

The Fractal-Holographic Universe



Nassim Hamein's life long investigation into the geometry of space has led to his recent publication of several scientific papers in which he presents a new solution to Einstein's field equations and the mechanics of universal forces. The theory incorporates both *holographic* and *fractal* principles and has accordingly been named the "Holo fractographic Universe", or simply "Fractal-Holographic Universe".

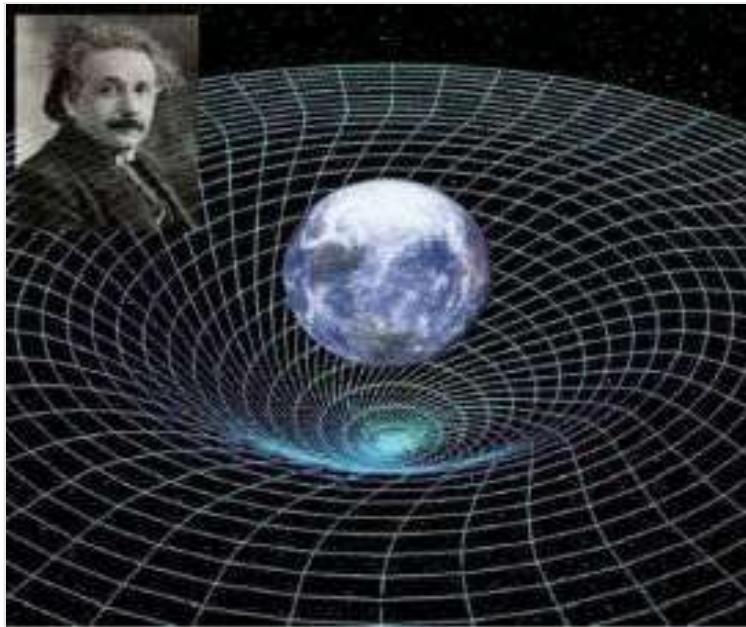
Hamein's model seems to achieve what no previous model has, namely the unification of physics across the micro- and macro-cosmic scale. Throughout the history of physics this has been a holy grail; to integrate the universal force of Gravitation with the complex workings of the quantum world. Whereas earlier attempts have fell short, producing overly complex patchworks of mathematics, Hamein's model seems to master the task in a simple stroke; with a few crucial modifications to conventional models a simplified, elegant understanding of the fundamental mechanics of our universe is achieved. And, as expected of a true Grand Unification Theory, the integration promises to unite the many branches of Science under a common tree, inviting us to reconsider them from this new perspective. For more information and updates from Hamein and The Resonance Project Foundation, visit [The Resonance Project web site](#).

Here we'll take a closer look at the theoretical framework of the Fractal-Holographic Universe:

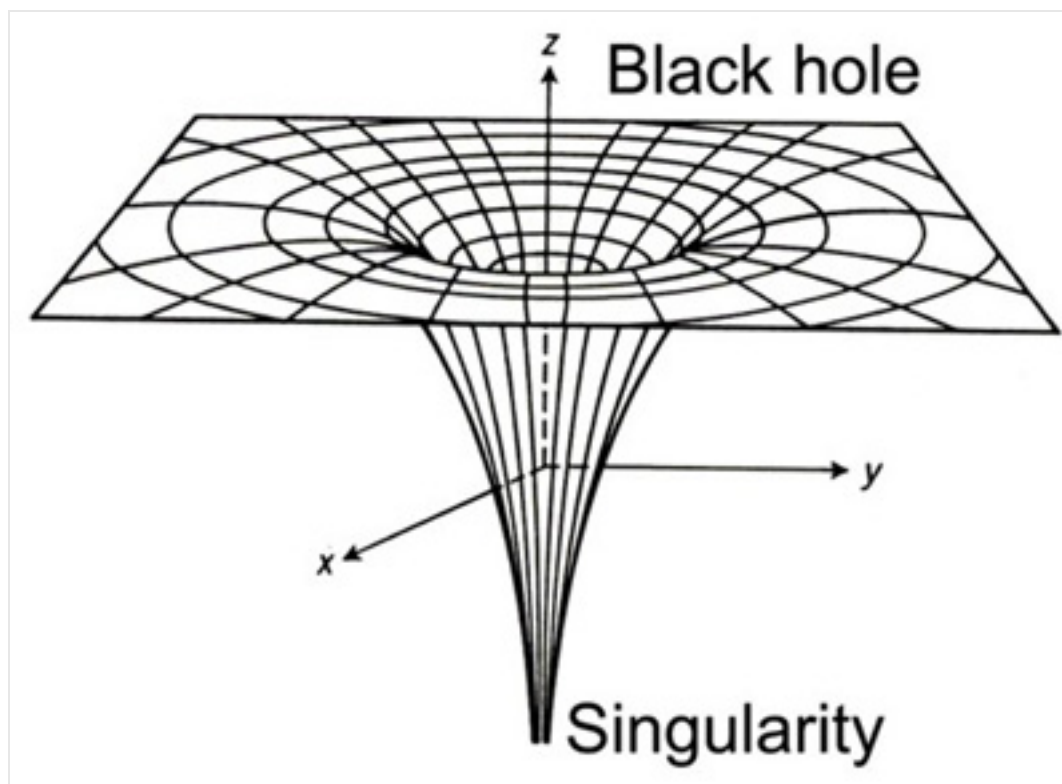


The Spacetime Continuum

Albert Einstein was the first to discover that space and time is weaved together in a seamless continuum, permeating the universe. His equations revealed that this fabric of reality may stretch and bend in the presence of matter or energy. To give a mental image, this flexibility of space generates a geometric structure in space-time comparable to the surface of a trampoline, in which the presence of matter/energy produces curvature attracting other objects on its surface, forcing them to orbit or fall inwards. However, Einstein's equations also predicted the presence of *infinite* curvatures in the space-time manifold. In other words: they predicted black holes. This proposition was a radical one in his time and few believed these



exotic objects would ever be found. Yet today evidence suggests that black holes are common features of our universe; observations have confirmed them ubiquitously in various sizes, from smaller stellar systems to super-massive ones, centering galaxies. So what exactly are these “black holes”?

