THE GOLDEN RATIO, THE GRAVITON & THE TREE OF LIFE

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Abstract

A supplementary investigation of the 5-dimensional graviton and its relationship to the Golden Ratio brings us to the unlikely — but unavoidable — conclusion that it is somehow linked to an ancient figure of Jewish Mysticism called the Tree of Life. The properties of this graph are investigated from a modern, as well as historic perspective and its greater implications for Theoretical Physics are discussed and investigated, in a preliminary fashion. The importance of this figure stems from the 5-dimensional nature of the graviton, according to the DGO (Dimensional Gate Operators). All ten faces of this particle are imaged and anomalies are discussed. The graviton is broken down further into other visual representations, at which point the similarities between it the Golden Mean, and the Tree of Life become manifest.

The Tree of Life

The early scientists of the Middle Ages were a very secretive bunch. They spent nearly all of their time in darkened laboratories distilling chemical compounds from various organic substances and writing down their results in a coded fashion. If they were describing the process of calcination, they might well refer to it as a 'black serpent' or 'toad', whereas the white phase of coagulation was seen as a 'white serpent' or a 'dove'. These descriptions of various alchemical and chemical processes remain remarkably consistent despite the innate anti-social nature of the alchemists themselves, as well as their respective geographic distance from one another.

The famous psychologist Carl Jung believed that this was evidence of man's 'collective unconscious'. Others think that the noxious fumes of their hazardous work environments caused them to hallucinate. It is my personal belief that they were probing the depths of their unconscious mind through the psychological lens of dreams and ill-health to gain insight into the various processes and structures that go into making up the material universe.

One of the areas that the Alchemist no doubt derived their knowledge was from a curious schematic known as the 'Tree of Life'. The exact origins of the Tree of Life diagram, in time and space, are unknown. Some believe that it emerged in Europe during the Middle Ages, and sometime after the publication of the Zohar. Others think that it is as old as the Universe itself. All we can say

for certain is that the Tree of Life has its roots in a type of Jewish Mysticism, known as the Kabbalah.

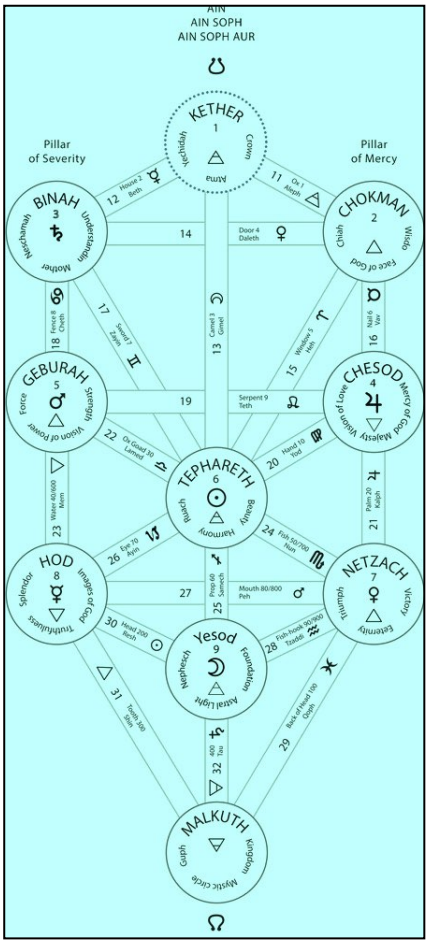

Fig 0: The Tree of Life

The Tree of Life diagram was devised as a total system of early scientific and advanced magical thinking. It includes elements of divinatory practices such as Astrology, the Tarot, as well as complex linguistic and scientific disciplines like Alchemy and the Hebrew language and alphabet. There are the 7 Astrological planets; the Sun, the Moon, Mercury, Venus, Mars, Jupiter and Saturn, represented. And a further 3 celestial realms: the Celestial Sphere, Heaven and Thronus. These 10 spheres are referred to as the Sephiroth and they are sometimes accompanied by an 11th hidden sphere called Daath. Each of these 10 Sephiroth are linked together via pathways, which number 22 in total. These 22 pathways are linked to the 22 major archana of the Tarot, and the 22 letters in the Hebrew alphabet, which together make up the Torah. The Tree of Life also encodes alchemical knowledge of the four principle elements; earth, wind, water and fire, which is possibly why it drew the attention of the alchemists, in the first place.

5-Dim Graviton

The Dimensional Gate Operator (DGO) model, places the graviton as the penultimate particle in 5-dimensional space, just below the Higgs boson. [1] The structure of the graviton is revealed to be a 5-dimensional truncated rhombic-dodecahedron (or more accurately — a chamfered cube).[2] The 5-dimensional chamfered cube is obviously based on a 5-cube. From Wikipedia, we get this description of the form and its properties:

> *In five-dimensional geometry, a 5-cube is a name for a five-dimensional hypercube with 32 vertices, 80 edges, 80 square faces, 40 cubic cells, and 10 tesseract 4-faces*. [3]

Already, we have a number of interesting correspondences here. The 32 vertices could easily correspond to the 32 particles of the Standard Model (SM), minus the graviton itself of course. Next we have the 10 tesseract 4-faces. The 10 tesseract faces can be imaged separately by rotating the Chamfered 5-cube through each of its axes. Since we can only see 3 of the 5 dimensions at any one time, this gives 5 chose 3 for a total of 10 projections. Therefore, each of our 3-D Chamfered cube faces are actually Chamfered 4-Cubes (C4-C). We might therefore expect each of these faces to be equally sized and proportioned, but for some reason this is not the case. When we run through all combinations of C4-C, we find that 3 of the 10 faces are actually distorted in a very specific way, implying that their geometry is a compound between the C4-C and something else. What that something else is remains a mystery.

A mystery I hope to tackle one day soon.

