Dirac's Monstrous Revenge: Very Likely Direct Relationship Between the 26 Sporadic Groups and the Volume, Mass of the Observable Universe

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Abstract

The Hubble scale is defined as the energy of a particle (Compton wavelength) with the size of the Hubble radius. Any larger particle would expand faster than light, ceasing to be a single particle. From this scale a minimum length, mass and volume are derived. The probability that we find ourselves in an universe made out of any of the groups belonging to any of the infinite families is infinitely low. The probability that our universe is made out of the 26 sporadic groups is very high. The volume of the observable universe is approximately 2.1×10^365 "Hubble scale" volumes. The direct product of all the 26 sporadic groups is approximately 2.32×10^365. The mass (dark matter, baryonic matter) is ~ 6×10^121 - a cube root of the product of all the sporadic groups, which is directly proportional to the square of time since the Big Bang – 8×10^60 Planck times. This time is the 6th root of the product of all the sporadic groups. The mass (dark matter, dark energy and baryonic matter) of the observable universe is ~ 1.8×10^122 Hubble scale masses, which corresponds to the circumference of the observable universe in Hubble scale lengths.

The Hubble radius, depending on given cosmology, is about 14.4 billion ly or 1.36×10^26 m. This leads to a minimum mass of 1.62×10^-68 kg or 9.1×10^-33 eV/1.46×10^-51 J. This scale is 1.34×10^60 smaller than the Planck scale. This leads to:

Elementary length	1.20×10^-95 m
Elementary volume	1.75×10^-285 m^3
Elementary time	4.02×10^-104 s
Elementary energy	9.1×10^-33 eV or 1.62×10^-68 kg
Elements in spatial hypergraph/elementary volumes in the observable universe	**2.10×10^365 = ~ 2.32×10^365**
Elements in branchial graph	1.81×10^120
Maximum power	3.63×10^52 J

The radius of the observable universe is 46.5 billion ly, this leads to a volume of 3.57×10^80 m^3. As one can see, this volume can hold 2.1×10^365 elementary volumes.
The direct product of all the 26 sporadic groups is a group of order ~ 2.32×10^365. This is a remarkable fit, given the relatively imprecisely known Hubble constant (error of about 5 %, giving a 15 % volume error).

Another remarkable coincidence is related to the transient equilibrium (between decelerated and accelerated expansion of the universe). This occurred at precisely or almost precisely 1/2 of the current volume of the observable universe. This means that one would fit almost precisely or exactly 1/2 of the elementary volumes inside the observable universe at that point. This is remarkable, because the ratio of mass and dark energy was 1:1 at that point. The volume that is being used here is related to the current Hubble radius and not the calculated Hubble radius at that point in time.

One can see about 1/100 coincidence in this. But the fact is that the relationship between the sporadic groups and the observable universe is strengthened when one looks at the mass of the observable universe.

The cube root of the product (sporadic groups) is 6.14×10^121, which if taken in elementary masses is 9.95×10^53 kg. This is remarkably close to the estimated mass of the observable universe: ~ 9×10^53 kg (dark matter + baryonic). Furthemore, if one takes the circumference of the observable universe, one gets 2.30×10^122 elementary lengths. This, when translated to elementary masses, gives 3.73×10^54 kg, which is close to the estimated total mass of the observable universe (baryonic, dark matter and dark energy) ~ 3×10^54 kg.

What's more, both the square root of the mass – 6.14×10^121 and the 6^{th} root of the sporadic groups give about 8×10^60, which is about 13.7 billion years in Planck times – or the apparent time since the Big Bang (the universe uses 3 scales at the same time) – satisfying one of the Dirac's propositions that the mass of the universe is proportional to the square of the time since the Big Bang.
Further work will show that the universe uses the Planck scale, Hubble scale and Universe scale at the same time + we'll have a look at the mass of the electron and the Hubble radius.

Conclusion

It has been shown that the mass, volume and age of the universe are very likely related to the direct product of the 26 sporadic groups.