The Latest Value of the Hubble Constant Indicates a Universe Matter Density Higher Than One Hydrogen Atom Per Cubic Meter

George R. Briggs

Abstract: The latest experimental value of 67.80 (km/s)/Mpc for Hubble's constant supports 8-fold supersymmetry and cyclic universe E8 symmetry theory

In my last note[1] I showed that one hydrogen atom of equivalent mass per cubic meter of space matched experimental results for fermions. However, the latest[2] measurements of 67.80 (km/s)/Kpc for Hubble's constant indicate a higher value of matter density. We now check this by applying Hubble's constant latest experimental value to Friedmann's first matter density equation[3] for the universe to obtain a matter density value which we then can compare to the matter density[4] supplied by cyclic universe E8 symmetry theory.

We first give the simplest form of the density equation, for which it is assumed that the universe is flat and Einstein's gravitational constant is zero. The equation is then density (k_g/M^3) = 3x H_u ^2/8 x pi x G ((k_m/s)/k_m)^2 x s^2 x k_g/M^3). For H_u = 67.80 (km/s)/Mpc), one first gets rid of the troublesome[5] Mpc by dividing by 3.0861968 x 10^19. This gives 2.1968786 x 10^-18, which one squares to give 4.8262755 x 10^-36. This is then multiplied by the density factor which is 1.7885 x 10^9 = 8.6317937 x 10^-27 (Kg/M^3) for the Freedmann matter density of the universe. To compare with other data, it is very useful to find the conversion factor between one GeV of matter and density of the same matter in the universe in Kg/M^3. This is[6] worked out as follows:

1.6998599 x 10^-27 Kg/M^3 of the density arises from 91.19 GeV of the mass, or one GeV =1.6998599/91.19 =0.0186408 x 10^-27 Kg/M^3.

Firstly, 1.6998599 x 10^-27 Kg/M^3 of the Freedmann density is supplied by the saved fermions from the previous universe.

Next we have the density equivalent of annihilation Gamma radiation energy[7], which is 4 (note correction from 2) x (H-Z) = 135.24 GeV = 2.52098177 2 x 10^-27 Kg/M^3.

Next we have the Kg equivalent of positive energy returned to supermassive black holes in the form of H particles in our epoch. This is H/Z = (125/91.19) x 1.6998599 = 2.3301072. We have a total of 1.6998599 + 2.52098177 + 2.3301072 = 6.3600743. This is to be compared to the measured value of 8.6317937. We need more mass. Where can we find it?

How about dark energy? , This is12 x 173.34 (top quark mass in GeV) =2080.08. The result is 38.774355 x 10^-27 Kg/M^3. This is too large to be an acceptable candidate. It is also well agreed that dark energy is simple expansion of space: not a form of matter.

For the measured 8.631793 units; matter captured in black holes probably explains the difference. But, a positive cosmological constant also could give the results we see.

I believe that the density of one equivalent hydrogen atom per cubic meter of volume of space and an average active galaxy volume equal to 10^27 M^3 has to be taken as axioms of cyclic universe E8 symmetry theory. Another axiom waiting

in the wings is that the Freedmann energy (or mass) density cannot exceed the value 8 x 10^-27 Kg/M^3 without invoking a positive cosmological constant to reduce the density. With a maximum allowed density of 8 units, we have 1.6400 units amount of mass unaccounted for. What about the Z particle dark matter mass used to shield the transferred fermions? The absolute amount of this mass is 1.6998599 units: close to 1.6400 units! Keep tuned!

1. George R. Briggs, "The critical fermion density of the universe found from cyclic universe E8 symmetry theory", viXra 1703.0310, (2017)

2. "Hubble diagram", Wikipedia, TheFreeDictionary, (2017)

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

4. George R. Briggs, "The critical fermion density of the universe found from cyclic universe E8 symmetry theory", viXra 1703.0310, (2017)

5. "Hubble's constant", Wikipedia, (2017)

6. See ref. 4

7. George R. Briggs, "Dark energy/fermion ratio matches E8 symmetry, cyclic universe within ½ % if dark matter annihilation gamma emission energy is 4(H-Z)", viXra 1605.0223, (2016)