Dim	Polytope
[0, 1, 2]	Chamfered 4-Cube
[0, 1, 3]	Chamfered 4-Cube
[0, 1, 4]	Compound C4-C
[0, 2, 3]	Chamfered 4-Cube
[0, 2, 4]	Compound C4-C
[0, 3, 4]	Compound C4-C
[1, 2, 3]	Chamfered 4-Cube
[1, 2, 4]	Chamfered 4-Cube
[1, 3, 4]	Chamfered 4-Cube
[2, 3, 4]	Chamfered 4-Cube

Fig 1: The 7 Chamfered 4-Cube faces of the graviton and the 3 Compound C4-Cs.

The full list of C4-C faces and their corresponding geometries are seen in the table in Fig 1.

In Fig 2, I have attempted to depict the net of the Chamfered 5-cube, as a series of C4-Cs. However, there are problems with this model. While it is clear that the 5-cube has 10 faces, for some reason, the net only depicts 8 of these. We will refer to this as the 8-10 split, for future reference. The remaining two C4-Cs of the 8-10 spilt are obviously super-imposed on one another, most likely at the intersection of the 4D net. Since, I am unfamiliar with this methodology and the reasoning behind it, I am content merely showing the C4-Cs side by side, for now.

In ‘trace 8’ of Fig 2.1 and ‘the Graviton Anomalies’ of Fig 2.2, we get a closer view of the Compound C4-Cs. The geometry of this form is truncating into something else, although, I don’t know what. This truncation often occurs when more bosonic structure is being added to fermions,

changing them gradually — at least from an outward perspective — into a boson, although this likely not effect how the particle operates on a practical basis.

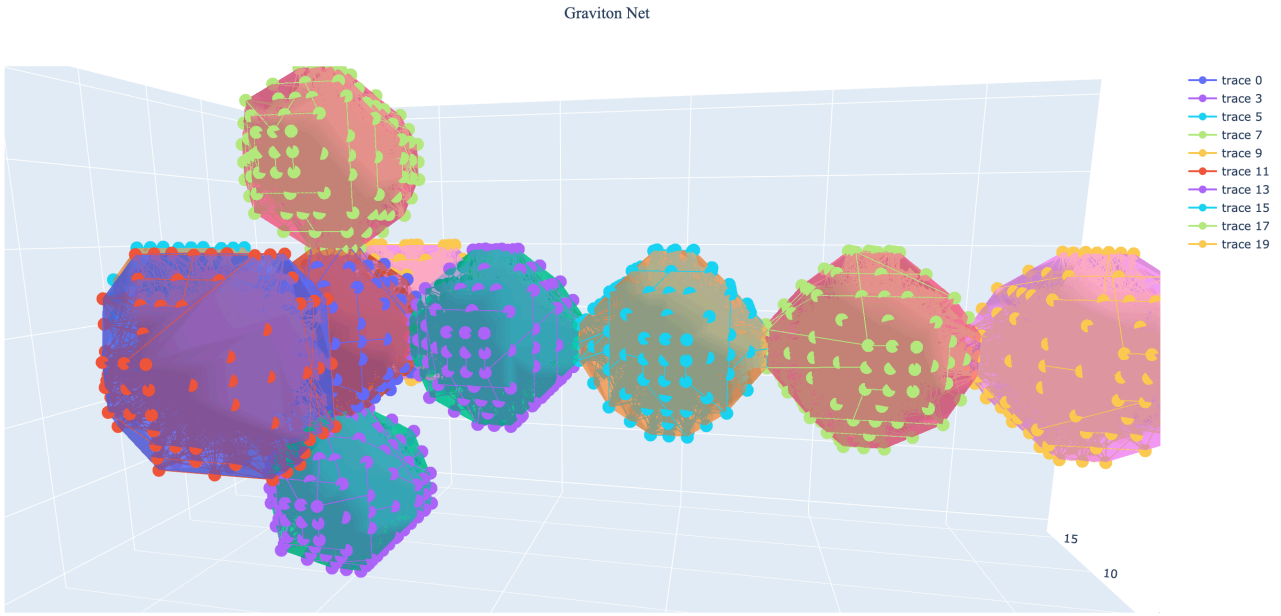

Fig 2: Graviton net, with 7 C4-Cs and 3 Compound C4Cs.

I also find it interesting that the small faces of the cube, begin to stretch and it reminds me of the complex conjugates and complex transpose matrices that define the Hermitian matrices. It seems likely that such Hermitian matrices will be found in other specific DGO particles, because the coordinate values are easily inverted by rotation. Similarly, the transposes are also easily acquired by rotations. All that is left to do is to calculate which of these faces are actually Hermitian and whether or not that is useful to our investigation.