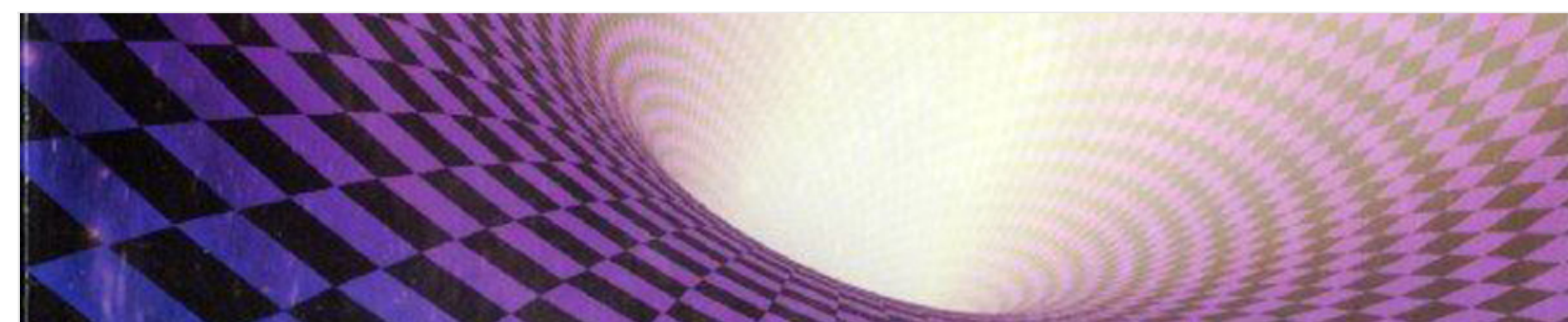
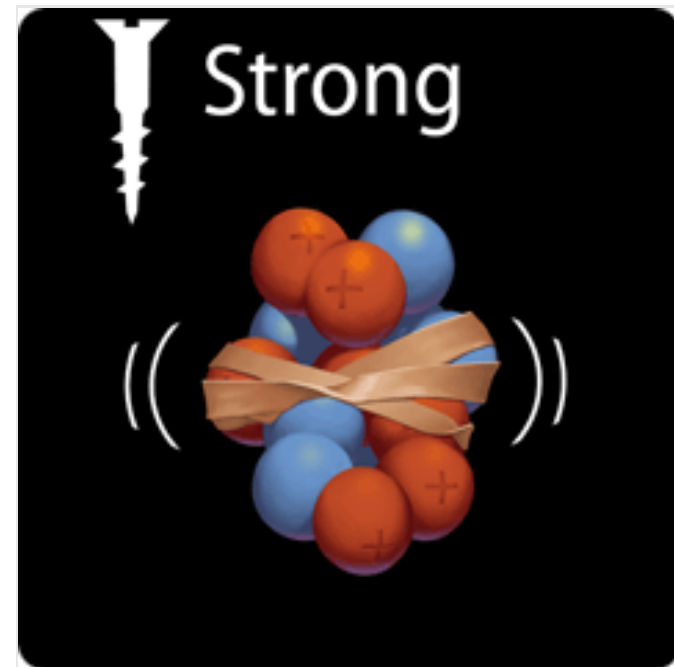


A black hole is normally thought of as a massive object (i.e. a star) which has collapsed under its own gravitational force, creating a “hole” in the space-time continuum; a gravitational well in the fabric of space with *infinite* curvature. Such a curvature is theorized to produce *zero* volume with *infinite* density at its core, a phenomenon known as a “singularity”. In a singularity the known laws of physics break down as the normal rules of our familiar three-dimensional space no longer holds. Here mathematical quantities used to measure Gravity increase to infinity, making concrete physics difficult to formulate. It’s generally understood that explaining physics under these conditions requires an understanding in which all the universal forces (of Gravity, Electromagnetic, Strong and Weak force) are unified. And this is indeed the main problem barring unification at this time: explaining the large-scale laws of Gravity under the same set of laws as Electromagnetism and the sub-atomic workings of Quantum Mechanics. In the singularity these problems all seem to come together.

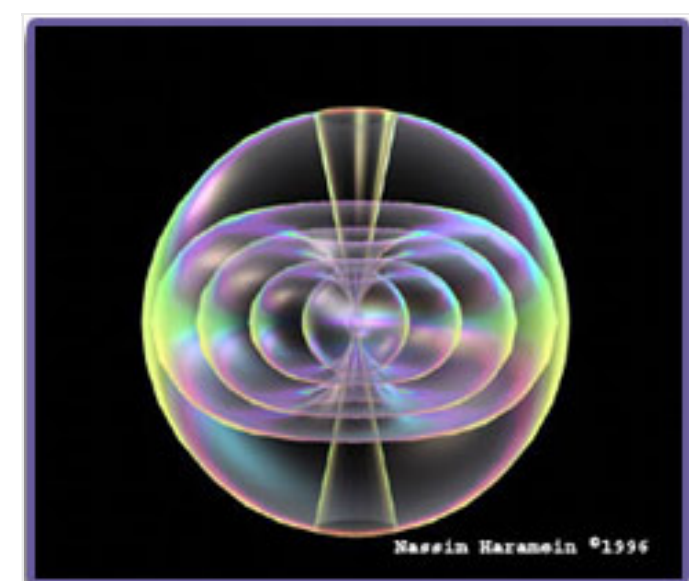
God does not play dice!

Einstein himself (among others) was convinced that a correct understanding of the space-time manifold

would account for *all* phenomena in space, uniformly across the boundary between the microscopic and the macroscopic world. Yet the physicists of his time were producing mathematical theorems in which the quantum world was given many strange properties, which would never apply to the large-scale cosmos. Among these was the famous “uncertainty principle”, which stated that a position and speed of a particle can never be simultaneously known. Others were the invention of the “Strong” and “Weak” force to explain how the nuclei of atoms stick together. Suffice to say, Einstein never liked the emerging science of quantum mechanics, because it gave mathematical descriptions of quantum effects yet never explained any fundamental mechanics causing these characteristics to arise. The physics community were in a position where they were required to take certain qualities as a given, without giving an appropriate explanation for their presence. This diametrically opposed Einstein’s vision of a model wherein all phenomena of the universe could be understood through causal, deterministic processes. This crucial crossroads led the rapidly evolving field of theoretical physics down a path in which the underlying causes of a variety of different phenomena was never addressed, and thus the field of quantum physics became riddled with uncertainty. Einstein’s discontent with the situation is reflected in his famous statement, “God does not play dice!”.



The Dual Torus Manifold

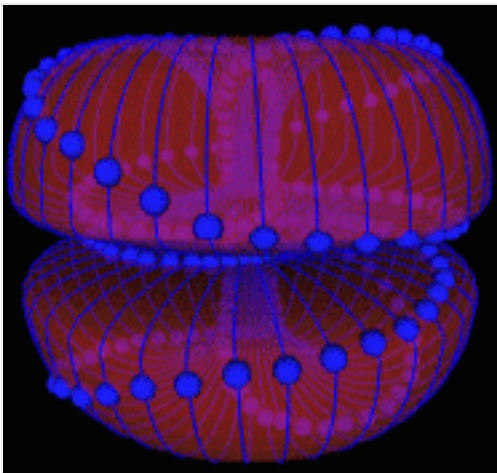


This discrepancy between physics and scientific reason has not been lost on everyone. Throughout modern history several prominent figures voiced their dissatisfaction with the axioms of Quantum Mechanics. Among them is Nassim Haramein who already as a child had a hard time incorporating the ideas peddled in his geometry class. In the end his logic reasoning led him to produce a beautiful solution to the problem of dealing with the physics of singularity...

