

The First Principles of Aether

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Various fractals are both defined and described that exist within the Aether Fractal Plenum. Mathematical equations are developed from those fractals that define the distribution of energy within the Aether Fractal Plenum. Sierpinski's Triangle and Pascal's Fractal are unified yielding additional mathematical descriptions for those fractals. Structures for electromagnetic waves, charged fibers, and charged particles are referenced from previous papers. A Periodic Table is developed for the various fractals that form within the Aether Fractal Plenum yielding methods for calculating the masses of the electron, proton and neutron, and for the values of the Fine Structure Constant and Planck's Length. Alternate mathematical methods are proposed for verifying the previous calculated values. Structures for the electron and the nucleon are proposed, and atomic structure and the structure of aether is reviewed.

1. Introduction

The purpose of the paper is to further delineate the fundamental characteristics of the fractal based structures that exist within the aether fractal plenum. There are four basic assumptions upon which these fundamental characteristics are derived. The first assumption is of course that there is an aether that pervades all of the spaces within the universe including both the material and the nonmaterial worlds. The second assumption is that the aether has a fine structure within which the smallest electromagnetic wave or highest frequency that can be manifested, is directly related to or is a derivative of Planck's Length. The third assumption is that all particle formations are fractal structures within the aether that are built upon and built from scalar multiples of the smallest electromagnetic wave or highest Planck's Frequency. And finally, the fourth assumption is that the aether is a hyper-dynamic, non-homogeneous, elastic substance that creates and forms a myriad of plethora's of various field structures, which exist as a holistic array of constantly changing motions and structures, and which thereby together form an interrelated complex of mass distribution patterns and electromagnetic field structures.

2. A Modern Day Theory for Aether

It is proposed that there is a single fundamental substance that pervades the entire Universe and that fundamental fine structure for this aether is Planck's Length or a derivative of Planck's Length. It is further proposed that there are multiple states of the aether. First, it can exist as an uncharged independent energy cell level of a common structure at Planck's Length or at a derivative of Planck's Length; and second, that when these cells are placed under tensed or compressed conditions, these energy cells combine to conserve energy and thereby form charged stings, rings and loops. Accordingly, the so called empty spaces of the Universe are instead filled with a multiplicity of energetic structures constantly changing their form and shape. It is these uncharged independent energy cells that allow for the transmission of electromagnetic waves, and it is the charged strings and rings that account for the creation of mass. Accordingly, as the energy cells are either tensed or compressed their axes align into common trajectories, thereby forming the various

patterns of fibers, strings, loops and rings. These patterns can also disband just as quickly as they were formed when the tensed or compressed conditions have passed. The energy cells of the aether are constantly forming and reforming a net holistic array of energy patterns within the Universe that is reflective of the complex distribution of matter within the Universe. Both interact with each other and both mutually affect each other.

It is further proposed that each individual energy cell can only orient its axis in one direction at a time, and accordingly can only combine with other energy cells into a single common pattern at any one time. There are no average trends at Planck's Level, and therefore there is an implied limit to the number of patterns that can form and to their orientations. However, aether does have some very interesting properties at Planck's Level. That is, it is not a vector, but instead one energy cell can be aligned and its energy traveling in one direction while an adjacent energy cell is nonaligned and its energy traveling in an entirely different direction. This allows for some very interesting characteristics; for example, field structures could be interlocked and/or interlaced with complete and separate autonomy.

3. Fractal Structures within the Aether

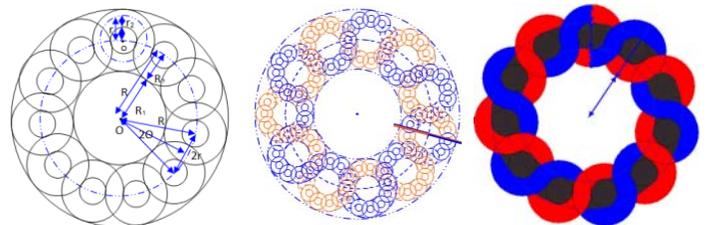


Fig. 1. 1st & 2nd Generation 11 twist-loop fractal

From Briddell's work [1], even numbered looped structures are always energy loops, since they always return to their point of origin on their first trip around the loop, and odd numbered looped structures are always mass loops since they must go around the loop many times before returning to their point of origin. Accordingly, fractal structures can only form from odd numbered twist-loops, since they loop around numerous times before they return to their point of origin. In Figure 1 are various illustrations of a 1st and 2nd generation 11 twist-loop fractal structures as proposed at last year's NPA Conference. In each figure,

the primary outer loop and all secondary and tertiary loops are exact replicas of each other, except at varying scalar levels. In the two right figures, each of the smaller twist-loops are colored in red and blue to illustrate that there are two outer, larger trip-loops. Please note that end of the red loop is connected to the beginning of the blue loop and that the end of the blue loop is connected to the beginning of the red loop, illustrating that it is one continuous string of energy with two trip-loops.

A brief summary of the mathematics as presented in earlier papers, is as follows:

- R_1 = the inner radius of the single outer large loop
- R_2 = the inner radius of each of the 11 smaller loops
- $R = R_1 + R_2$, or the centerline radius of the same large loop
- $C = 2\pi R$ = the circumference of the outer loop centerline
- O = the center point of the single outer large loop
- N = number of smaller loops within the single outer loop

Accordingly, r, r_1, r_2, c & o are the same except they define each of the smaller loops. The scaling ratio S is then as follows:

$$S \equiv \frac{r}{R} = \frac{r_1}{R_1} = \frac{r_2}{R_2} = \sin \theta \tag{1}$$

From Fig. 1, N isosceles triangles oOo' , with o and o' adjacent small circle centers, each containing angle 2θ , fill the entire circle around O with 2π radians. Thus each angle is:

$$2\theta = \frac{2\pi}{N} \Rightarrow S = \sin \frac{\pi}{N} \tag{2}$$

This same logic applies to each successive generations of the fractal, thereby doubling the number of trip-loops for each generation. Also, not only would there be an imaginary cylinder inside the first generation of twist-loops, but there would also be other imaginary cylinders inside each the successive generations of twist-loops and trip-loops, which are surrounded by strands of helically wound loops.