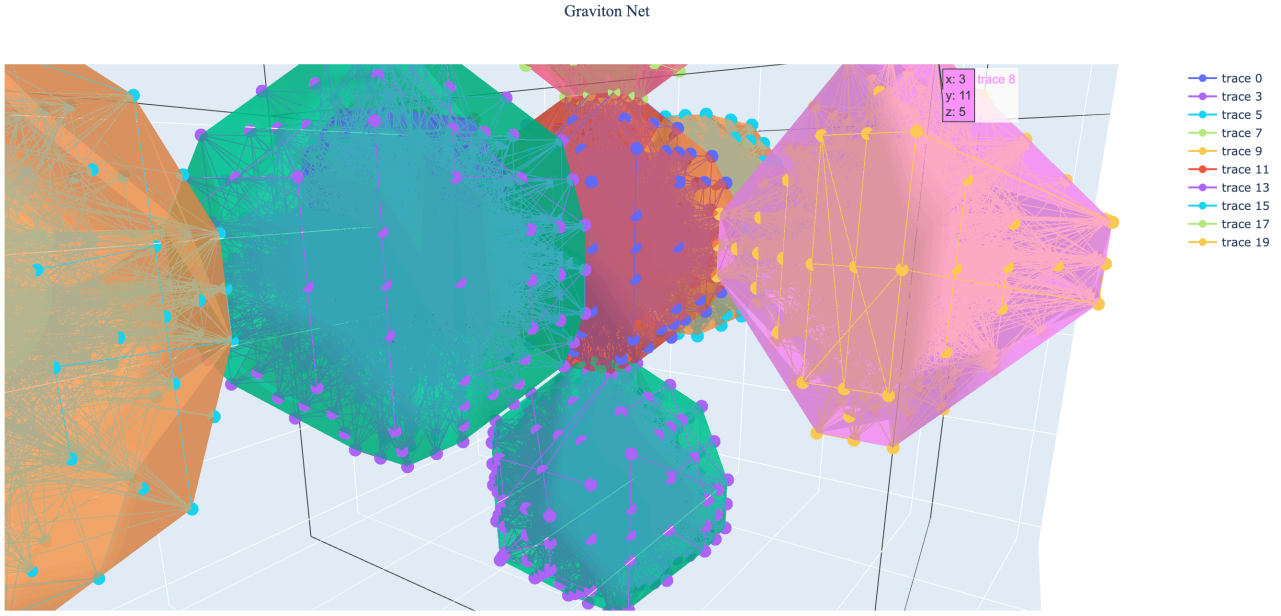

Fig 2.1: Graviton net, with 7 C4-Cs and 3 Compound C4Cs.

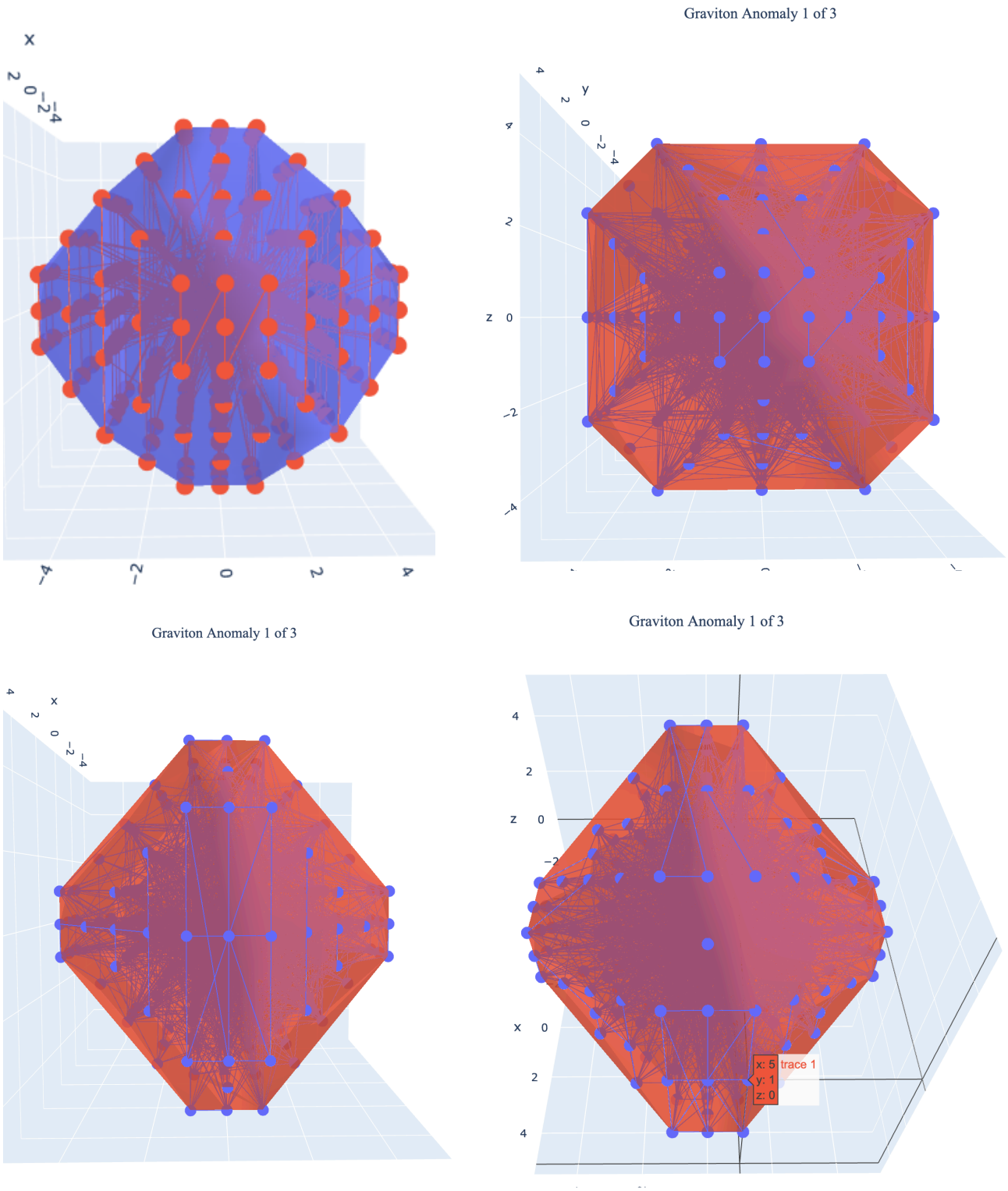

Fig 2.2: Clockwise from Top Left: the Graviton, three different perspectives on the Compound graviton.

My intuition is telling me it won't be, seeing as how we have already effectively done away with abstract concepts like 'i', which are still very much apart of Quantum Mechanics (QM). I hope to be wrong about that, because it would open up a more complex field of connectivity between QM and DGO and therefore create new and larger avenues for research.