In many ways Haramein’s model continues where Einstein left off, and explains both Gravity *and* Electromagnetism as mechanical functions of space-time geometry. In the fractal-holographic model black holes are not exotic objects, but rather represent an *intrinsic* feature of the universe itself. It’s not that collapsing stars *create* black holes, rather space-time itself naturally curves towards infinity and zero volume always – and at all points. This may seem like a radical statement but actually it reflects the original scenario created by Einstein’s field equations: the presence of even one singularity with infinite curvature automatically implies that all other points of the continuum belongs to that extreme curve, hence the word’s etymological root, “singular”, meaning *single* - there is only one.



But commonly it is believed that information/energy disappears *forever* once caught within this curve. No known mechanism brings that information back out. However, the holofractographic model revises this understanding with a modified topology of space-time which allows information to both implode *and* expand from the singularity state. Rather than being a one-way ticket to nowhere, black holes are both radiating objects *as well* as imploding “holes”. This is made possible with just a little twist to Einstein’s space-time manifold:



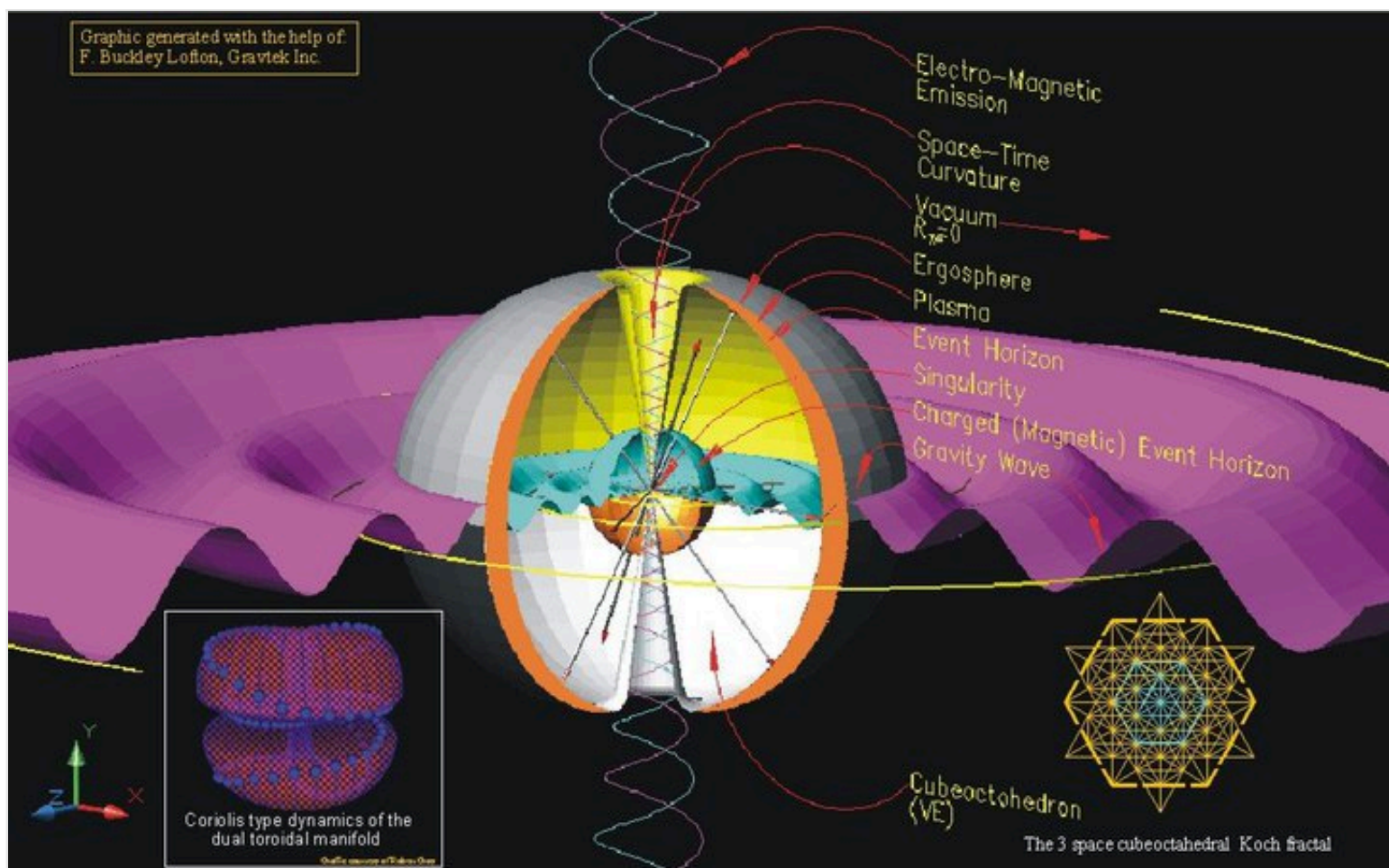
The dual torus manifold

In this model the universal topology of space-time (which equates “black holes”) is described as a rotating double torus which is expanding and contracting on itself endlessly. Notice in the animation that as space-time curves towards the centering singularity, it also *curls* like in a whirlpool. Instead of the analogy of a trampoline, this curling motion generates a geometrization of space-time in which the curvature is comparable to the surface tension of water running down a drain. This natural rotation of the space-time

manifold is the *mechanical* source of *spin* at all levels, from atoms to planets, stars, galaxies and so on. Objects are forced to spin because space-time itself curls. As it curves towards singularity, this curling motion approaches the speed of light, generating enormous centrifugal forces which in turn creates *expansion*. The expanding space is finally overcome by the curvature of space and contracts back towards the center only to repeat the process again. This continuous cycle of implosion and expansion produce the forces of nature known as Gravitation and Electromagnetism. The gravitational field is generated as space-time curves towards the center of the system, and electromagnetic radiation is produced when centrifugal forces near the center forces it to expand or *radiate*. Electromagnetic radiation is thus mechanically connected to space-time curvature (Gravity) and spin.

Previously the source of spin in the universe remained unaddressed and objects were thought to spin perpetually in space due to an initial momentum gained in the Big Bang. Neither could we account for the force of electromagnetic radiation as functions of the space-time manifold. But this beautifully simple twist to Einstein's field equations generates an entirely new picture which not only accounts for, but *binds together*, the forces of spin, electromagnetic radiation *and* gravity, all in one elegant topology of space. If Einstein was still alive he would most certainly applaud this amendment!

“Einstein’s general relativity theory, though profoundly beautiful, is likely to be amended. That amendment will somehow entangle spin and rotation” – Nobel laureate C.N Yang



The Event Horizon and the Black Hole

In a fractal-holographic universe, all things can be understood as “black holes”. All things are centered by

singularity; atoms, planets, stars, galactic nuclei, quasars, universes and even biological cells can actually be understood as black hole-type structures, or singularities, of various sizes. To better understand this perspective, we must look deeper into the black hole dynamics. Here we learn how the universal topology of the rotating dual torus actually generates the various structures we see in the cosmos, from atoms to planets, stars, galaxies and quasars and so on.



