matter coming in so that the net mass is zero and the growing universe remains flat. The positive energy H boson components of the quanta are not used energetically but their zero spin hold them in place while they are annihilated slowly by more -H bosons purposedly stored in supermassive black holes by **nature** very eary in our epoch. Thus the redundant +H bosons of the quanta are gradually and quietly annihilated in the supermassive black holes with the minimum of fuss, yet the matter mass enters the universe thanks to the identical mass of -Z particles (invisible dark matter to us). To find this total mass of -Z matter is our first goal.

We do this by first finding the t part of the quanta: this is the broken symmetry age of the 4th cyclic universe in seconds (13.5 -0.1[3] -0.01[4] x10^9) billions of years x (31.5576 x 10^6) seconds per year = 3.15576 x 1.339 x 10^17 = t = 4.2255626 x 10^17 sec.

The fermion mc^2 energy per second per active galaxy is 4**Z** = 4 x **91.19 =** 364.76 GeV. Now 364.76 x t = 4.2255626 x 10^17 = 1.5413162 x 10^20 GeV per active galaxy (x 1.782662 x 10^-27 Kg = 2.7476458 x 10^-7 Kg).

I next must find the volume of space occupied per active galaxy. Unfortunately we can only surmise[5] the number of galaxies in the universe at present (10^27) and the radius of the universe[6] (4.1076555 x 10^26 M) in doing the calculations. For the universe we have 4/3 x pi x (4.1076555)^3 x 10^78 M^3 = 1.3333333 x 3.1415926 x 69.307785 = 290.31577 x 10^78 M^3 and for the galaxy 10^-27 of this volume . The critical fermion density resulting is 2.7476458 x 10^-7 Kg/2.9031577 x 10^56 M^3 = 9.464335 x 10^-64 Kg/M^3. This is numerically not far (1.0979506) from the published[7] value of 8.62 x 10^-27 Kg/M^3 but it is -64 vs. -27 = 10^-37 times too small. I notice that 1.0979506 squared is 1.2054955: this is close to 1.19 which is an important factor in holography, Now 4/3 x pi x R^3 /4 x pi x R^2 = R/3 is each side of a holographic square of area R^2/9 . We note that the divisor 3 is an important holographic factor that must be taken into account. We also note that t/3 plays a much better role than 4Z in determining the fermion mass of the universe. For example, if we take one Kg of mc^2 matter per second of t/3, then the published critical fermion density is matched closely (8.6489156 x 10^-27 versus 8.62 x 10^-27 Kg/M^3): 13.39 x 10^9 x 3.15576/3 x 1.782662 x 10^31/290.31577=8.6489156. Now 8.6489156/8.62 = 1.0033544 and the 1st square root of this is 1.0016757 and the 2nd square route is 1.0008374 and the 3rd is 1.0004186 and the 4th is 1.0002092 and the 5th is 1.0001045 and the 6th is 1.0000522 and the 7th is 1.000026 and the 8th is 1.0000129 and the 9th is 1.0000064 (which is close to the factor

1.0000055 used earlier in my work on the neutron and proton).

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