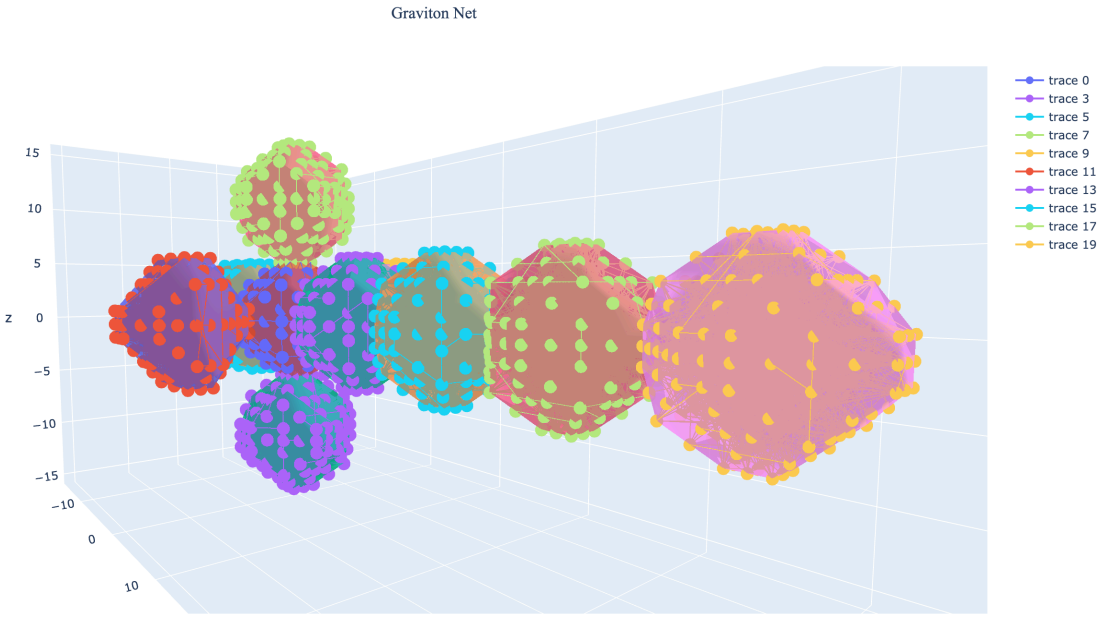

Fig 3: Graviton net, with 7 C4-Cs and 3 Compound C4Cs.

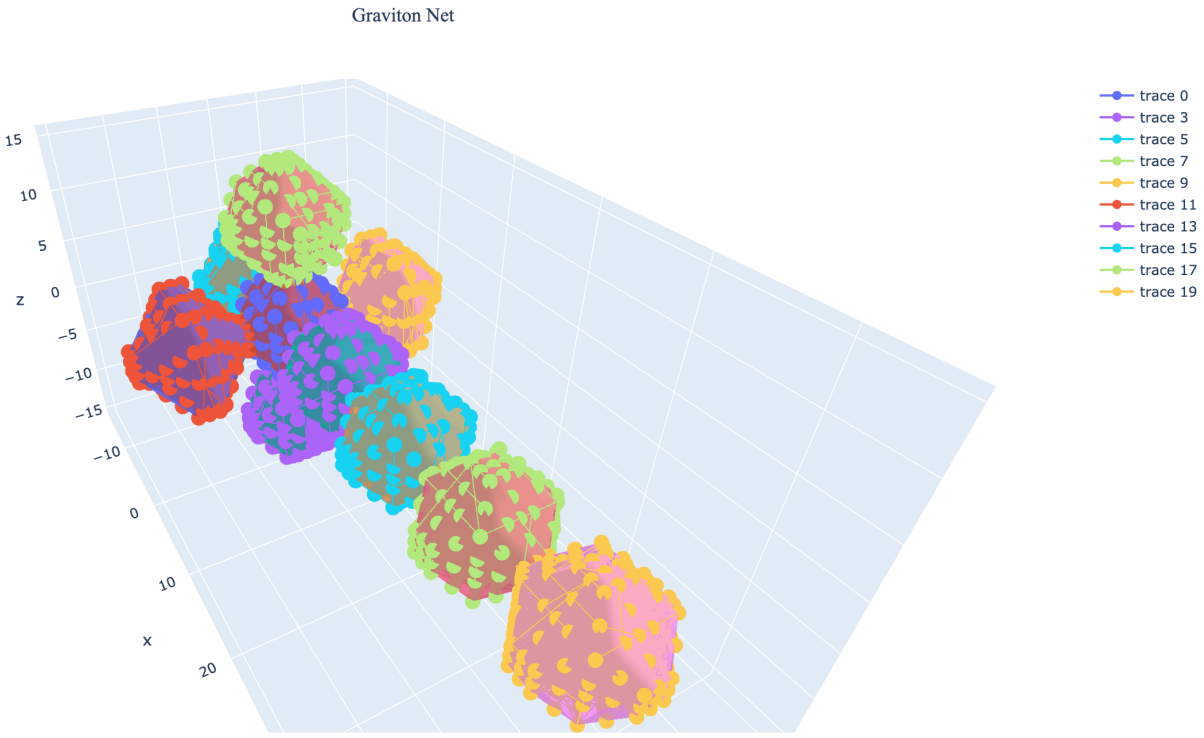

Fig 4: Graviton net, with 7 C4-Cs and 3 Compound C4Cs.

But why are 3 of the C4-Cs Compound? Is it a problem with the algorithm? If so, then why hasn't it affected any of the previous models? Could the fact that there are 3 Compound C4-Cs have anything to do with the 3-dimensions in ordinary space?

It is a good assumption, from my point of view, but without anything more solid to hang it on, it remains a conjecture floating in midair.

This is all well and good, you might say, but how does this relate to the Golden Mean of roughly 1.618033… or the Tree of Life, for that matter?

The Golden Bough

If we read from the Wikipedia article on the 'rhombic dodecahedron', we learn the following information about its projections:

> *The 5-cube can be projected down to 3 dimensions with a rhombic icosahedron envelope. There are 22 exterior vertices, and 10 interior vertices*. [3]

Recall that there are a total of 22 dimensions in the DGO Standard Model. [11] It is therefore very interesting that we should see it crop up here in the 5-cube. Although it must be pointed out that the geometry of the 5D chamfered graviton and the generic 5-cube are not the same, and therefore these 22 points cannot not apply to the graviton. However, it would apply to the XNORed Higgs particle, which is created by the subtraction of one graviton from another. [2] Although it is not entirely clear that the XNORed Higgs 5-cube (H5-C) is an actual particle. It might simply be an annihilation operator ($a^{\dagger}$) — in the same vein, as those that appear in the 2-dimensional (dionion) anyon group. [4] This appearance of $a^{\dagger}$ at the two extremities of the DGO model provide a nice set of 'book ends'.