Fig. 2. 1st and 2nd Generation 9.5 twist-loop fractals

This level of complexity continues with multiple combinations of any odd number of twist-loops, with up to as many eleven generations of trip-loops; thereby creating myriads of various field structures, that is, until the structural limits of the aether are reached through either Planck's Numbers or the finite size of the Universe. And then comes more complexity. That is, not only can multiple generations of odd numbered fractals form, but also, multiple generations of fractional numbered trip-loops can form. Figure 2 is an illustration of a $9\frac{1}{2}$ twist-loop fractal; however in this case, it now requires four trip-loops per generation to complete the entire cycle, thereby yielding sixteen trip-loops for the second generation half-numbered fractal. This would then continue for each successive generation with the number of trip-loops increasing by a multiple of four. And this is

still not the end of the complexity, for a third, fourth, fifth, etc. fractional numbers of twist-loops can also be created.

This entire structure would be very similar to other helically wound structures, such as cables or ropes except that in this case, the structure would be composed of one continuous unending single fiber of energy. Obviously, for multiple generations of these fractals, both a visual drawing of the structure and the structural mathematics are exceedingly complex and can only be done by a computer. However, mathematical limitations have been derived for limits to the art of winding ropes as presented by [9] Jakob Bohr and Kasper Olsen of the Physics Department at the Technical University of Denmark in their paper titled "The ancient art of laying rope." However, in the above case the imaginary cylinders that the fibers are wound around are a torroid instead of a linear cylinder, and therefore, the mathematics would be even yet more complicated.

Of course, this structure and its high level of complexity brings up the question as to what these fibers are? Many times hints can be derived from looking closely at the words and the sentences that we use to define scientific phenomena. One of the words that I have used in many of my previous papers for describing the aether is "hyper-dynamic." That got me to thinking just what would a hyper-dynamic aether be like and how would it operate? Dynamic means the aether is in motion and hyper means that it is motion in a myriad of ways. Accordingly, it is proposed that the fundamental fine structure of aether can easily form and reform into a myriad of strings, rings and loops of energy of all differing sizes and structures and constantly and rapidly changing its form and it shape. From this hyper-dynamic changing myriad complex of structures, there would be a very few special and unique group of structures that could condense or tense into the various particles. The challenge is to find those unique structures that lead to the electron, proton, neutron, etc.

4. Pascal's & Sierpinski's Triangles

						1														
						1	0	1												
						1	0	2	0	1										
						1	0	3	0	3	0	1								
						1	0	4	0	6	0	4	0	1						
						1	0	5	0	10	0	10	0	5	0	1				
						1	0	6	0	15	0	20	0	15	0	6	0	1		
						1	0	7	0	21	0	35	0	35	0	21	0	7	0	1

Fig. 3. Pascal's Fractal

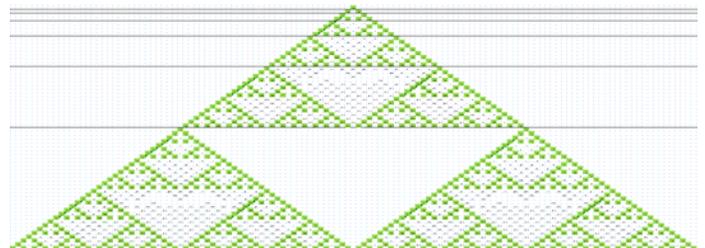


Fig. 4. Sierpinski's Triangle

Figure 3 below is an overall view of Pascal's fractal, and Figure 4 is an enlarged and expanded version of the top triangle of Figure 3, with the numbers of Sierpinski's triangle superimposed on the top of Pascal's fractal. The number zero is then added

the same length of an overall fractal. Then when you divide the overall fractal in half again, it then require four steps to define the same length of the same overall fractal. This is the key to resolving the issue of 1836.15 versus 1836. That is, since the ratios always remain the same all we need to do is to zoom in four more layers of the fractal to get a higher resolution picture of the fractal. This is accomplished in the chart by adding four more levels to the chart, levels 8 thru 11. This then means that there are a total of 362,797,056 energy cells (pixels) in this layer of the fractal. Applying the previous ratio of 1836/2187 to this total yields the whole number 304,705,366 and applying the known

codata value for the mass of a proton of 1836.15/2187 yields the rounded off number 304,595,694, which falls within the known accuracy of the current codata value for the mass of a proton. The difference between these two numbers is then 25,326, which represents the additional number of loops of mass that is gained by the transformation process from a hexagonal fractal structure to a twist-loop fractal structure. Obviously, the actual fractal structure for a proton will have to be calculated or determined by a computer since it includes over 300 million energy cells. Likewise, this same process should then also calculate the parameters for a neutron and an electron.

Level	Fractal	Number	Triangular Mass Loops			Hexagonal Fractal Loops			Trip Loops		
			Qty	Total	2/3	1/3	Total	2/3	1/3	Qty	Total
0	.1	1	1	1			1			1	1
1	.1	2	2	3	2	1	6	4	2	2	3
2	.1	3	2							4	
	.2	4	4	9	6	3	36	24	12	8	15
3	.1	5	2							16	
	.2	6	4	23		1	184		8	32	
	.3	7	4	24		3	192		24	64	
	.4	8	8	27	18	9	216	144	72	128	255
4	.1	9	2							256	
	.2	10	4							512	
	.3	11	4							1024	
	.4	12	8							2048	
	.5	13	4	68		1	1,088	(1088.09)	16	4096	
	.6	14	8	69		3	1,104		48	8192	
	.7	15	8	72		9	1,152		144	16384	
	.8	16	16	81	54	27	1,296	864	432	32768	65535
5	.1	17	2								
	.12	28	16							32	
	.13	29	8	204		3	6,528	(6528.54)	96		
	.14	30	16	207		9	6,624		288		
	.15	31	16	216		27	6,912		864		
	.16	32	32	243	162	81	7,776	5,184	2,592	2.147E+09	4.2940E+09
6	.1	33	2								
	.27	59	16							64	
	.28	60	32							192	
	.29	61	16	612		9	39,168	(39171.258)	576		
	.30	62	32	621		27	39,744		1,728		
	.31	63	32	648		81	41,472		5,184		
.32	64	64	729	486	243	46,656	31,104	15,552	3.223E+19	1.8446E+20	
7	.1	65	2								
	.57	121	16								
	.58	122	32	Min	1836.152578		235,027.53	Proton	128		
	.59	123	32	Nomina	1836.152670		235,027.54	Proton	384		
	.60	124	64	Max	1836.152762		235,027.55	Proton	1,152		
	.61	125	32	1,836		27	235,008		3,456		
	.62	126	64	1,863		81	238,464		10,368		
	.63	127	64	1,944		243	248,832		31,104		
.64	128	128	2,187	1,458	729	279,936	186,624	93,312	1.701E+38	3.4020E+38	
8	.1	129									
	.128	256	256	6,561	4,374	2,187	1,679,616	1,119,744	599,872	5.79E+76	1.1592E+77
9	.1	257									
	.256	512	512	19,683	13,122	6,561	10,077,696	6,718,464	3,359,232	6.70E+153	1.341E+154
10	.1	513									
							50,761,728	50,765,349	746,496		
							51,508,224	(4,221)	2,239,488		
							53,747,712		6,718,464		
.512	1024	##	59,049	39,366	19,683	60,466,176	40,310,784	20,155,392	9.0E+307	1.798E+308	
11	.1	513									
							304,570,368	304,595,694	4,478,976		
							309,049,344	(25,326)	13,436,928		
							322,486,272		40,310,784		
.512	1024	##	177,147	118,098	59,049	362,797,056	241,864,704	120,935,352	9.0E+307	1.798E+308	