The expanding portion of a black hole takes the shape of a sphere and is called a “white hole”, describing its repulsive and radiating nature. The black hole then is actually a concentric black hole/white hole (also dubbed “black whole”), where the imploding black hole is *inside* the simultaneously expanding white hole. These radiating white holes, and the energy dynamics that occur around them, are what we perceive as atoms, stars, planets and such. At the center of the topology is the literal “hole”, the point where extreme curvature collapse towards infinite density, or singularity. At this point *all* forces in the space-time manifold meet in perfect symmetrical balance, creating thermal equilibrium and the appearance of a vacuum – absolute stillness – centering the system with a relative center of rotation, much like in the eye of a hurricane.

Surrounding the vacuum singularity is a spherical boundary named the *event horizon*. This boundary is created naturally where the force of Gravity and Electromagnetism (implosion/expansion) are exactly equal in strength. It is interesting to note that this balance of the fundamental forces was previously believed to be present only during the creation of the universe, at the Big Bang. At the event horizon, where the collapsing geometry and electromagnetic radiation are equal, a constant energy transfer happens between the infinite potential of the vacuum and electromagnetic information – which implies continuous creation at the event horizon of black holes. In simple terms, energy pulsates into and out from the black hole, creating a feed-back loop of information transfer between infinite potential and finite form.

Not only does is the idea philosophically and spiritually appealing, but it’s a concrete and precise

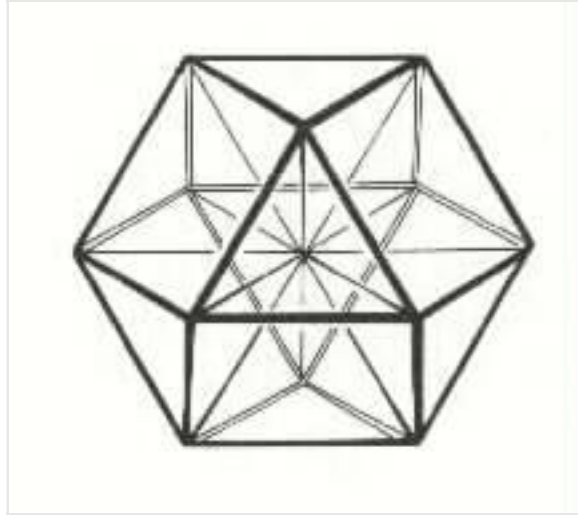
representation of the actual dynamics taking place. The model implies that Creation happens continuously – here and now – at the boundaries of all black holes, at an internal balance point with infinite potential, and not in some miraculous moment of the distant past. This picture echoes the spiritual understanding held by the worlds wisdom-traditions of Man as a limited being with inherent divinity, in quite the literal sense that all people in has infinite potential within their own form.



The Vacuum Singularity

Empty space – vacuum – is unique in the sense that it is everywhere. It fills the space between quarks, protons and electrons, as well as planets, galaxies and the universe itself. The vacuum constitutes 99.99999% of the atom and thus we can safely assume that everything we see around us for the most part is empty space – nothingness. Naturally, the vacuum has been a source of fascination among philosophers and physicists for millennia as it represents the canvas of Reality. When scientists of our modern time approached this “canvas” theoretically, with the terminology of mathematics and physics, they found that it holds a vast energy potential. Fluctuations in the vacuum may actually fill a defined volume of space with infinitely finer and finer degrees of vibration, and all vibrating fields considered, the vacuum must be said to possess absolute energy. In that sense infinity has been proven both in mathematical and relativistic terms; the Singularity and the quantum vacuum, but conventional physics still see no connection between them. In view of the fractal-holographic model however, we can understand our universe as the inside of a black hole – as a *singularity* – thus it naturally follows that its vacuum possesses infinite energy density as well. Thus the vacuum is a singularity. Let’s see how:

At the center of the torus topology we find the singularity, zero volume (or 0-dimension), the point where extreme space-time curvature balance out creating perfect vacuum. Here the space-time structure converges to minimum amount of vectors for stability, creating twelve converging lines of a cubeoctahedron. All forces balance out evenly in a complete equilibrium at this point, creating stillness and absolute zero degrees.



This makes the vacuum a perfectly stable, superconductive, superfluid medium with zero volume, infinite energy potential and non-local connectivity to all points of the universe. A Singularity in the truest sense of the word, and the only definition of the word giving meaning. Logically speaking we can not speak of singularity as confined to definite point in space or time. Once a singularity – always singularity everywhere – this is the inexorable rule from which modern physics is trying to wrestle away. Infinity is everywhere. As all curvature of space-time ends in singularity the spatial location of the outside radiating horizon is actually insignificant. No matter where the radiating event horizon (or white hole portion) of the black hole appears to be, the singularity is common to *all* black hole systems, regardless of size, regardless of spatial location in our – or any other universe . Although two mini-black hole atoms (or two humans) are separated by several light years, behind their event horizon they are one: the Cosmic Singularity connects all.

The vector equilibrium is the zero starting point for all happenings or nonhappenings; it is the empty theater and empty circus and empty Universe, ready to accommodate any act and any audience” - Buckminster Fuller

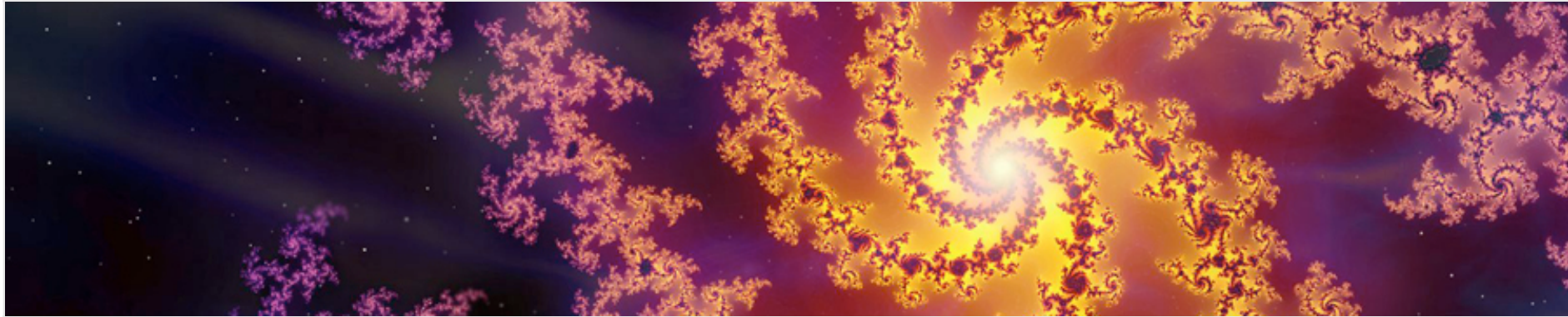


The Hyperdimensional Cubeoctahedron

The cuboctahedral structure of the vacuum singularity is hyperdimensional – beyond dimensional extension. That is; it constitutes concrete, geometrically defined parameters of pure potential without appearing in a physical sense. Thus the vacuum posses inexhaustible energy-potential yet resting in perfect equilibrium it does not make itself known through thermal radiation, temperature or distortion of space-time – as general relativity would predict – and thus it remains practically inaccessible and invisible

to us, much the same way as the density of water remains unnoticed by the fish in sea.