Modern theoretical physics appears to employ creation and annihilation operators as a means to get the necessary results they require from their equations. This realisation came as a disappointment to me, as it is generally a trivial and natural matter to alter signs in DGO without the need to 'put them in by hand'. [5] Perhaps, the H5-C is another kind of Higgs particle with a different charge, or perhaps it really is an abstract 5-dimensional annihilation operator capable of creating gravitons.

In a previous own paper, we noted how the graviton shared many similarities with excitons in solid state crystals. [6] Excitons are created from the absence of energy, which makes them appear as though they are "not really there", or mere 'quasi-particles'. If the H5-C is a really an annihilation operator, it might hold a kind of quasiparticle status, just as anyons do at the 2-

dimensional level. Although, from the perspective of 5-dimensional space, it may be the lower dimensional particles, which are ‘quasi’.

Wikipedia continues;

> *The 10 interior vertices have the convex hull of a pentagonal antiprism. The 80 edges project into 40 external edges and 40 internal ones. The 40 cubes project into golden rhombohedra which can be used to dissect the rhombic icosahedron. The projection vectors are u = {1, ϕ, 0, -1, ϕ}, v = {ϕ, 0, 1, ϕ, 0}, w = {0, 1, ϕ, 0, -1}, where ϕ is the golden ratio, [3]*

Again we see the number 10, this time in reference to the number of interior vertices of the 5-cube projection. Where else do we see the numbers 10 and 22 appear in conjunction with each other? That is correct, in the Tree of Life diagram.

We have already shown the significance of the number 22 in relation to the DGO Standard Model and dimensionality. [11] In that paper, we revealed how the dimensions of the DGO expand in accordance with the Golden Ratio. Could there be a relationship between the 22 pathways of the Tree of Life and the particles of the Standard Model (SM)? In order for that to be the case, there would first need to be 10 particles (or sets of particles) in the SM to match the number of Sephiroth.

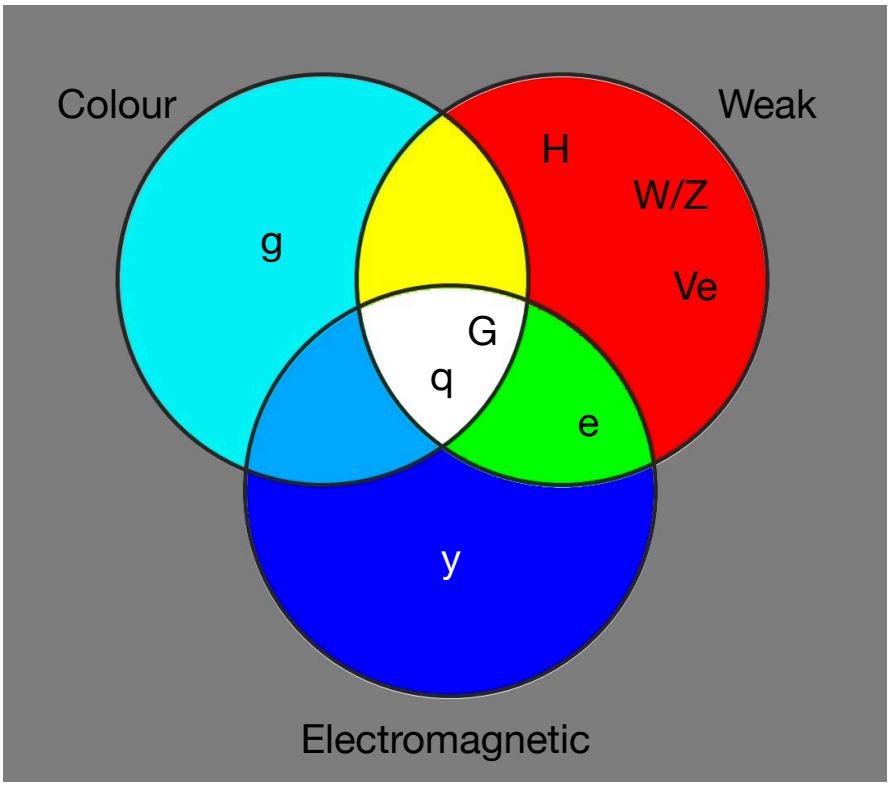

Fig 5: The fundamental forces arranged into a Venn Diagram showing their respective spheres of influence.

But there are more than 10 particles in the SM. There are at least, 32 by my count. And, don't forget: (22 + 10 = 32). Clearly, we are going places with respect to the kinds of additive operations of the Fibonacci sequence. This allows us to group some of these particles together in interesting ways to produce the 10 elements, we require. One obvious ordered set is the following:

{photon, electron, **weak bosons**, neutrino, graviton, gluon, quark, Higgs}

But this is a set of only 8 elements. Luckily, we can separate the weak bosons into their 3 constituent bosons; the W+, W- and Z-bosons. Now, we have 10 particles. We have our 7 original particles and our 3 expanded particles. This is the 7-3 split from earlier (See Fig. 1). The 8 particles into 10 is also reminiscent of the 8-10 split of the Chamfered 5-Cube. Recall that the 10 Sephiroth are divided into the 7 Astrological planets and the 3 Celestial spheres. This is yet another 7-3 split. So, it would appear that there is some case for correlation here.

But, if so, how should we best arrange these particles? It stands to reason that we should arrange them according to their mutual relationships (or lack thereof). In Fig 5, we see the four fundamental forces arranged in a Venn diagram. The electromagnetic, weak and strong force are arranged on the outside and the particles they interact with are shown in their respective spheres of influence. The Gravitational force is positioned at the centre to show that it interacts with all of the particles, although it is not thought to interact with the photon (y), the gluon (g), or the neutrinos (Ve), therefore, the diagram is slightly inaccurate. Nevertheless, it should serve as a blueprint for our next diagram (See Fig 6).