Table 2. Data Summary of Eleven Levels of the Hexagonal Fractal

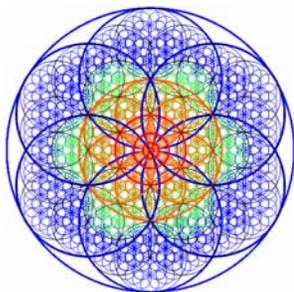


Fig. 6. Fifth Generation Hexagonal Fractal

Accordingly, it is proposed that the six-loop hexagonal fractal defines the fine structure of aether, and therefore alpha, the fine structure constant should be derivable from this fractal structure. The six-loop hexagonal fractal thereby represents the basic structure for the distribution of energy within aether, although it may not necessarily represent the structure for the smallest energy cell of the aether. Accordingly, there are then two different fractal arrangements that can exist within the aether, the twist-loop fractal and the hexagonal fractal. It is proposed that the six-loop hexagonal fractal defines energy in suspension within the aether and represents the natural harmonic frequency of the aether, and that the twist-loop fractal proposed earlier defines aether in tension; and furthermore, a yet to be described third fractal arrangement will define energy in compression. Accordingly, the six-loop hexagonal fractal defines the basic structure for the distribution of energy within the aether, and when it fragments the outer regions of an electromagnetic wave within the aether morphs or transforms into the twist-loop fractals presented earlier, and the inner regions of an electromagnetic wave within the aether morphs or transforms into a yet to be described third sequential two-loop fractal.

6. The Formation of Charged Particles

In an earlier paper, a twist-loop fractal arrangement for the distribution of energy within an electromagnetic wave was presented. Accordingly, it is proposed that the former twist-loop fractal applies to the tensed condition of energy located in the outer regions of an electromagnetic wave. Accordingly, in the outer region of the electromagnetic wave the energy gets wound up into concentric layers of complex fibers, strings, cords and ropes. Tensed particles are truly spun from the aether of the Heavens, just as yarn is spun from cotton or wool. In contrast, within the inner region of an electromagnetic wave, the energy condenses into a complex sophisticated snowflake or crystalline structures. The transformation of free energy within the aether into charged particles is then as illustrated in Figure 7. The picture to the left is the same third generation six-loop hexagonal fractal presented earlier, and the picture in the middle is the same fractal but illustrating the formation of an 18 twist-loop fractal in its outer regions. The undefined center region of six energy loops is then the concentric circle of a new six-loop hexagonal fractal that is free to form an entirely different fractal arrangement as shown in the figure to the right. The remaining twelve loops of the total thirty six loops in this generation of the hexagonal fractal then coexists with its various parameters and characteristics either divided between both structures or broken free to form independent particles of their own.

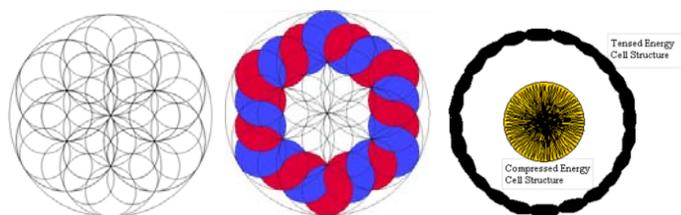


Fig. 7. Third Generation Six-Loop Hexagonal Fractal

7. A Periodic Table for the Hexagonal Fractal

In Figure 6, a fifth generation hexagonal fractal was illustrated with all major loops easily identifiable and then colored to disassociate the outer, middle and center regions from one another. It is interesting to note that the red inner fractal, which is identical to the overall fractal, but only at a smaller scale, represents exactly one sixth of the total number of loops within the entire fractal. The center green and outer blue sections represent exactly five sixths (.83333) of the total number of loops within the entire fractal. This ratio agrees very closely to the ratio of a proton to Briddell's [2] magic number of $1836.15 / 2187$ or (.83957).

Also, the blue section represents 18 of the total 36 loops in the second generation of the fractal, and accordingly, the green section represents another 12 loops, and of course, the middle section represents another 6 loops for a combined total of 36 loops. A normal electromagnetic wave simply oscillates back and forth between these two states. However, as was proposed earlier, when the frequency of the electromagnetic wave exceeds the natural oscillation frequency or the natural propagation speed of the aether, a second generation wave is created and both conditions exist simultaneously. These two forces then beat against each other and at some point tear apart from each other. When the charged fibers are broken in the green and red sections, they become uncharged and accordingly the charge is released or transferred back into both the inner and outer sections, such that the charge is divided on a $2/3$ (18 blue loops + 6 of the green loops) to $1/3$ (6 red loops + the remaining 6 green loops.) However, the masses of the broken loops are not transferred, but instead must realign themselves to form new particles or waves as byproducts from this division. Even though almost all of the green loops become part of the tensed outer blue loops as mass, the charge is instead split equally. These are two entirely different structural parameters and they proceed under two entirely different mechanisms. When a spring breaks the energy of tension is released equally in both directions regardless of where the spring actually breaks.

This rationale then agrees closely with the dodecahedron quark ball and the electromagnetic wave structure as proposed in earlier papers. The quark ball thereby represents not only a method for organizing particles, but also a method for defining the process as well as the structure by which the particles are formed. Also, it was previously proposed that there are four energy packets in each wave, which together with their anti energy packets form the basic eight quarks (up, down, charm, strange and their anti-quarks). Moreover, it was proposed that each quark has either a $2/3$ or $1/3$ charge, and which has now been validated by the previously proposed fractal structures within this paper. Furthermore, since only a fraction of the ener-

gy required to build a particle comes from a quarter wavelength, it seems very reasonable to require as many identical waves coincident at the same point as possible to form the new particles. Finally, quarks are not particles, but only charge segments of an electromagnetic wave and thereby cannot exist individually by

themselves but only within the constructs of the electromagnetic wave. Accordingly, there must be some triggering mechanism and structural method that allows them to become entangled within a charged particle, such as three quarks coincident on polar axes?