From a contemplative perspective, we may imagine this *geometry* as the expression of a metaphysical principle concerning the fact that Infinity itself necessarily exists in a state of total balance – equilibrium. And within this all-immersive equilibrium all gravity, radiation, temperature, pressure, thoughts, emotions – all dynamics – cancels out and leaves a perfect silence and unity, a complete metaphysical potential, non-existence and existence unified – a fullness which, in Buckminster Fuller’s words, surpass even the concept of oneness...

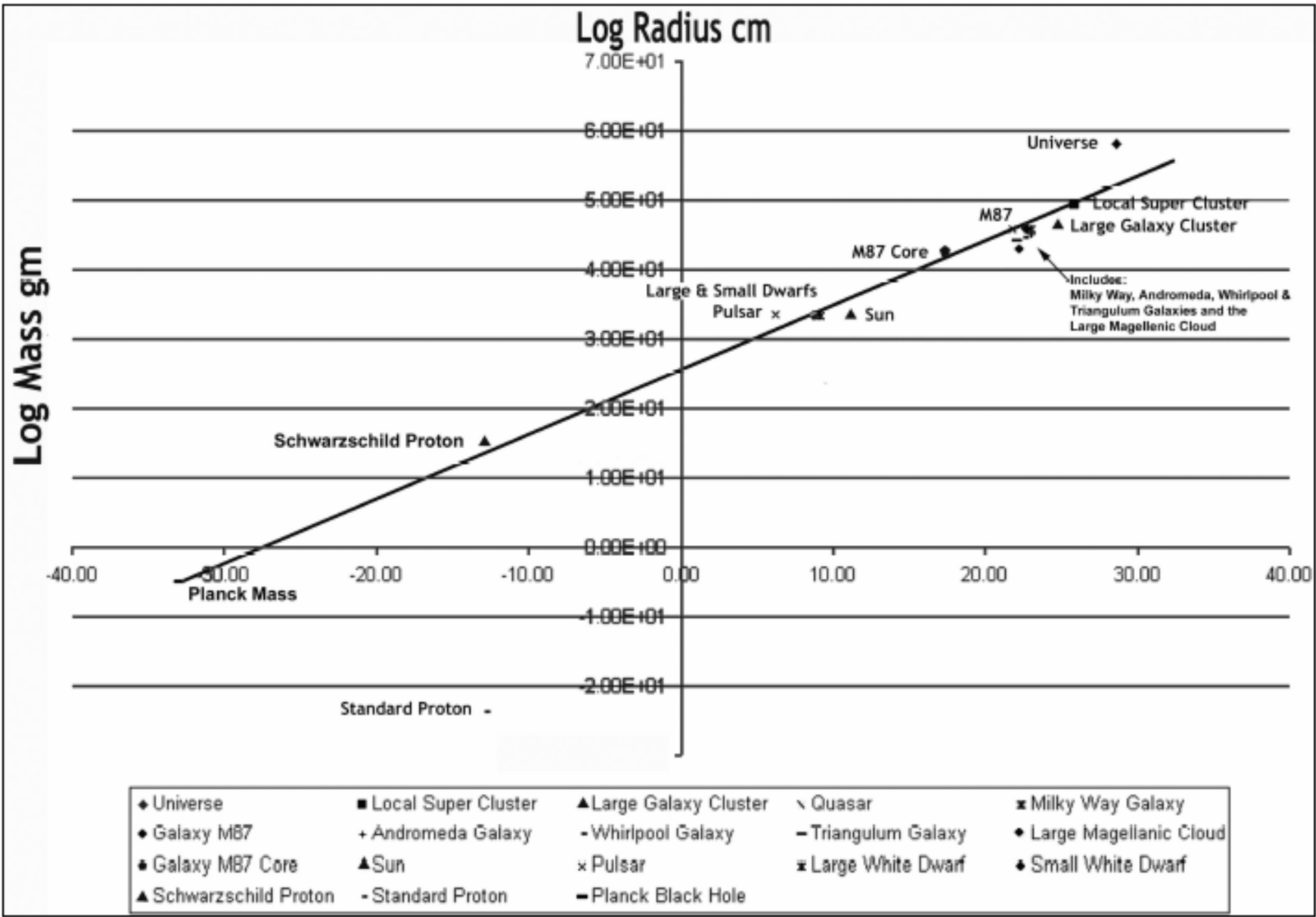


An Harmonic Cosmological Scale

We have seen how a continuous interaction between infinite and finite dimensionality creates visible manifestations and how the dual torus is the dynamics of this exchange. With this we’ve barely touched upon the holographic nature of the universe (for more on this read [Quantum Gravity and the Holographic mass](#)). Now we’ll take a closer look at how black holes arise in various orders of magnitude from micro- to macro-cosmic scale, and how the zero point vacuum grows into three-dimensional space. With this we move on to the *fractal* nature of the universe.

The fractal-holographic universe is composed of black holes – singularities – but if so it seems logically contradictory that things appear as separate and finite in form; as mentioned, the presence of even one singularity implies that everything else belongs to this curve. As such one would think that everything in the universe is a uniform, homogeneous porridge of energy. If reality is infinite how does infinity assume differentiated form? The key to this question lies in the meta-geometric characteristics of Infinity itself. As the vacuum energy potential naturally rests in a state of total balance there is perfect geometric equilibrium throughout all possible space. Paradoxically it is this very same balance that leads to differentiation, natural dimensioning of space and organization of matter.