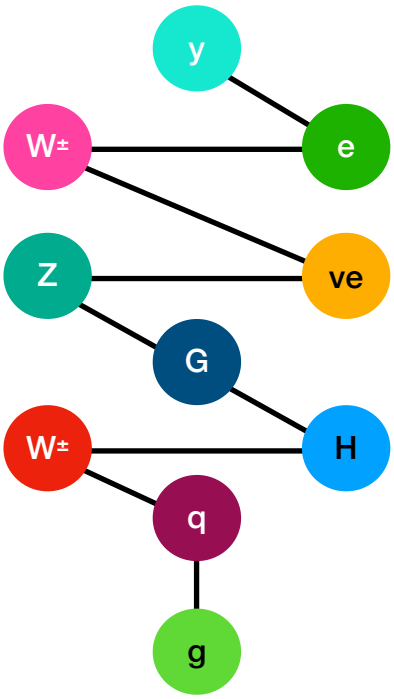

Fig 6: Line diagram showing the particles and their interactions

The savvy amongst you will no doubt recognise this, as the line diagram of the Tree of Life. But why should the 10 particles of the Standard Model fit inside a figure that was revered by Alchemists from the Middle Ages?

As we know, the Tree of Life was devised as a total system of magical thinking. Since its entire purpose was to be flexible enough to accommodate multiple complex systems, it is perhaps not so surprising that it could incorporate the elementary particles of the Standard Model also.

This diagram (Fig. 6) attempts to show the forces and the sphere of their particle interactions. So, for instance, the electromagnetic force (depicted as the photon 'y') interacts with the electron (e), but not with the Weak Force ($W^{\pm}$). The Weak Force (on the other hand) interacts with both the neutrino (Ve) and the electrons.

There are, of course, numerous ways to arrange this information, especially when we can expand the W-bosons in a variety of directions and permutations. So, how do we know if we have the right permutation? And what does that even mean in this context?

Fig 7: Table

Index	Dim	Polytope	Particle
1	[0, 1, 2]	Chamfered 4-Cube	Photon
2	[0, 1, 3]	Chamfered 4-Cube	Electron
3	[0, 1, 4]	Compound C4-C	$W^{\pm}$ Boson
4	[0, 2, 3]	Chamfered 4-Cube	Neutrino
5	[0, 2, 4]	Compound C4-C	Z Boson
6	[1, 2, 3]	Chamfered 4-Cube	Graviton
7	[1, 2, 4]	Chamfered 4-Cube	Higgs
8	[0, 3, 4]	Compound C4-C	$W^{\pm}$ Boson
9	[1, 3, 4]	Chamfered 4-Cube	Quarks
10	[2, 3, 4]	Chamfered 4-Cube	Gluon

It seems reasonable, when attempting to assign particles to the 10 interior vertices of the 5-cube that we assign them to the 10 C4-C faces of the Chamfered graviton also. The order in which we assign them is at least somewhat important, and is based on the mutual relationships (or lack thereof) between the bosons and the fermions, as laid out in the Tree of Life diagram (Fig 6). Since we are doing that, it seems even more reasonable to put them in the same table, as the C4-C tesseract faces and match them up with the projections (See Fig. 7).

When done, we notice that the W and Z bosons line up with the Compound C4-Cs almost exactly. However, one of them appears to relate to the graviton. One way to fix this is to have the

Graviton switch places with the bright red W boson (See Fig. 6), but this fowls up our interaction between the W boson and the quarks, which is important.

A better way to deal with this problem is to instead shift the Compound C4-C to the position of the red W-boson. When we do this, we notice a series of interesting correspondences. For one, the coordinates of the three Compound C4-C projective planes are [0, 1, 4], [0, 2, 4] and [0, 3, 4]. This is a highly periodic sequence. More importantly, however, is their index value. Notice that it goes; 3, 5, 8. These are the 4th, 5th and 6th terms of the Fibonacci sequence again.

In honour of the alchemists of old, I will attempt to relate aspects of the above information in a code befitting their own;

> *They built the tower in a mountain underground and then removed the clay around it to reveal the shining bronze edifice. 3, 10. The number of people that ascend the tower. Finally, 72 soldiers go up the tower and one other.*

Since we expanded the 3 W and Z bosons, in order to make the particles of the SM fit with the Tree of Life, it stands to reason that we can collapse them back down again. When we do this we arrive at the figure on the left (see Fig. 8). This looks somewhat chaotic, until we rearrange it into the figure on the right. This figure is known as a Claw graph.