Level	Scalar	Correction	Ratio	Prime #				Prime #		Prime #		Prime #	Prime #	Prime #
	2	0.5		(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)
1	1	0.5												
2	2	1.5	3.000000000	177147	59049	19683	6561	2187	729	243	81	27	9	3
3	4	3.5	2.333333333	11162.067340	4783.7431455	2050.1756338	878.6467002	376.5628715	161.3840878	69.1646091	29.64197531	12.703703704	5.444444444	2.333333333
4	8	7.5	2.142857143	4374.469667	2041.4191780	952.6622831	444.3757321	207.4686750	96.81871499	45.1820670	21.08496460	9.89650146	4.591836735	2.142857143
5	16	15.5	2.066666667	2937.479081	1421.3608459	687.7352480	332.7847974	161.0249020	77.91527515	37.7009396	18.24239012	8.826962963	4.271111111	2.066666667
6	32	31.5	2.032258065	2442.122314	1201.6792338	591.3024801	290.9583632	143.1699883	70.44872438	34.6652453	17.05750167	8.393373838	4.130072841	2.032258065
7	64	63.5	2.015873016	2234.060277	1108.2346254	549.7541843	272.7127056	135.2826807	67.10873138	33.2901581	16.51401543	8.191991906	4.063744016	2.015873016
8	128	127.5	2.007874016	2138.459621	1065.0367526	530.4300689	264.1749755	131.5694976	65.52676939	32.6349008	16.25346042	8.094860678	4.031558063	2.007874016
9	256	255.5	2.003921569	2092.608171	1044.2565235	521.1064843	260.0433532	129.7672311	64.75664173	32.3149582	16.12585977	8.047151136	4.013701653	2.003921569
10	512	511.5	2.001956947	2070.151213	1034.0638023	516.5264936	258.0107901	128.8792900	64.37665417	32.1568624	16.06271428	8.023506351	4.007831618	2.001956947
11	1024	1023.5	2.000977517	2059.037700	1029.0159098	514.2566076	257.0026915	128.4383703	64.18791276	32.0782778	16.03130349	8.011735939	4.003911024	2.000977517
12	2048	2047.5	2.000488520	2053.509412	1026.5039724	513.1266499	256.5006721	128.2190173	64.09385309	32.0391007	16.01563836	8.005863669	4.001954318	2.000488520
13	4096	4095.5	2.000244200	2050.752351	1025.2509925	512.5629122	256.2501679	128.1094418	64.04690076	32.0195408	16.00781384	8.002930761	4.000976861	2.000244200
14	8192	8191.5	2.000122085	2049.375588	1024.6252480	512.2813530	256.1250420	128.0547042	64.02344394	32.0097680	16.00390708	8.001465112	4.000488356	2.000122085
15	16384	16383.5	2.000061039	2048.687647	1024.3125620	512.1406508	256.0625105	128.0273479	64.01172036	32.0048834	16.00195333	8.000732489	4.000244159	2.000061039
16	32768	32767.5	2.000030519	2048.343787	1024.1562653	512.0703189	256.0312526	128.0136729	64.00585978	32.0024416	16.00097661	8.000366228	4.000122073	2.000030519
17	65536	65535.5	2.000015259	2048.171884	1024.0781289	512.0351579	256.0156257	128.0068362	64.00292979	32.0012207	16.00048829	8.000183110	4.000061036	2.000015259
18	131072	131071.5	2.000007629	2048.085940	1024.0390635	512.0175785	256.0078127	128.0034180	64.00146487	32.0006104	16.00024414	8.000091554	4.000030518	2.000007629
19	262144	262143.5	2.000003815	2048.042969	1024.0195315	512.0087892	256.0039063	128.0017090	64.00073243	32.0003052	16.00012207	8.000045777	4.000015259	2.000003815
20	524288	524287.5	2.000001907	2048.021485	1024.0097657	512.0043946	256.0019531	128.0008545	64.00036621	32.0001526	16.00006104	8.000022888	4.000007629	2.000001907
21	1048576	1048575.5	2.000000954	2048.010742	1024.0048828	512.0021973	256.0009766	128.0004272	64.00018311	32.0000763	16.00003052	8.000011444	4.000003815	2.000000954
22	2097152	2097151.5	2.000000477	2048.005371	1024.0024414	512.0010986	256.0004883	128.0002136	64.00009155	32.0000381	16.00001526	8.000005722	4.000001907	2.000000477

The Following Products are all Whole Numbers

Multiply	lvl 3 - lvl 4	48,828,125	9,765,625	1,953,125	390,625	78,125	15,625	3,125	625	125	25	5
	lvl 4 - lvl 6	3.1381E+10	3.4868E+09	3.8742E+08	43,046,721	4,782,969	531,441	59,049	6,561	729	81	9
	lvl 5 - lvl 8	3.4272E+13	2.0160E+12	1.1859E+11	6.9758E+09	4.1034E+08	24,137,569	1,419,857	83,521	4,913	289	17
	lvl 6 - lvl 10	5.0542E+16	1.5316E+15	4.6411E+13	1.4064E+12	4.2618E+10	1.2915E+09	3.9135E+07	1,185,921	35,937	1,089	33
	lvl 7 - lvl 12	8.7508E+19	1.3463E+18	2.0712E+16	3.1864E+14	4.9022E+12	7.5419E+10	1.1603E+09	17,850,625	274,625	4,225	65
	lvl 8 - lvl 14	1.6462E+23	1.2761E+21	9.8925E+18	7.6686E+16	5.9447E+14	4.6083E+12	3.5723E+10	2.7692E+08	2,146,689	16,641	129
	lvl 9 - lvl 16	3.2305E+26	1.2570E+24	4.8910E+21	1.9031E+19	7.4051E+16	2.8814E+14	1.1212E+12	4.3625E+09	16,974,593	66,049	257
	lvl 10 - lvl 18	6.4758E+29	1.2623E+27	2.4607E+24	4.7967E+21	9.3502E+18	1.8227E+16	3.5529E+13	6.9258E+10	1.3501E+08	263,169	513
	lvl 11 - lvl 20	1.3121E+33	1.2801E+30	1.2489E+27	1.2184E+24	1.1887E+21	1.1597E+18	1.1314E+15	1.1038E+12	1.0769E+09	1,050,625	1,025
	lvl 12 - lvl 22	2.6728E+36	1.3044E+33	6.3662E+29	3.1070E+26	1.5163E+23	7.4003E+19	3.6117E+16	1.7627E+13	8.6025E+09	4,198,401	2,049