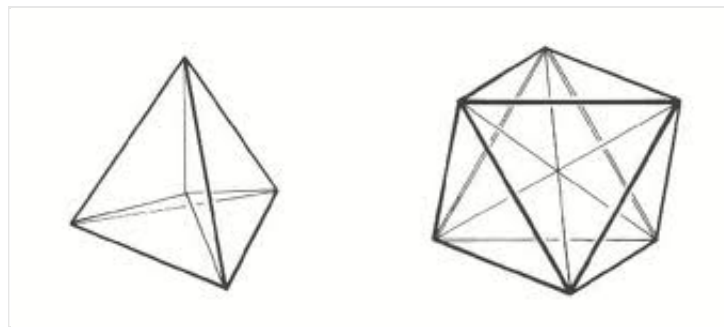
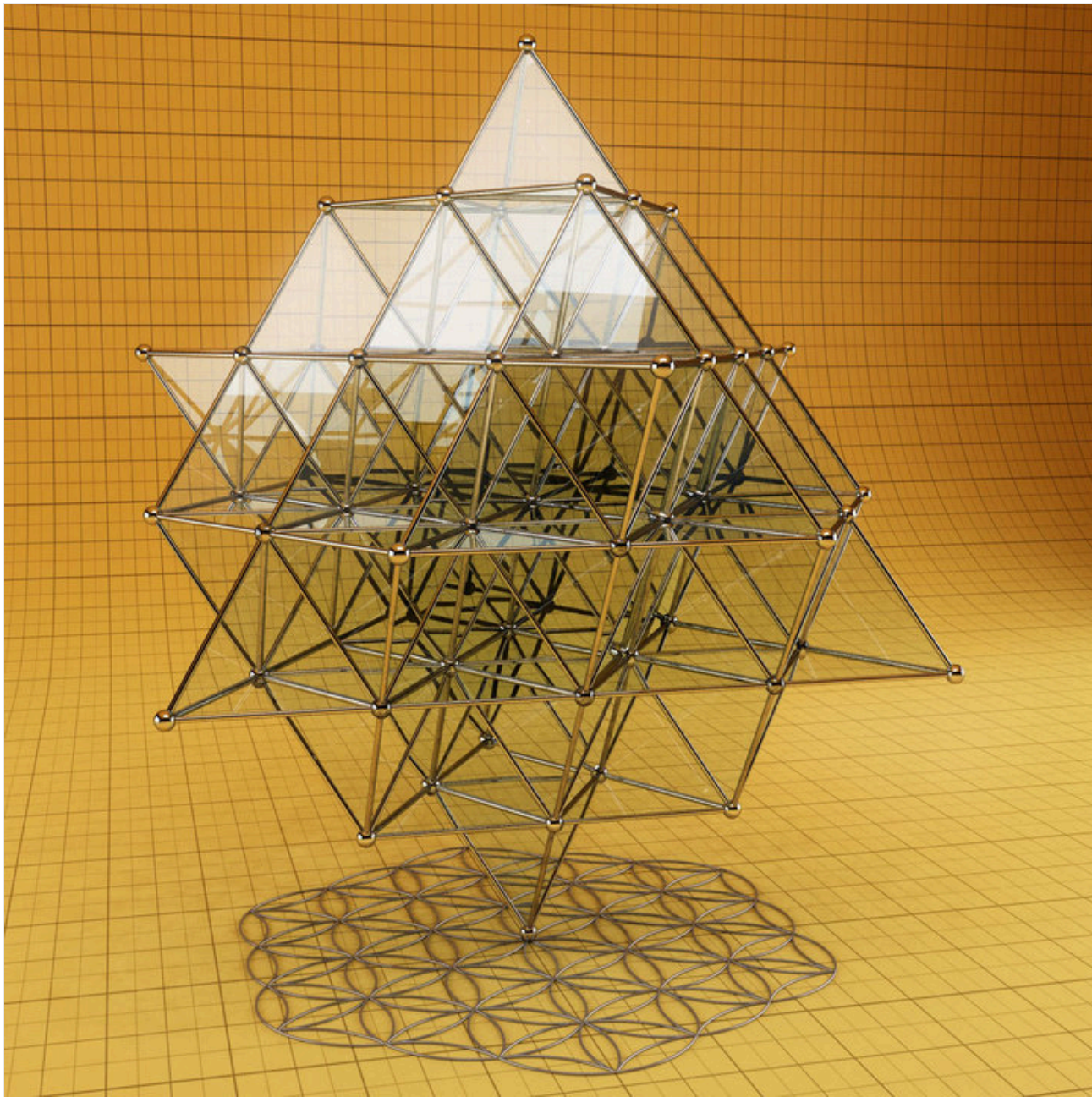
Haramain figured early in his logical reasoning that the universe must possess an underlying geometry. If everything can be understood as black holes of differing magnitude, there must be a defined structure that dictates the scale of these phenomena – from microscopic black hole atoms to macroscopic black hole universe. In collaboration with Elisabeth Rauscher, he collected data points on energy-levels and mass-values of various cosmic objects and plotted them on a graph.



This led to the “Scaling law” which demonstrates a linear relationship between the mass and geometric radius of objects in the universe across the boundary between micro-and macrocosm. The graph demonstrates a continuous, rhythmic pattern of dimensional scaling of astrophysical objects, and the way the system’s total mass is relates to the system’s radius. This finding is important, as it’s a first common denominator between Relativity and Quantum Mechanics. The graph reveals a repetitive pattern of division in the vacuum and implies that different cosmic objects – from atom to universe – can be seen as toroidal black hole-systems embedded within another, expressed in clearly defined dimensions of the space-time manifold.

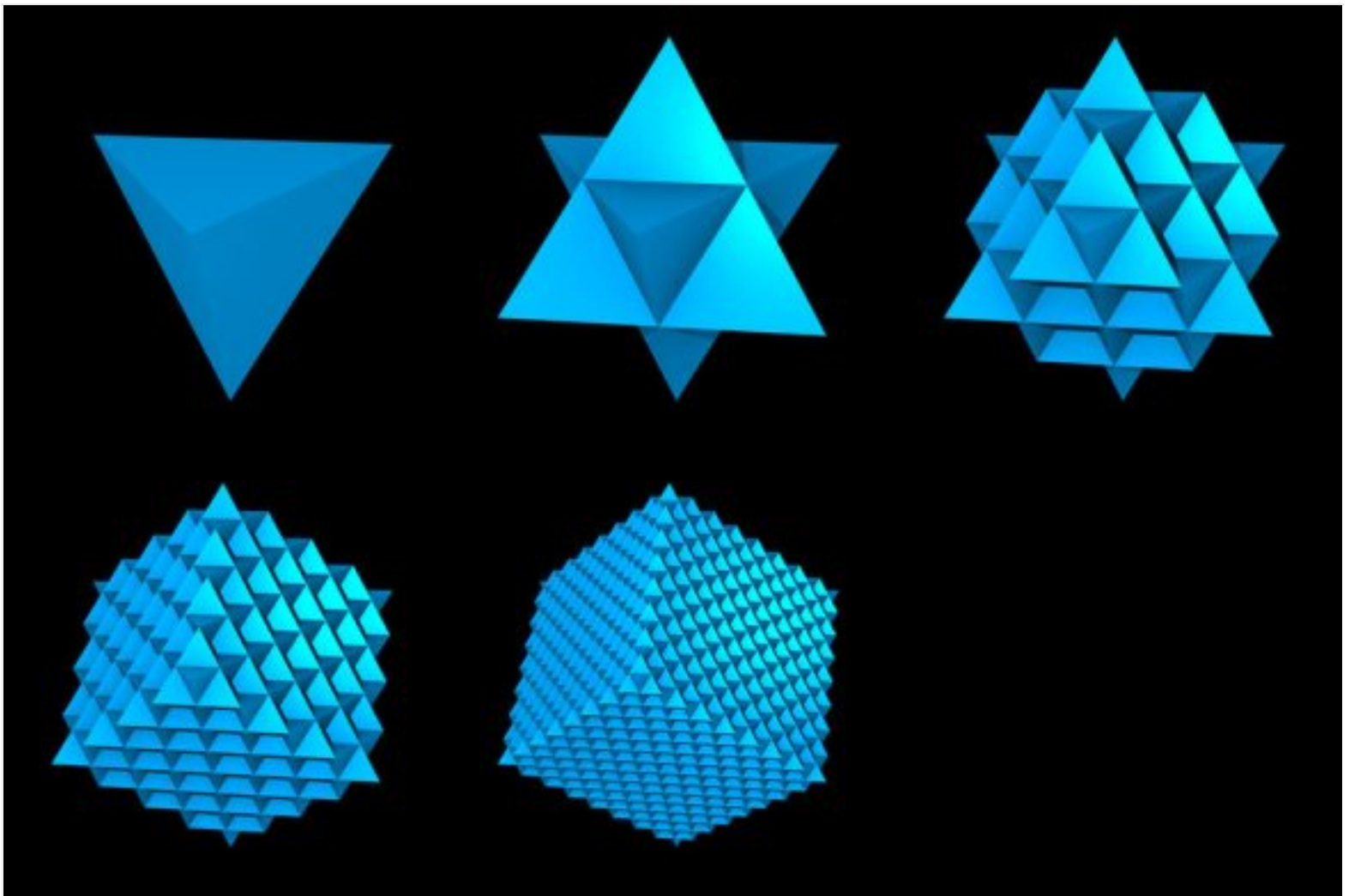
The geometry of the vacuum displays a recursive structure in the form of increasingly repetitive, embedded vector equilibriums, or cuboctahedra. As the vacuum rests in a state of perfect symmetry it can be divided into smaller and smaller parts without ever losing its balanced condition – the vector equilibrium is present at all levels. This ubiquitous state of balance can be described mathematically as a tetrahedral fractal where new vectors are generated continuously to achieve equilibrium throughout the vacuum medium. Hamein at last concluded that the vacuum geometry must take the form of a three-dimensional 64-tetrahedral vector matrix which creates recursive vector equilibriums, cuboctahedra, in