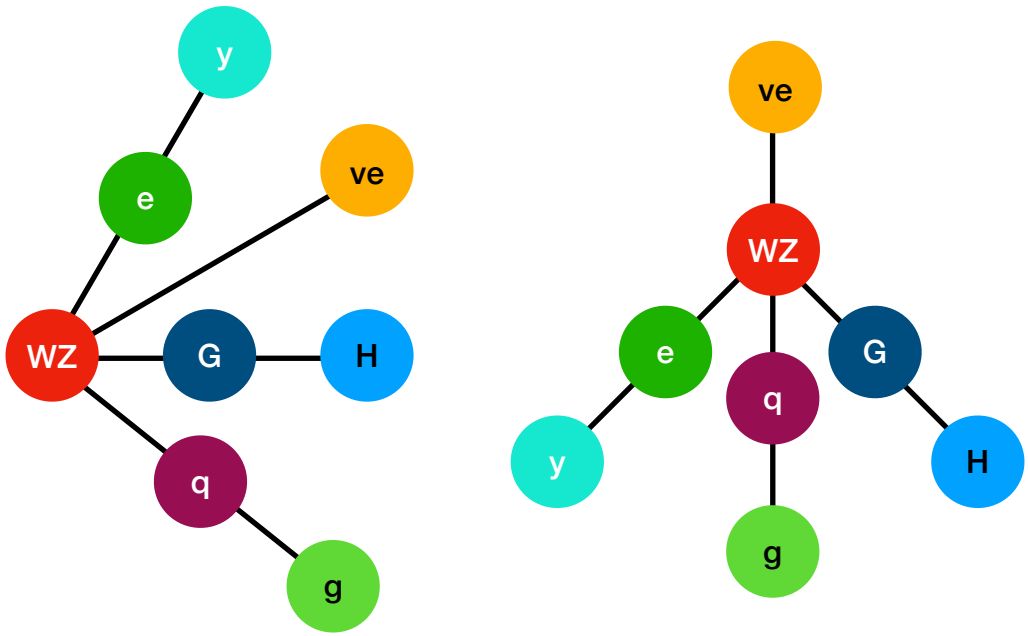

Fig 8: Collapsing the W and Z bosons back down produces a Claw-graph

This tells us that the Tree of Life is hiding its Claw-like nature and that it is in fact, a Claw Graph in disguise. The Tree of Life diagram itself must therefore be a claw-free graph — as

otherwise there would be no need for the subterfuge. We can prove this easily enough by showing that 22 =/= 10-1. Claw-free graphs are used to find the solutions to the Maximum Weight Stable Set (MWS) Problem. [10] Now that we understand and recognise the Tree of Life, as a claw-free graph, we can apply some of these rules and ask; What is the Maximal Independent Set of the Tree of Life? When we do this, we might find interesting correlations of particles.

For example, the two maximally independent sets of Fig 8 are:

{ve, e, q, G} and {y, W/Z, g, H}

which nicely divides the bosons from the leptons, with the exception of G. We know from the DGO Standard Model that G is a boson, whereas the Higgs is a boson with a fermion structure. Therefore, the maximal independent sets, should run: {ve, e, q, H} and {y, WZ, g, G}, which implies that G and H need to be switched in our graphic, or that G has some greater affinity with the matter particles, than with the bosons.

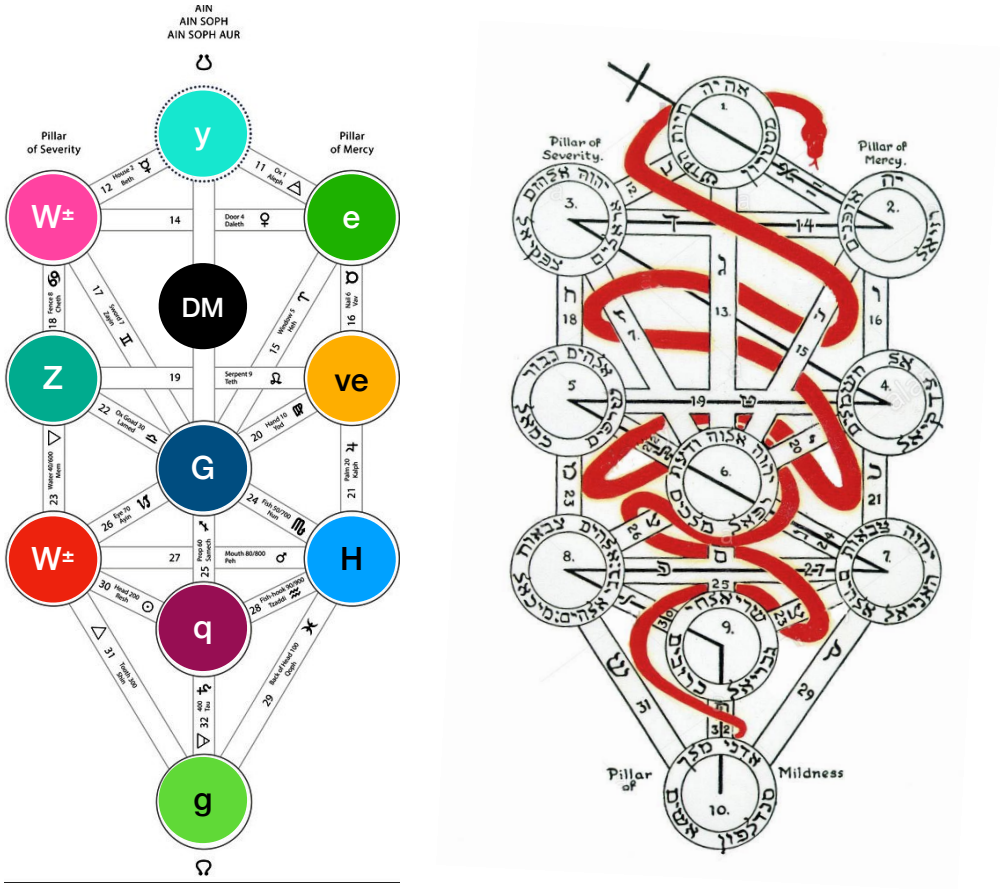

Fig 9: The 10 particles in the Tree of Life diagram (left). The Golden Dawn Tree of Life (right).

Notice that because the Tree of Life is a mesh network, it would have been impossible to simply arrange the particles into the form without some kind of guiding principle. This guiding principle came about from the projective plane of the 5-D Chamfered Cube and the line diagram in

Fig 6. The inspiration for the latter came from the Golden Dawn version of the Tree of Life (Fig. 9: right). In this version, a Christian cross is seen zig-zagging through the sephiroth like a lightning bold. This gives the correct linear order for the particles.

However, once the other 22 paths are in place (See Fig. 9: left) this order vanishes. Now, we can move from the W boson to the photon and back again without any issue. This is a problem from the point of view of the hierarchy laid out in Fig. 5 Venn diagram. At lower energy levels, the electromagnetic and weak force aren't connected to one another, but at higher energies they unify into what is known as the 'electro-weak force'. This implies that the Tree of Life diagram is expressive of a high energy unification schema.

But there is a big difference between unifying the fundamental forces with mathematics and simply drawing some connective lines on a page and claiming unification has been achieved. Besides, the whole point of drawing a correspondence between the Tree of Life and the DGO was to get a better understanding of the 22 dimensional space surrounding each of them. From the DGO perspective, these 22 dimensions alternate from imaginary to real numbered dimensions and back again and have a Fibonacci like structure. But, it is difficult to see how to relate each of these dimensions to the connective lattice of the Tree of Life.

1	1	1	i	i
i	1	1	1	i
i	i	1	1	1
i	i	i	1	i
1	1	1	1	1
1	1	1	1	i
1	1	1	i	i
1	1	i	i	i
1	i	i	i	i
i	i	i	i	i

Fig 10: Dimensionality and the Fibonacci sequence

A clue is provided by the snake in Fig 9, which shows you the correct path to take when navigating the dimensions, but it isn't really a huge help, because all of the paths are numbered to begin with.

Originally, I had misinterpreted the significance of the number 22 and applied it to the number of columns (i.e. distinct particles) in the DGO Standard Model. This caused me to include a

second generation of Gravitons and Higgs particles. [1] Removing these means that we have 20 unique particles (excluding the 6 quasiparticles of the anyons). This, as it happens, pairs up quite well with the SO(10) divided by SU(5), or 20 dimensions which results from the current Representational Model of Theoretical Physics. [7]

Another seeming difficulty comes with the 11th Sephiroth Daath. There are only 10 particles in the Standard Model set, so where is this 11th particle coming from? The Daath Sephiroth is also called 'the Void'. This is because none of the other Sephiroth or pathways really interact with it, except for the pathway that joins Gravity (Tiphareth) to the Photons (Crown/Kether). So, we are looking for an 11th state of matter that doesn't interact with any of the other particles except maybe indirectly via gravity and light.

The obvious conclusion is that the 11th Sephiroth is referring to Dark Matter (DM).

This was something of a revelation to me, as I was questioning the validity of Dark Matter, believing that Modified Gravity or some other electro-gravitic theory might explain anomalous activity observed in the rotations of galaxies better. Since the time of this discovery in the Tree of Life, I have found Dark Matter in several other systems including the 4DRD Standard Model and in the Sedenion Extended Standard Model, which no leads me to believe that Dark Matter is an unavoidable component of the Universe. [8, 9]

And I am quite happy that this is the case and that this is true.

It is precisely because of this correspondence between gravity, photons and Dark Matter that I am hesitant to take the advice of the Maximal Independent Sets and switch the Higgs with the graviton. Then again, this might be an option, if we were to say that the graviton operates through the Higgs, as per the relationship in Fig. 6. Or if the two particles are in some kind of superposition.

Conclusion

There are 3 anomalous polychorons in the 5-dimensional chamfered cube of the graviton; making a 7-3 split in the graviton. The vertex-first projection of a 5-cube creates a rhombic icosahedron envelope with 22 vertices and 10 interior angles, which corresponds to the 22 Fibonacci dimensions of the DGO and the 10 sets of particles in the Standard Model, as well as to the Sephiroth and pathways present in the Tree of Life. Therefore, it is safe to place the particles inside the Sephiroth. There are 10! (or 3,628,800) ways to do this. Applying what we already know about the particle interactions, the relationship of the particles to the 5-dimensional chamfered cube, and the structure of Tree of Life, we can reliably place the particles into their correct positions. This, in turn, leaves an 11th Sephiroth free into which we can drop all of the Dark Matter particles.

References

[1] ‘THE HIGGS BOSON & THE GRAVITON’, DOI: 10.13140/RG.2.2.13242.21443, Christopher C. O’Neill, https://www.researchgate.net/publication/348305308_THE_HIGGS_BOSON_THE_GRAVITON

[2] https://en.wikipedia.org/wiki/Chamfer_(geometry)

[3] https://en.wikipedia.org/wiki/5-cube

[4] ‘ELECTRO-MAGNETIC INTERACTIONS OF LEPTONS’, DOI: 10.13140/RG.2.2.14919.93604, Christopher C. O’Neill, https://www.researchgate.net/publication/348305211_ELECTRO-MAGNETIC_INTERACTIONS_OF_LEPTONS

[5] https://en.wikipedia.org/wiki/Creation_and_annihilation_operators

[6] ‘THE GRAVITON AS 5D CHAMFERED CUBE’, Christopher C. O’Neill, https://www.researchgate.net/publication/348355596_THE_GRAVITON_AS_5D_CHAMFERED_CUBE

[7] “Toward the Unification of Physics and Number Theory”, DOI: 10.1142/S2424942419500038, Klee Irwin, https://www.researchgate.net/publication/314209738_Toward_the_Unification_of_Physics_and_Number_Theory

[8] ‘POLYHEDRAL PARTICLE INTERACTION PATHS & DARK MATTER’, DOI: 10.13140/RG.2.2.19605.76002, Christopher C. O’Neill, https://www.researchgate.net/publication/348336433_POLYHEDRAL_PARTICLE_INTERACTION_PATHS_DARK_MATTER

[9] ’OCTONIONS, THE THREE FLAVOURS OF MATTER & A NEW KIND OF SUPER-SYMMETRY V. 2’, DOI: 10.13140/RG.2.2.26663.98727, Christopher C. O’Neill, https://www.researchgate.net/publication/348305661_OCTONIONS_THE_THREE_FLAVOURS_OF_MATTER_A_NEW_KIND_OF_SUPER-SYMMETRY

[10] https://en.wikipedia.org/wiki/Maximal_independent_set

[11] ‘DIMENSIONALITY, FIBONACCI NUMBERS & QUANTUM PHYSICS Version 2’, DOI: 10.13140/RG.2.2.27468.44164, Christopher C. O’Neill, https://www.researchgate.net/publication/348550219_DIMENSIONALITY_FIBONACCI_NUMBERS_QUANTUM_PHYSICS_Version_2