Table 4. First Order Periodic Table for the Six-Loop Hexagonal Fractal

Level	Scalar	Correction	Ratio	Prime #				Prime #		Prime #		Prime #	Prime #	Prime #
	2	0.5		(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)
1	1	0.5		32767	16383	8191	4095	2047	1023	511	255	127	63	31
2	2	1.5	3.000000000											3.000000000
3	4	3.5	2.333333333											7.000000000
4	8	7.5	2.142857143											15.000000000
5	16	15.5	2.066666667											31.000000000
6	32	31.5	2.032258065							63.000000000				21.000000000
7	64	63.5	2.015873016							127.000000000				42.333333333
8	128	127.5	2.007874016							255.000000000				85.000000000
9	256	255.5	2.003921569							511.000000000				170.333333333
10	512	511.5	2.001956947			1023.0000000	341.0000000	146.1428571	68.2000000	33.000000000				68.2000000
11	1024	1023.5	2.000977517		2047.0000000	682.3333333	292.4285714	136.4666667	66.0322581	33.000000000				33.000000000
12	2048	2047.5	2.000488520	4095.0000000	1365.0000000	585.0000000	273.0000000	132.0967742	65.0000000	32.24409449				65.000000000
13	4096	4095.5	2.000244200	2730.3333333	1170.1428571	546.0666667	264.2258065	130.0158730	64.4960630	32.12156863				32.121568630
14	8192	8191.5	2.000122085	2340.428571	1092.2000000	528.483871	260.0476190	129.0000000	64.2470588	32.06066536				64.247058800
15	16384	16383.5	2.000061039	2184.466667	1057.0000000	520.1111111	258.0078740	128.4980392	64.1232877	32.03030303				64.123287700
16	32768	32767.5	2.000030519	2114.032258	1040.238095	516.023622	257.0000000	128.2485323	64.0615836	32.01514411				64.061583600
17	65536	65535.5	2.000015259	2080.492063	1032.055118	514.003922	256.4990213	128.1241447	64.0307767	32.00757021				64.030776700
18	131072	131071.5	2.000007629	2064.118110	1028.011765	513.0000000	256.2492669	128.0620420	64.0153846	32.00378464				64.015384600
19	262144	262143.5	2.000003815	2056.027451	1026.001957	512.499511	256.1245723	128.0310134	64.0076914	32.00189221				64.007691400
20	524288	524287.5	2.000001907	2052.005871	1025.0000000	512.249634	256.0622711	128.0155048	64.0038454	32.00094607				64.003845400
21	1048576	1048575.5	2.000000954	2050.000978	1024.499756	512.124786	256.0311317	128.0077519	64.0019227	32.00047303				64.001922700
22	2097152	2097151.5	2.000000477	2049.0000000	1024.249817	512.062386	256.0155649	128.0038759	64.0009613	32.00023651				64.000961300

Table 5. Second Order Periodic Table for a Six-Loop Hexagonal Fractal

# of Energy Cells	Platform #	Wighted Average Scaling Factor 136.4666667		Calculations			
				Speed of Light =	2.99792458E+08		
		Scaling	Platform		Frequency	2.41799E+14	
		Factors	Wavelength	Wavelength	c/Wavelength	Energy - EV	
		(unitless)	λ (meters)	λ (meters)	c/λ (Hz)	Freq/Factor	
3.65616.E+15	20	128.4385703	1.6110924E-35	1.6110924E-35	1.86080242E+43	7.69565956E+28	
6.09360.E+14	19	128.8792900	2.0692640E-33	2.0692640E-33	1.44878786E+41	5.99170447E+26	
1.01560.E+14	18	129.7672311	2.6668528E-31	2.6668528E-31	1.1241433E+39	4.64908247E+24	
1.69267.E+13	17	131.5697946	3.4607010E-29	3.4607010E-29	8.6627669E+36	3.58263209E+22	
2.82111.E+12	16	135.2826807	4.5532372E-27	4.5532372E-27	6.5841608E+34	2.72298980E+20	
4.70185.E+11	15	143.1699883	6.1597413E-25	6.1597413E-25	4.8669651E+32	2.01281479E+18	
7.83642.E+10	14	161.0249020	8.8189009E-23	8.8189009E-23	3.3994311E+30	1.40589156E+16	
1.30607.E+10	13	207.4686750	1.4200627E-20	1.4200627E-20	2.1111213E+28	8.73089533E+13	
2.17678.E+09	12	376.5628715	2.9461852E-18	2.9461852E-18	1.0175615E+26	4.20829570E+11	
362,797,056	11	2187.0000000	1.1094240E-15	1.1094240E-15	2.7022353E+23	1.11755460E+09	
60,466,176	10	128.4385703	2.4263102E-12	2.4263102E-12	1.2355900E+20	5.10998904E+05	
10,077,696	9	128.8792900	1.8890822E-14	1.8890822E-14	1.5869741E+22	6.56319686E+07	
1,679,616	8	129.7672311	1.4657764E-16	1.4657764E-16	2.0452810E+24	8.45860152E+09	
279,936	7	131.5697946	1.1295428E-18	1.1295428E-18	2.6541045E+26	1.09764930E+12	
46,656	6	135.2826807	8.5851223E-21	8.5851223E-21	3.4919998E+28	1.44417493E+14	
7,776	5	143.1699883	6.3460617E-23	6.3460617E-23	4.7240710E+30	1.95371855E+16	
1,296	4	161.0249020	4.4325363E-25	4.4325363E-25	6.7634519E+32	2.79713863E+18	
216	3	207.4686750	2.7527024E-27	2.7527024E-27	1.0890842E+35	4.50408973E+20	
36	2	376.5628715	1.3268038E-29	1.3268038E-29	2.2595085E+37	9.34457528E+22	
6	1	2187.0000000	3.5234590E-32	3.5234590E-32	8.5084701E+39	3.51882010E+25	
Plnk's Lngth	1	0	Reference Level	1.6110924E-35	1.6110924E-35	1.8608024E+43	7.69565956E+28
Codata Value				1.6162520E-35	Difference =	5.1596278E-38	0.320%

Table 6. Electron & Proton Based Energy / Frequency Platforms for the Electromagnetic Wave Spectrum