harmonically repeating intervals.



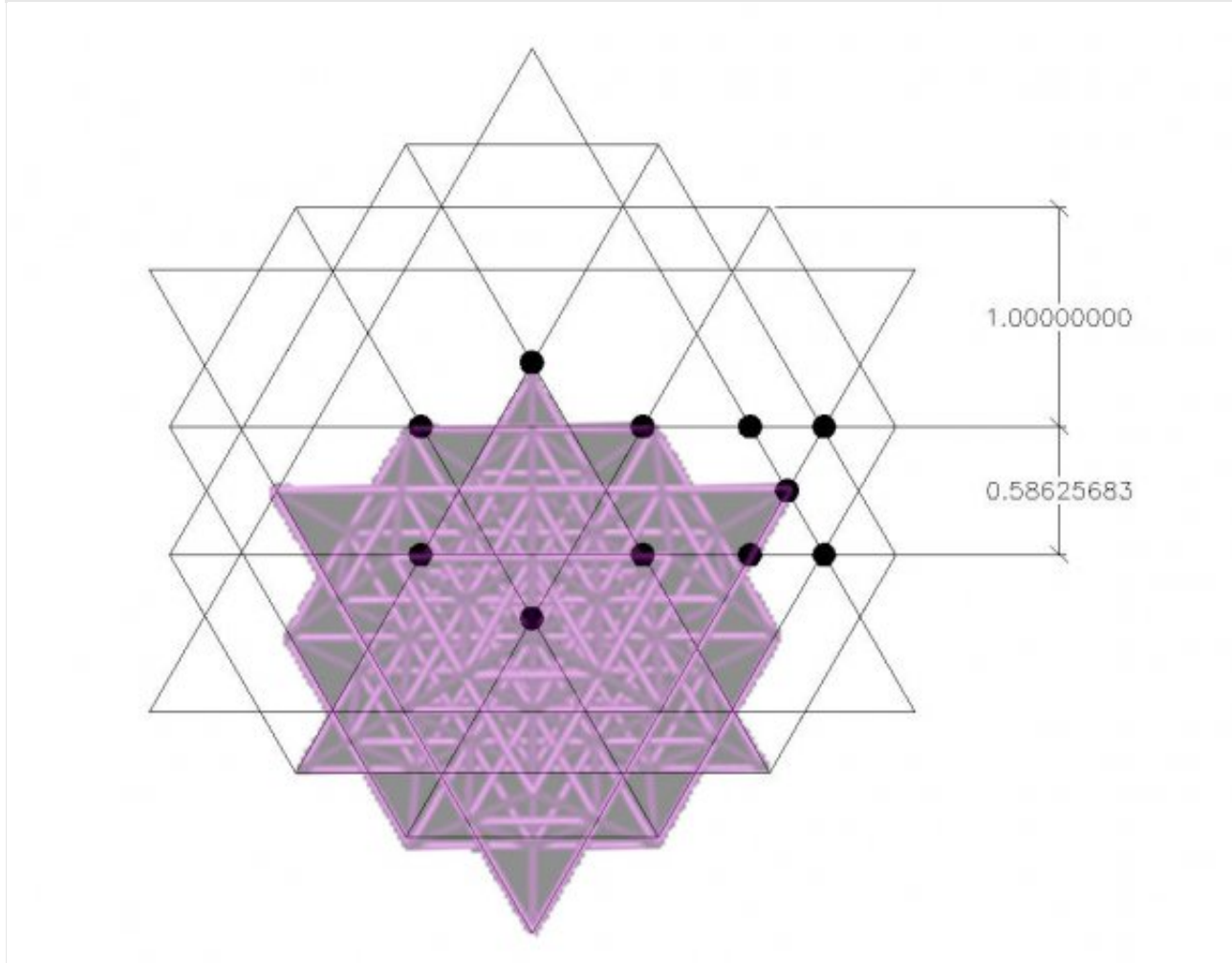
The 64 tetrahedron matrix consists of tetrahedrons and octahedrons. A tetrahedron is the smallest possible geometric volume and constitutes a basic form with minimal energy consumption vs. optimal structural stability.

This is possibly the only possible genuine three-dimensional fractal geometry and it is unique in the sense that it naturally creates vector equilibrium at harmonic intervals – this is the geometry of space. Moving towards the infinitely large or the infinitesimally small, the underlying matrix remains in structural equilibrium within its own scale. The picture below shows a tetrahedron and a polarized star tetrahedron, then we see the first three iterations of the fractal; its minimum size in the form of the 64 tetrahedron crystal, then 512 tetrahedron, then 1026 tetrahedron.



We can imagine the possibility of increasingly finer geometric resolutions of this structure through fractal recursion. To speak of size in this context is only meaningful when defining a position within the fractal from which we observe the other dimensions. Thus, paradoxically, it is the *absence* of volume that is the source of all spatial dimension – all dimensions arises as a natural consequence of the equilibrium of infinity. Spatial location is only an aspect of the whole system.

Zero volume and infinite potential can be expressed *mathematically* as a geometric fractal structuring the space-time manifold. The pattern repeats in harmonic intervals, or frequencies, creating natural dimensions of the vacuum that follows the golden ratio -Phi – which we find everywhere in Nature. The interval defines magnitudes of torus systems that organize matter naturally. (The video at the bottom of this page shows how the Phi-spiral relates to the vacuum geometry.)