1	2	3	4	5	6	7	8	9	10	11	12
Name	Codata Mass Values (Mev)		Mass Loop Calculations				Ratio Calculations			Particle Mass Calc.	
	Codata Mev	Codata Mev Electron Mass	EM x 128	EM x 128 x 1296	Loops	Quarks	% Loops	% Lps x 2187	Lps/27648	% 11 th Pf Ev	Error
Neutron Max		939.565641	1838.684284	235,351.59	305,015,658.49						
Neutron	939.565560(81)	939.565560	1838.684079	235,351.56	305,015,624.43	305,015,624	101,671,875	84.073346%	1,838.68408	1,838.68408	939.5655469 0.000%
Neutron Min		939.565479	1838.683873	235,351.54	305,015,590.38						3.08038498 ev/cell
Proton Max		938.272036	1836.152762	235,027.55	304,595,709.35						
Proton	938.272013(23)	938.272013	1836.152670	235,027.54	304,595,694.13	304,595,694	101,531,898	83.957598%	1,836.15267	1,836.15267	938.2720009 0.000%
Proton Min		938.271990	1836.152578	235,027.53	304,595,678.92						3.08038498 ev/cell
Difference		1.293547	2.531408531	279,936.00	362,797,056.00	362,797,056	120,932,352	100.00000%	0.000457247	2187	1117554602.21679
Electron Max		0.510998923									3.08038498 ev/cell
Electron	0.510998910(13)	0.510998910	1	128.00	165,888.00	165,888	55,296	0.0457247%	1.00000	1	0.510998904 0.000%
Electron Min		0.510998397									0.000003080 ev/cell

Table 7. Electron / Neutron / Proton Mass Calculations

A Periodic Table for the six-loop hexagonal fractal is then shown in Tables 4 and 5. The process begins by taking the scaling factor of two (2) and then multiplying by itself 22 times as listed in the 22 rows in both tables. This next point is very important as it pertains to the infinitely small versus a quantum limit to the micro world. That is, when a fractal forms there must be a center circle whereas all of the fractals illustrated thus far have a point at the center. Therefore, a correction factor must be

introduced into the scaling factor that is equal to one half of the quantum limit of the fine structure of the aether. Accordingly, if there is no limit to the infinitely small, then fractals cannot form and we are not here; but since we are here, there is a quantum limit. This one half factor is then subtracted from each of the scaling numbers listed in the 22 rows. This correction factor has a significant effect at the lower levels and only a minor effect at higher levels of the fractal. Then in the next column of the chart

new ratios are calculated based upon this previous subtracted correction factor of one half of the quantum limit. Finally, in each of the successive columns, these new scaling factors are multiplied together for the various layers of a fractal arrangement, and are then repetitively recalculated for the various levels that each fractal could occupy.

For examples, in the first red column to the left in Table 5, eleven scalar numbers are multiplied together for each of the eleven different layers that an eleven layered fractal could exist. In the bottom row of the eleven layer fractal is the number 2049, which is the last eleven scalar numbers multiplied together. Then the number located right above the number 2049 was calculated by shifting up one row and then multiplying the next eleven scalar numbers. This process was then continued for each of the eleven various fractals that could exist within the eleven fractal arrangement. Accordingly, this process was then continued for all possible fractals from one layer through eleven layers. There are so many coincidences apparent, that they can no longer be considered coincidences. Multitudes of variations were tried with no success, but instead this one combination exhibits a multitude of whole number successes. This must be the structure for the aether, and hopefully a significant part of the answer as to how particles are formed.

First of all, it is amazing how many times whole numbers are generated from more than ten digit decimals as highlighted in the various colors in each column. For example, the five layered fractal contains both exactly a 33 and a 63 scaling factor. Also, please note that this same coincidence exists for each column and shifts downward in an exact stair stepping fashion. Also, note that the lowered colored row in any column is exactly two units less than the top colored number in the next column. For example, the five layered fractal has a scaling factor of exactly 63 at the top and the six layered fractal has a scaling factor of exactly 65 at the bottom. The fractal skips the number 64, which it must do, since 64 is an even multiple of 2 and therefore represents a natural energy level of the aether. Again, this same sequence occurs in each two successive columns. Then please note a group of numbers in red running in a stair step fashion diagonally across Table 5. When these numbers are multiplied by the number 15 the numbers that are listed in the top row develop. These numbers are exact multiples of the number two (2) minus one unit. Then note that the two previous stair stepping coincidences cross exactly in the middle of the 7 layer fractal with a scaling factor of 136.4666667. There are many other coincidences with similar fractional numbers. For instance, the decimal .1428574 occurs over and over within the fractional scalar numbers; and again similar coincidences exist over and over again within the entirety of this Periodic Chart.

Table 4 was developed by taking the previous scaling factors to various powers, one for each layer of the fractal as listed in the heading row. Accordingly, the scaling factor of 136.4666667 can also be calculated from this chart by taking the seventh root of the product of the same seven individual scaling factors. Also, please note in the addendum chart at the bottom of Table 4, that when multiplying various combinations of these scaling factors together a plethora of whole numbers develop. And those whole numbers listed are not the only whole numbers to be generated from this charting concept, for there is a duplicate chart to Table

5 for each of the Columns in Table 4 by substituting each of the product columns from Table 4 into the ratio column in Table 5. Essentially, this generates a set of numbers that is N powers greater than the base numbers in Table 5, where N equals the whole numbers 2, 3, 4, 5, etc.

The difficulty is now to apply this chart to the electromagnetic wave spectrum and then to be able to calculate a significant parameter such as the mass of a particle. The first supposition is that if there are eleven layers within this fractal arrangement, with a weighted average scaling factor of 136.466667 for a seven loop fractal, then why couldn't there be another exact higher order fractal of eleven layers in another exact replica of another eleven layer fractal. Accordingly, in Table 6 Planck's Length was used as the base of the fractal and then each platform scaling number for an 11-layer 7-loop fractal was applied by converting Planck's Length into electron volts. However, the electron volts for the eleventh platform did not match the number required for the ratio calculations in Table 7; therefore, Planck's Length was calculated backwards from the eleventh platform to the number of 1.611096E-35 as shown. Table 7 then calculates the mass of the proton neutron and electron from the numbers generated in Table 6. Obviously, much back and forth between Tables 4, 5, 6 and 7 was required before this final version was realized.

Table 6 then represents the fractal platforms for the electromagnetic wave spectrum from the base of platform 0 (Planck's Length) through platform 11 (electron, proton, and neutron particle formation). The first column in Table 7 is simply the name of the particle to be evaluated and the second through the fourth columns list their associated codata values, their minimum, nominal and maximum values for these values without the error of uncertainty included, and in the fourth column those values converted into electron volts. The fifth through the eighth columns progressively multiplies the electron volts by 128, which is the conversion factor to change from a 3 loop fractal structure to a 6 loop fractal structure as discussed earlier; and then multiplies that result by 1296 to add the four additional layers to the fractal as also discussed earlier. The seventh column then selects a whole number somewhere in the middle that is divisible by three so that the number of cells in a quark listed in the eighth column is also a whole number.

In the ninth column, the percentage of the energy cells for each particle out of the total number available is calculated; and in the tenth column, that percentage is divided by the number 2187 to reestablish the previous relationship of this chart to known electron mass ratios. In the eleventh column, the number of mass loops in the particle is divided by the number of mass loops in an electron (165,888) to reestablish the correlation between the six-loop hexagonal fractal and the known electron mass ratios, with all numbers matching exactly. Finally, in the twelfth column, the total mass in electron volts of the eleventh platform in Table 6 is multiplied by the % ratio for each particle from Table 7. This result is then divided by one million, and accordingly recorded in Mev with a zero percentage error. Planck's Length then calculates to be 1.611092E-35, which is a difference from the codata value of .051560128E-35 or .320%.

There may be an alternate method to cross check this number. The structure would be two helically wound charged fibers and the mathematics is difficult. The method is to start with the fol-

lowing formula derived in section 3 in this paper $S = \pi/N$, and to let $N = 2$ for a two loop structure, which also defines the ideal growth ratio from a circular loop to a collapsed loop. However, a correction factor (x) must be introduced into the equation to account for the loss in length of a collapsed loop due the helical twisting effect of the two charged fibers; and therefore, the equation becomes $S = [(\pi/2)-x]$. Then to calculate the alpha factor for an eleven platform fractal the equation becomes $\alpha = [(\pi/2)-x]$ ¹¹. The equation to derive the x factor would be again similar to the equations and mathematical limitations as derived for limits to the art of winding ropes by [9] Jakob Bohr and Kasper Olsen of the Physics Department at the Technical University of Denmark in their paper titled "The ancient art of laying rope".

8. The Structure of an Electron

Finding the exact structure for the three fundamental particles, the electron, the proton and the neutron will be a very difficult task. Of these, the electron should be the simplest, since it only contains 165,888 energy cells. It is proposed that the electron structure is made up of 1296 strings of 128 energy cells, although other mathematical possibilities exist such as 162×1024 , 324×512 , or 648×256 . This reason the former was chosen is because the hexagonal fractal must be at least three generations deep before any fractal can form as was discussed earlier, and accordingly, six to the fourth power is 1296. Then the rest of the cells would have to be evenly distributed between the remaining seven layers, and accordingly, $165,888/1296$ equals 128 which is 2 to the seventh power (2⁷).

Therefore, a new two loop fractal would be required as shown in Figure 8. Also, this new two-loop fractal could account for the various orbits and sub-orbits for the electron within atomic structure, since there are seven layers in the electron and accordingly seven orbits in atomic structure, with each orbit having progressive multiple sub-orbits of two (2), just as fractal layers are progressively multiplied by two. Then when the energy of a photon is absorbed by the electron, the corresponding cells of similar wavelength would inflate to their uncharged position. Likewise, when the energy of the photon is released, the corresponding cells of a similar wavelength deflate to the regularly charged position. The wavelength of the photon absorbed or released determines how many cells in each layer or sub-layer that would be affected.

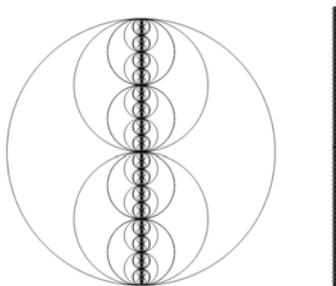


Fig. 8. Seventh Generation String Fractal

The outer loops shown in the left half of Figure 8 are only for illustration purposes and do not exist, therefore the innermost loops remaining in the fractal would form a string in the middle of the loops as shown above. In reality, it would appear as a sin-

gle string of energy as illustrated in the right side of the picture, and may simply be another definition for a unique variation of a light wave. Therefore, the structure of an electron would be comprised of 1296 strings of 128 energy cells each in some polyhedral arrangement. The string itself would probably be comprised of two helically wound electromagnetic fibers that are following the fourth platform frequency and the subsequent harmonics of each of the successive seven platforms. The final and exact structure still needs to be resolved, however it will probably be something like a Hoberman Sphere or his expanding geodesic dome that is instead constructed from charged strings or concentric charged strings.

Alpha Constant	137.0359996790	136.4666667	Error
Bohr Radius	5.2917720859E-11	5.2697867654E-11	0.42%
Compton Wavelength	2.4263102175E-12		
Calc. $\lambda / 2187$		2.4263101806E-12	0.00%
Calc. $(c/Ev \cdot 2.41E+14)$		2.4263101806E-12	0.00%
Compton Radius	3.8615926459E-13	3.8615926459E-13	0.00%
Classical Radius	2.8179402894E-15	2.8296966133E-15	0.42%

Table 8. Seventh Generation String Fractal

The Compton wavelength in Table 8 then becomes the wavelength of the 10th platform from Table 6. However, the Classical Radius and the Bohr Radius of the electron is still unknown, until the variance of .42 % between the Codata value of alpha and the weighted average scaling factor derived in the Periodic Table for a hexagonal fractal can be resolved.

9. The Structure of the Neutron & Proton

From the previous descriptions it is more likely that the neutron and proton are very similar, and that the neutron is actually an electron encased within a proton by a sum total of neutrally charged sub-structures, which hold the electron in place. Also, the charge of both the neutron and proton may be somewhat ameliorated.

The basic structural arrangement proposed for the nucleus is identical to the tetrahedral arrangement proposed for aether, since within fractals things have a way of reproducing themselves. The method assumed that it is the nucleus that determines where the electrons will be and not the other way around. Therefore, it is the nucleus that determines the size and the shape of the atom. The orbits and sub-orbits of the electrons in an atom were then applied to the nucleus, under the assumption that the only way the nucleus could force the electrons into those orbits is if the nucleus exhibited a similar structure. Protons were assumed to be loops of energy, which could interlink in some fashion. However, it is now proposed that the loops merely represent the pathway that energy follows, and that these pathways actually fuse together instead of link together, as illustrated in Figures 9 and 10. That is specifically why we have given the name of fusion to nuclear reactions. However, in the case of higher order particles such as the proton or neutron, this fusion process is very advanced and complex as each of the individual thousands of strands of charged fibers would have to fuse together individually in perfect unison and perfect harmony. Also, the end product would be identical to a helically wound structure. Again, the structure that worked was a 4-loop tetrahedral

arrangement as shown in Figure 9. This allowed for four loops connected on a three dimensional axis yielding six (3 dimensions x 2 directions) points where each group could be interlinked or fused. Accordingly, the first four loops represent the 1s and 2s orbits, and the six interlink points represent one each of the six p orbits. This same process is then expanded to a final structure that correlates very closely to all electron orbits.

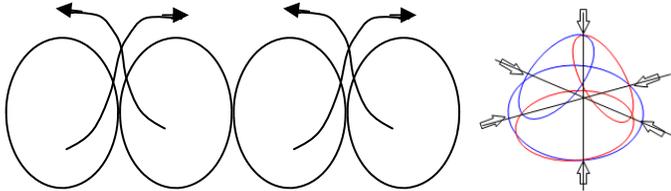


Fig. 9. Various forms of Fused Loops

Definitions for this structure are then broken up into arms, bands, and groups. An "arm" is defined as any number of protons along any one of the 3D spatial axes and a "band" is defined as any number of protons along at any one spatial location in all of the arms, and a "group" is defined as any cluster of protons at any one location in any arm or band. Accordingly, "groups" are equivalent to orbits and "bands" are equivalent to sub-orbits. This structure then allows for multiple nuclei of atoms to fuse together since an arm could break off or be added. All that happens is that the two remaining nuclei or the newly created nuclei redefines its new center point, since the entire structure is a repetitive copy of the same exact structure over and over again. Therefore, it would be possible for nuclei of some atoms to fuse and create an entirely new atom, or vice versa. However, all combinations are not possible due to the structural arrangement of the protons in the various arms, groups and clusters.

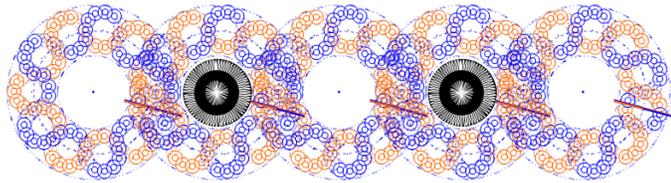


Fig. 10. Nucleons formed from fused Neutrons and Protons

There were 214 protons in the original proposed atomic nuclear structure; however, it is yet to be determined whether half of these spaces are occupied by neutrons or the neutrons coexist between the protons. Again, the reason is that the structures for both the neutron and the proton should be nearly identical, allowing for them to fuse together to form the nucleon. This would be accomplished by fusing each of the myriad of individual charged fibers together in the outer twist-loop fractals of the proton with the neutron, and thereby combining two individual and separate loops into a single twist-loop. This fusion would deform both particles such that the neutron with its inner electron shells remaining intact, would become stable. This process would then continue throughout the entire nucleus such that all of the component particles within the nucleus are fused together into a single interwoven complex of energy pathways. Detailed drawings for the exact inner structure of the neutron and proton are required to prove this theory. However, this should be possible, since all of the detailed information required for construct-

ing both the neutron and the proton are included within the combined Pascal's and Sierpinski's Triangle and the Periodic Table of the Hexagonal Fractal. Since this includes over 300 million energy cells interwoven in a specific pattern, it will require advanced mathematics, creative and open-minded engineers and scientists, and computers to determine the final structure for both the proton and the neutron.

10. The Structure of Aether

As indicated within the Periodic Table for a hexagonal fractal, the calculated fine structure of aether is actually .32 % below the current codata value for Planck's Length. Planck's Length simply represents the first size, wavelength or frequency that a loop of organized energy can first appear, and then all higher order structures of energy are simply multiples of Planck's Length. Earlier in this paper, previous attempts at providing a possible structure for the aether itself was presented. Although a very good description for the structure and the distribution of energy within the aether is included within this paper, more information will be required before any positive description for the structure of an individual aetheral energy cell can be defined, and it is unknown at this time if it is possible to generate any additional information. However, it is proposed that again the energy contained within an individual energy cell represents pathways, and therefore could join or fuse together easily at tangential paths as shown previously for the proton in Figure 10. Again, fractals have a way of constantly and repetitively reproducing themselves. Also, the hexagonal fractal projects each energy cell to have about 3 electron volts of energy, which is well within the parameters for the definition of a neutrino.

Another very important realization is that the missing dark energy and dark matter discussed within contemporary main stream science is actually light energy that preexists within the aether in the form of energy loops at Planck's length and the higher order organizational harmonics of those energy cells as shown in the periodic table. This preexisting energy is then wrapped up into the particles as they are created from the energy within the aether. For example, .5 million electron volts are required to create an electron from the aether; however, there is a lot more than .5 Mev in that electron. Accordingly, there is a lot of energy pre-existing within the aether before the electron fractal can possibly form since it forms seven layers deep into the fractal. The .5 Mev is only the added energy that is required to rearrange that pre-existing energy into the fractal form of an electron. Therefore, the entire aether fractal plenum must be excited with energy before any particles can form from that energy. This excitation energy is then the so called missing dark energy and when it is spun into charged particles it is the so called missing dark matter.

Main stream science has got a lot of things right about our world, but from a wrong foundation. Space is not empty but is instead filled with the energy of aetheral light in multitudes of various forms, structures and shapes.

11. Conclusion

I hope that this paper finally puts to bed the issue of whether there is an aether or not, yes Virginia, there is an aether. Also,

the Universe is not infinitely small, but is instead limited by the fine structure of the aether. If there were no quantum limit to the smallest size in the aether, then twist-loop fractals could not form and instead all energy would stay suspended within the hexagonal fractal as pure energy. In an unlimited non-quantum universe, the hexagonal fractal would be able to hold unlimited energy. Therefore, there would be no limit to the highest frequency electromagnetic wave or the smallest quanta of energy, and unlimited energy would become infinitely small as a point charge. Accordingly, twist-loop fractals, particles, atoms, and matter could not form and we would not be here. But since we are here, there must also be an aether with a quantum limited fine structure. Likewise, it is proposed that when the mathematics is all complete, it will be shown that the universe is also not infinitely large, but instead is incredibly large but finite in size. Thus, when our final concept for the universe is completed and when all of its variables are explained, then that is all there is.

Finally, there is still much work remaining to be done, including reconciling the proposed Periodic Table for the Hexagonal Fractal with the existing Fine Structure Constant and Planck's Length. It must be determined which is correct and why it is correct. This will only be accomplished with a complete understanding of the entire structural and mathematical processes involved within mainstream physics and a complete reconciliation of all mathematical constants. Accordingly, string theory and ring theory may aid mathematicians in this reconciliation process, since fractal structures include both strings and loops of energy. This final step of reconciliation must be done by others as I do not have the necessary skills or knowledge to complete it.

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