Universal Torque

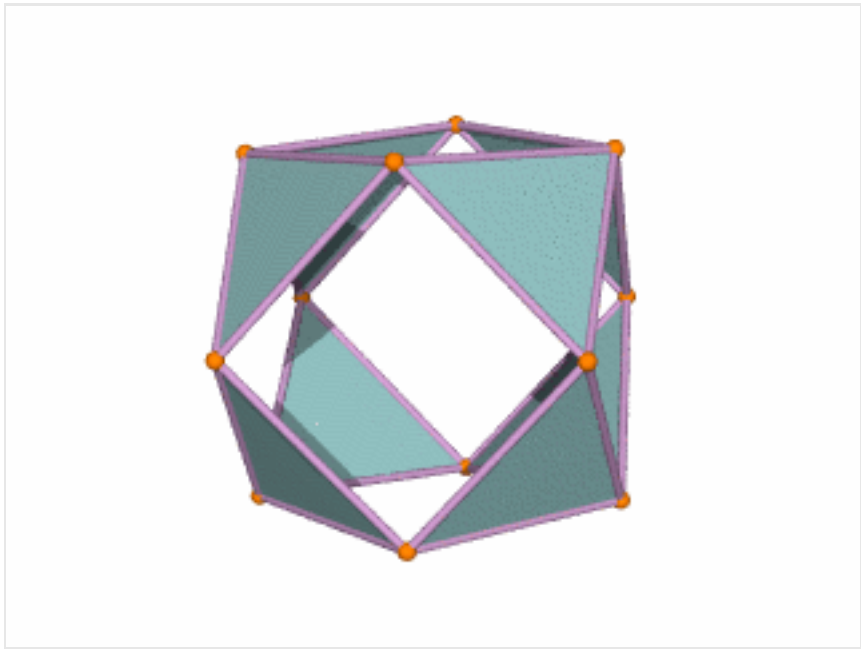
We have now explored two fundamental aspects of the universe; the dynamic aspect of energy in its toroidal form and the static aspect of energy as the vector equilibrium. Now we can see the syneregetic interactions between the two and how they together generate the field patterns we recognize as our material world.

Everything spins; from tiny atoms to giant galaxies, in their most elemental dynamic all things are in state of perpetual spin. In modern cosmology however there is currently no adequate explanation for the forces that cause universal rotation, and it is often believed that all things acquired a rotational moment in the Big Bang and has been spinning in a frictionless environment since then. The problem with this hypothesis is that the universe is in fact full of friction. Galaxies are full of stars, planets, plasma clouds, dust and gases but still they rotate at tremendous speed. In this model the toroidal topology of space-time is the source of all rotation – spacetime curves and *twirls* towards an infinitely small point, and forces objects to spin. But to understand the forces that *drive* this dynamic, we must look again at the underlying

fractal structure of the space-time manifold.



Studying the cubeoctahedral vacuum geometry we find that the vector equilibrium actually possess the ability to collapse when forced into rotation due to its structurally unstable quadratic surfaces (only triangles are structurally stable – see video on the bottom of this page). This *tensigrity* of the cubeoctahedron allows the vacuum-symmetry to “fall” out of balance and create pulsing torus-dynamics of expansion and contraction.



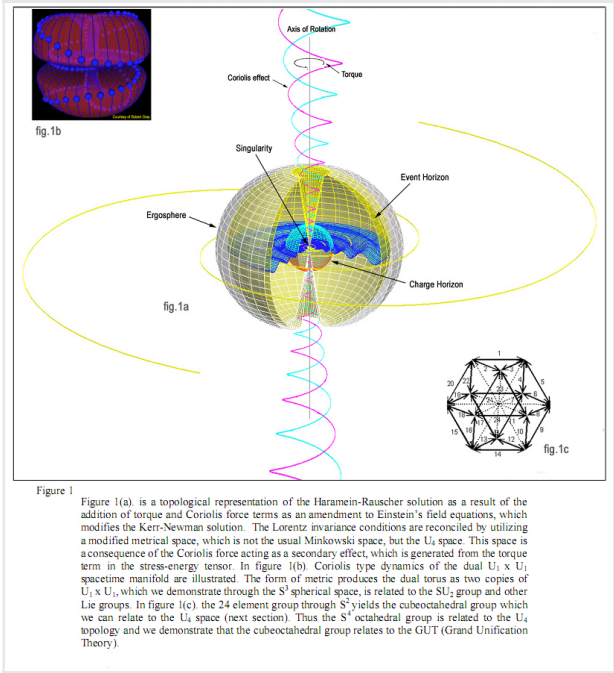
The vacuum energy is a sea of potential – pure nothingness. However, nothing remains nothing unless there is motion, unless there is disturbance of the vacuum symmetry which collapse infinite potential into

differentiated form. Through this collapse an extremely small amount of energy from the vacuum field enters a polarized spin dynamic, a toroidal topological entity, which appears as definite form and movement. The vacuum moves from being invisible, immeasurable potential to assuming a particulate and localized form – a photon, an atom, a man, a star, a galaxy, a universe. In reality it's only a tiny vortex in an endless ocean – Absolute energy in motion. Like the fish in the sea does not see the water until it's in motion, until a small twirling vortex makes it visible, differentiated and localized – yet, still, it remains only water. In the fractal holographic model every tiny little atom is a vortex in the vacuum medium and these vortices arise naturally as a consequence of the hyperdimensional geometry.

The geometrically balanced vector symmetry of the vacuum is crucial to understanding how the force of torque is applied to the space-time manifold. The density of vectors required to make symmetrical stability in the vacuum constantly increases in its infinite contraction towards the infinitesimal – the further in we go, the denser it gets. This creates a relative vacuum density gradients, from infinitely dense to infinitely un-dense, and it is these very differences that drive the toroidal dynamics at all scales, resulting in differentiation of the vacuum potential. This works in the same way that small differences in pressure and temperature in the weather system on earth can drive enormous hurricanes which carries large amounts of water. In the same manner a continuously collapsing fractal structure generates torque in the universe and organizes energy / matter in harmonic enclosed rotating toroidal systems – galaxies with billions of stars, suns with dozens of planets, atoms with electrons etc. The systems appear to us as atoms, creatures, star systems and galaxies but are in reality the same vacuum-singularity, the same energy, albeit in differentiated and localized form. All things come together and balance out through its opposite – balance meets imbalance, expansion meets contraction, infinity meets finitude – an eternally mystical dance.

Conclusion

In the end the unified view presents us with a world in which we are all united through a fractal geometry of spacetime, intrinsically connecting all things via the infinite vacuum medium. This fundamental understanding of reality truly promises to unite the countless fields of Human endeavor, from spiritual understanding to technological engineering, and lift them all to a completely new level. With this knowledge we may understand more deeply our communion with each other and with Nature, and develop technologies that utilize the primordial power of the Universe to lift our collective consciousness beyond the Earth and into the stars!





See how the vector equilibrium has structurally unstable quadratic surfaces which collapse when exposed to rotation:

See how the Phi-spiral relates to the cubeoctahedral vacuum-geometry:

