

The Meaning of Structure: The Structural Approach to Understanding Nature

Charles Donald "Don" Briddell

8002-A Dollyhyde Road, Mt. Airy, MD 21771

e-mail: donbriddell@fieldstructure.org; website: www.fieldstructure.org

Premise: The biggest obstacle to understanding what structure means is that we assume we know what structure means. Three physics dictionaries in my library have not considered structure worth defining. Evidently, the ubiquitous term is considered too obvious to be worthy of a definition. From my research into the meaning of structure, even the Oxford Dictionary's definition of structure is misleading. It gives three meanings, (1) the arrangement of and relations between the parts of something complex. (2) a building or other object constructed from several parts. (3) the quality of being well organized.

In Field Structure Theory, only the last definition (3) vaguely applies. This paper looks at the question of structure and determines that structure is not the arrangement or relations of the parts to the whole, but rather the ability of the whole to define, generate and give cause to parts. As a culture, we think about structure as a product of parts. This misconception carries forward into our thinking about physics. So much of physics is trying to establish form and structure of the whole by looking at the parts. That is like trying to understand a string by considering the knot. That which defines a knot does not define, in the least, the nature of the string. The string defines the knot, not the other way around. When the knot is untied, its arrangement and relations disappear. Not so with the string. Nothing can remove string-ness. What happens when we consider structure as the string and matter/energy as a being knots, is the discovery of what structure means. Example and models will be used throughout this exposition.

1. Introduction

Structure is one of those catchall terms everyone thinks they know perfectly well, but when questioned, have no clear definition they can articulate. Meanwhile, the whole of physics, the whole of about everything, is assumed to have structure. In fact, it is structure that everyone seeks to discover and yet never studies by itself. Where in universities are there courses on the theory and principles of structure as a science in its own right?

Presently, structure is always defined by the discipline in which it arises, never as a stand-alone discipline in its own right. Structure is taken for granted and therein lays the problem. And yet to tell someone they do not understand structure is an insult. Personally, when it dawned on me forty years ago that I had no idea what structure could mean, I was shaken to the core. Similarly moved, my roommate, Stanley Wysocki and I decide to do our senior thesis paper on the subject. Our work on "Form and Structure Theory" began by sweeping the table clean of preconceptions and starting at ground zero by going directly to Nature, not to any contrived human interpretation of structure.

First off it was obvious mathematics can only reveal its own structure. It can only speak for Nature to the extent the mathematician knows Nature's intent. Taking the structural approach is an attempt to allow Nature to speak for herself. This we did by building working structural models. Because the universe is three dimensional, the modeling has to be as well.

When asking, "what is structure", the typical response is to ask another question, "the structure of what?" This implies that structure has meaning only in relation to something else more tangible. Structure independent of form had no meaning. We are told to consider the form before we considered the structure. Form became the first consideration. I came to see that has to

change. By assuming structure to be causal and form is casual, changes everything.

2. The Constructs of Structure

Since we do not have a sufficiently broad sensory apparatus to see the very small (it moves too fast) or to comprehend the very large (it moves too slow), we are forced to conceptualize reality. We employ theory to do what our senses in a limited space and time cannot do. We require theory to explain what we cannot experience, but demand that the theory be confirmed our human scale of experience. Science permits speculation, but demands proof.

However, along comes quantum mechanics and this line of thought forced us to abandon our notions of what happens in our familiar human scale. We entered a world of paradoxes and accepted possibilities rather than insist upon certainties. Structure, in any deterministic sense, was abandoned and replaced with statistical probability mathematics. We began accepting that a detailed description of the world would only be a mathematical description. Physics quit talking about the world of the very small or very large in familiar human scale terms. The only rational that could go to these extremes of small and large and still be meaningful was mathematics. Math however, is a descriptive tool. It can describe, but cannot explain. It has had a few hundred years, thousands of people, millions of man hours, and billions of dollars and has failed to explain in causal terms how the universe actually works. The problem is systemic; the wrong tool has been used.

The tool that obeys natural law and cannot give wrong answers is nature herself. This may sound hedonistic to modern ears, but nature can speak for herself if permitted. How?

Humans naturally get their ideas about structure from their human (mencro) scale world of experience. If our misunderstanding about structure at our familiar mencro scale (human scale) is mistaken then our notions of structure applied to the micro and macro scales, will most likely be wrong as well. Once one becomes aware of this problem, it can be easily seen why physics, in following the trail of form and structure to the unseen small and large, make false assumptions and get wrong answers.

3. Mencro Scale Structures

Mencro scale inspired structures can be recognized as being those that have a beginning and come to a final conclusion. Any thinking process that observes these rules is inspired by our senses and their mechanical extensions. Does this mean nature has to be similarly inspired? Maybe natural form and structure, including all things studied by physics, is not similarly constrained? Maybe we should look into this question?

Changing our cosmology to embrace universal structure, as opposed to localized structural thinking, requires our constructs to be applicable to all scales including the infinite. Our gut level understanding of what structure means will require a new paradigm in structure that will meaningfully and functionally unite into a comprehensive whole all scales of structure from the micro to mencro to macro. Our sense based frame of reference sees only materially. Materials have locality. They do not have totality. Only energy has non-locality, and only energy is holistic in its operation. Trying to understand totality with locality is mission impossible.

4. Structure Explains Form

Structure is described by form. Math has form and invokes structure so why does it not explain, as well as describe, form and structure? Because we have been confining our description of form to the material aspect of form. Form is more than its material description.

We expect form to tell us about structure, and it can't any more than a wave can adequately describe the ocean. And yet, physics has been relying on the material world to ascertain the nature of reality. We, and physics, cannot see energy directly. We only "see" energy as it affects material reality. Pure energy, energy of any kind, is imperceptible. The common usage is to regard structure as concerning energetic relational issues and matter as concerning perceptible form. By using matter to inform us about energy is impossible. It is the same thing as asking a wave to explain the ocean or knot to explain a string. The ultimate analysis, you can have an ocean without waves and you can have a string without a knot. The wave and the knot, tells you nothing casual about themselves whereas the ocean and string do

5. Form vs. Structure

The conclusion is: Using form to understand structure is useless and that has been the paradigm of modern physics. But how do you study energy if you can't work directly with it? The standard dictionary definition of structure is: "Structure is the product of the parts acting together." This definition is loaded with false assumptions. The correct definition is:

"The whole determines the parts and the parts determine the form of the whole."

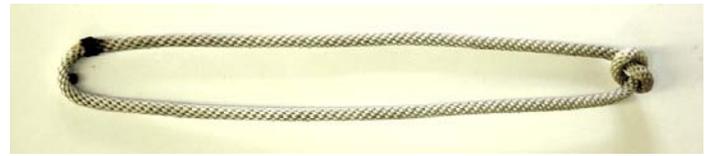


Fig. 1. Loop with knot

The new paradigm recognizes that before there can be a knot, there has to be a string. A knot is to a string what a particle is to a field; to repeat, a knot is to a string what a particle is to a field.

What are fields? Fields are the inherent pathways of action (energy), determined by the field's form, capable of hierarchical fractal iteration (fields within fields within fields), with each field having a unique force signature. All forms are structural when its appropriate action field is structurally included. Form without its action field is unstructural and will collapse. When an action field is connected to its form field, the form is structural.

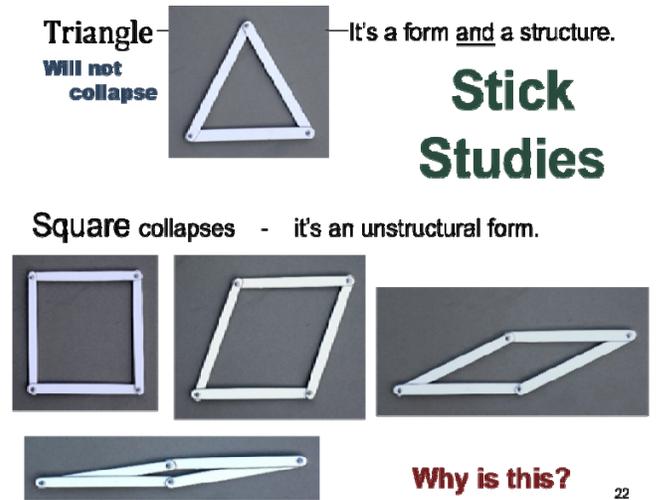


Fig. 2. The difference between Form and Structure

If the square doesn't have a field, where is the field in the triangle? It looks to be no different. In the triangle, the field is a fractal iteration of its self, so at all scales it is identical. Only the size changed. In a square and all other polygons, the field is not a fractal of its self and hence it is not structural.

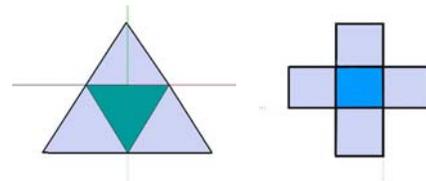


Fig. 3. Adding like triangles to a triangle produces a larger triangle fractal identical to itself that contains the original triangle. The square and all other polygons produce a dissimilar form.

6. The Principle of Fractal Scalability

Any form built in 3-D without a tetrahedron, or its derivative, is non-structural in the sense the form without its field will collapse. A field is an iteration of the nuclear form.

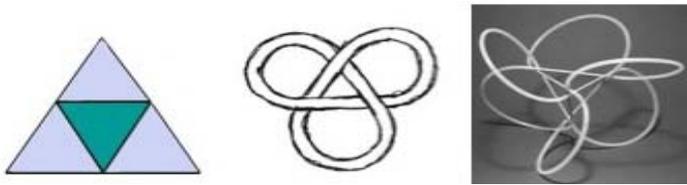


Fig. 4. 2-D triangles close-pack, but tetrahedron don't close pack in 3-D, so how could they fractal? If you double the tetrahedron in the same domain (common center), a cube is formed and cubes close pack in 3-D. Another supporting reason for why Nature doubles everything and relies on symmetry to obtain balance and energy to negotiate back and forth keeping the form structurally balanced.

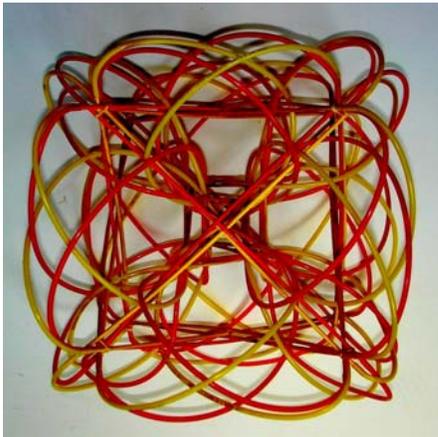


Fig. 5. RH and LH Tets SuperStructors form a cube

7. Energy Field and Action Field

Fields are fractal and double in 3-D to maintain isometry and symmetry, necessary for form to be structural and produce a universe that does not bend (flat universe). "Doubling", in fieldstructure terminology, means having a right-handed (RH) and a left-handed (LF) form occupying the same domain. This leads directly to Pauli's Exclusion Principle.

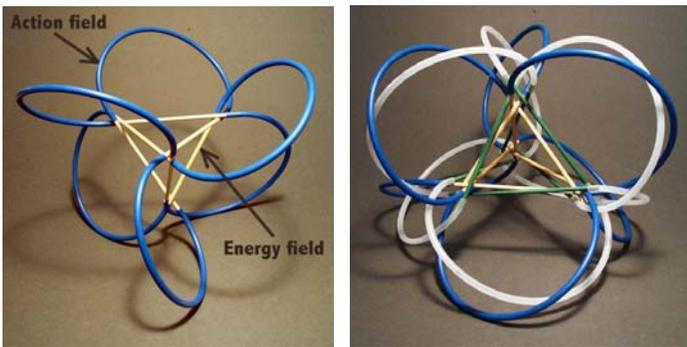


Fig. 6. Energy and action vortex view (note: vertices are called vortices in FST (Field Structure Theory). RH and LH fieldstructure (Ambi-Structure). The fields of a fieldstructure sharing the same domain. Face view.

Loops store energy by twisting and adding additional loops. Repeating the form triangulates the form and turns it into a tetrahedral truss. In 3-D this is a helical torus. Circuiting a form is looping. Repeating a form is twisting. See Figs. 7 and 8.

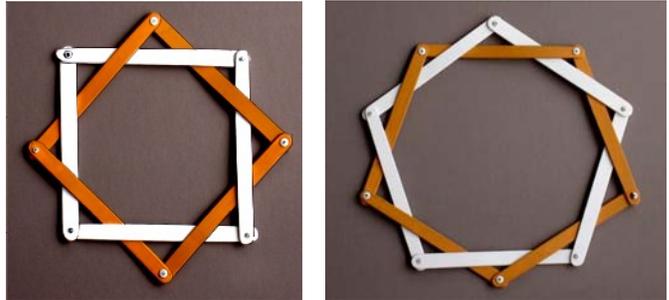
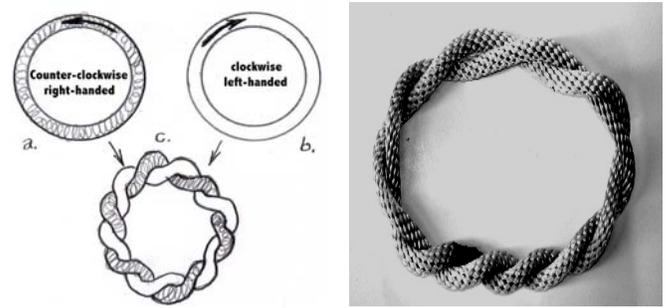
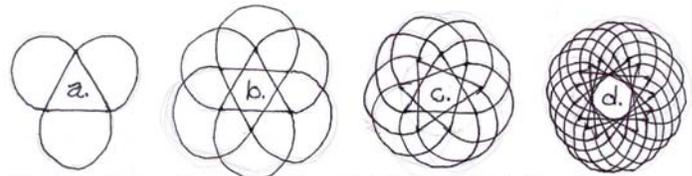
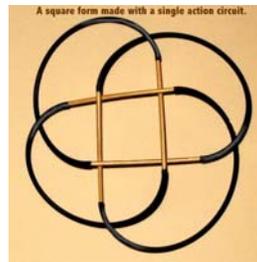


Fig. 7. Adding twist is actually repeating the form in a domain; various models



Adding circuits, adds loops, adds complexity, while retaining the form (tetrahedron in this case).

Fig. 8. Adding loops, rotating a line of action 360°, adds energy; various models of looping.

8. The Four Axioms of Emergent Qualities



Fig. 9. Lines delineate action. Form is dictated by the relationship between events, diagramed as lines.

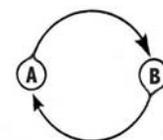


Fig. 10. Lines are loops. Closure occurs when the relationship becomes continuous, establishing orbits and loop circuits. Oscillation attempts to become circular in order to balance the energy evenly through out the orbital (entropy)

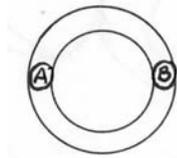


Fig. 11. *Lines have dimension.* They are not infinitesimally thin. Were they without dimension, the universe would be without dimension because all things could occupy the same place.



Fig. 12. *Lines interact.* They do not intersect. In this way multiple loops can occupy the same domain.

9. Loops can be Deployed or Condensed

A deployed loop distributes the twist evenly over the entire loop and a condensed loop gathers the loops nodes to one location on the loop. Odd and even numbered twists handle the condensed state very differently which accounts for the difference in form between energy and mass (in FST terms between an action field and an energy field).



Fig. 13. *Deployed single loop.* Odd # nodes, such as a frequency 11 in the illustration, always mean a single loop is interacting with itself. Deployed means the frequency nodes are evenly distributed around the loop.



Fig. 14a,b. *Condensed single loop.* All the energy concentrates the wave to a position on the loop and in so doing defines three distinct frequency waves.

10. The Interaction of Multiple Loops

Two or more loops behave very differently from a single loop wave when they collapse.



Fig. 15a. *Deployed two loop wave.* Even number frequency waves always mean more than one loop is involved. Deployed means the nodes are evenly distributed over the loops.
15b. *Condensed two loop wave.* All nodes in a double loop condense to one of the two loops, and the other loop is left with only one twist, which in FST accounting is one unit of energy.
15c. *Condensed three loop wave.* Any number of loops woven together in the deployed state can condense around a single loop. Note how all the energy of the three loops condenses so that one loop remains fully deployed but without frequency (energy).

11. Formation of a Nucleus

The nucleus is the inevitable result of having the loops interact in 3-D space. Such interactions require a three loops minimum to produce 3-D space. Space itself is formed by the interaction of action loops. Seeing that cosmological space is the product of intersecting loops of action is perhaps harder to visualize than seeing it in the micro world of particles and atom, but that is the case nonetheless in the view of FST. In viewing atoms we are in a larger fractal fieldstructure looking from the outside in. In viewing the universe, we are inside looking out of a gigantic fieldstructure. Both are fractal iterations of the underlying structural substratum (the Action Plenum). All form is circular, closed, chiral and, as propounded by William Day, orbital. [1]

12. Wave Energy Condenses to Form 3D Nuclei

Why does the energy of a wave concentrate to form a nucleus in 3-D? The nature of a wave is to radiate. A wave left to its self is centrifugal. It wants to expand. It wants to expand toward the entropic state of stasis whereby the energy is evenly distributed over its entire line (plane and volume) of action. When waves interact in a special state called a "field equilibrium", the loops become knotted together. This knotting prevents the radiant wave from expanding. Knotting of the waves in 3-D creates choke point at the vortices of the 3-D polyhedron which prevent the interacting waves from expanding. The choke points are the vortices of the polyhedron in the structure. The vortices prevent the wave from traveling around its action circuit (loop) the way a finger on a guitar string prevents the wave from traveling the full

length of the guitar string. The vortices change the vibrating string to a higher frequency by confining the vibration to a limited portion of the line of action (string). The portion of the string outside the polyhedron has no vibration but acts as does the negative line of an electric wire. The positive side of the line is where all the energy resides. The positive side wants to move to the negative side so that the energy can be equally distributed. When the energy is equally distributed, the wave, though energized, is only a potential. This is the fieldstructure's structural explanation for why electrical energy works as it does.

Each loop in Fig. 16 is trying to disperse its knot over its entire length; to deploy its energy and achieve stasis. The knot prevents this from happening. Fig.16 is a flat, quasi-3-D structure. This same form in true 3-D is Fig. 17.

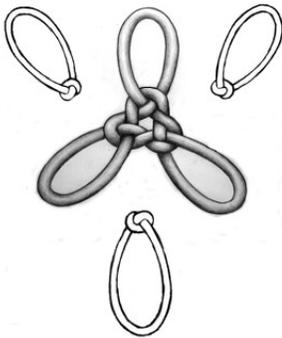


Fig. 16. The Nucleated knot of interacting loops and why the loop energy is confined to the nucleus.

A 3-D nucleated fieldstructure model is yet to be made, but will be presented at the NPA 17 conference.

13. Form and Structure Families

The full family of form and structure is a hierarchy of loop architecture that begins with the primal form, the Loop and ends with the Facilitator.

1. **Loop** = forms the Action Plenum: RH and LH forms, the origin of chirality for the hierarchy.
2. **Actor** = Plenum loops carrying wave energy interacting, the source of EM, RH & LH forms
3. **Nadi** = Produced by interacting Actor waves, neutrino, SOL particle of RH producing anti-matter, LH producing real-matter.
4. **Structor** = interacting RH & LH Nadis producing the electron/positron (fermion) particle pair.
5. **InStructor** = the proton produced by the collapse of the position RH Structor to the nucleus leaving the LH electron Structor deployed with minimum energy while the positron has taken the energy of both the electron and positron to the nucleus to form and created the proton. This is why the proton has a positive charge and the electron has a negative (meaning no energy) charge. Negative energy cannot flow because negative means "the absence of" while positive energy means "an abundance of".
6. **SuperStructor** = produced when proton and electron interact, the basis of atomic architecture.
7. **Facilitator** = the neutron produced when an electron collapses to the nuclear domain only adds a tiny amount of

energy to the proton to become the neutron. The neutron with its negative electron adds a tiny bit of energy (something less than 1.293 MeV) to the proton. This neutralizes the charge without adding significant energy. The positron of the electron/positron pair, has already collapsed to take their combined energy to the nucleus in order to form the proton. To add a new proton/electron pair requires a new proton electron pair that includes the both the electron devoid of all but rest energy and the positron to both be in the nucleus so that the neutron can form and the charge balance of the nucleus not be disturbed. Models for the various combinations of electron/positron and proton/neutron couplings have yet to be made, but the author sees that it is possible to make these forms with fieldstructures. The Facilitator, like the neutron, makes form building, atom building, structurally possible.

Once this family of form is established, Nature now has the elements it needs to extend its energy field to build atomic complexity. With atoms the possibility of building molecules with valance electrons becomes possible allowing the field energy of atoms to deploy, and in so doing add hundreds of thousands of molecular combinations. All of this is viewed as the field building potential of the humble loop.

14. Family Photo Album of Form Structures

Here follow photos of the principle structor forms in developmental order.

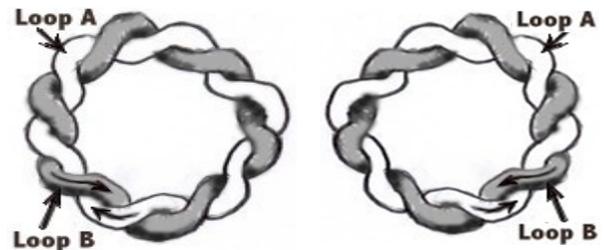


Fig. 17a,b. Loop. RH and LH (mirror image)

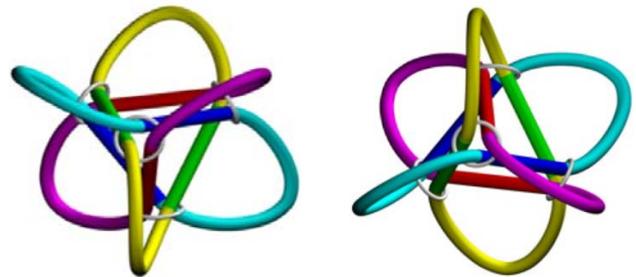


Fig. 18a,b. Actor (Boson). RH and LH



Fig. 19. Nadi. Three RH Actors plus three LH Actors combined

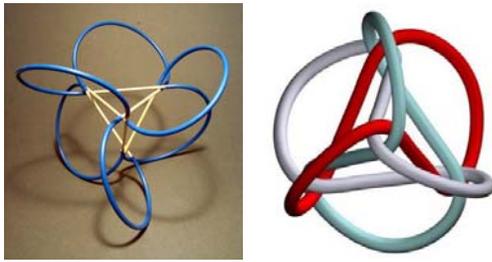


Fig. 20a,b. *Structor (Fermion)*. First stable form that can be at rest. Does not need a chiral counterpart to be structural. Creates space, has mass, can concentrate energy in its nucleus. Logo **b** by [2].

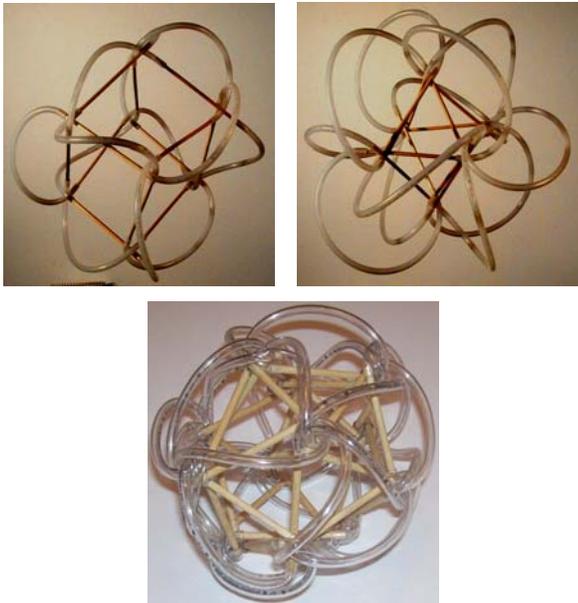


Fig. 21a,b,c. Cube, Octahedron & Dodecahedron [3]

Field structures can be made from any polyhedra, regular, semi-regular or irregular. Frequency of the Structor wave is determined by the nuclear polyhedron. Each polyhedron has its own unique frequency, or set of frequencies. Fieldstructures reveal why spectral analysis can identify atomic forms by their frequency signature. Frequency signatures can now reveal the wave architecture of the atoms.

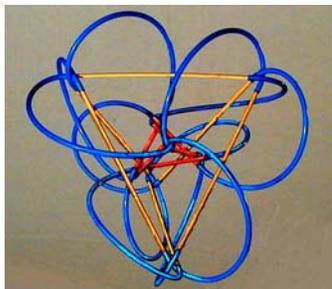


Fig. 22. *SuperStructor*

The SuperStructor has a concentrated polygon at the nucleus of the form and lives inside another (other) polyhedrons to which it is directly attached via circuitry. In Fig.24, the red polyhedron is connected to the yellow sticks of the outer tet polyhedron. The inner polyhedron (red) has the opposite handedness to the outer polyhedron (yellow). The unbound (to the nucleus) proton

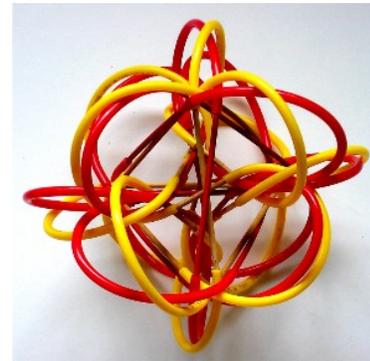


Fig. 23. *Ambi-SuperStructor*. The interaction of a RH and LH sharing the same domain. The atoms are built on this paradigm of structure. The bound proton is only found in the nucleus.

The *Facilitator* (yet to be modeled) corresponds to the neutron. Its structure facilitates the growth of atoms, because it allows energy to be condensed to the nucleus without having to make the proton grow without constraint and exceed its natural energy limit. The limit of proton energy is determined by the number of twists that a proton fieldstructure can have. The energy limit of a proton is the fourth power of the minimum electron. Electron energy ranges from: $m(m^2)$, the minimum energy of an electron, to $m(m^2)^4$, its maximum energy. Any more energy than that and the electron morphs into a proton/electron hydrogen atom. In other words, it can have anywhere from a mass value of 3 to 2187. A 2187 mass value electron is sufficiently energized to permit it to collapse into a proton/electron pair (hydrogen). The part of the electron that collapses is actually the positron loops, which have a right-handed spin, the same spin as the proton. At this level charge and spin are the same thing. We are not talking about the fact and abundance of electrons in a domain is called a positive charge. That is another type of charge and highly confusing for physics to be using the same word for two different things. Historically and unfortunately, the distinctions were not realized until later. The positron also takes the entire energy of the electron/positron pair with it when it collapses (as explained with Fig. 15a and 15b) except for the minimum of energy needed to sustain the electron ($1/1836$ of the e^- and e^+).

15. Changing Circuitry Changes Everything

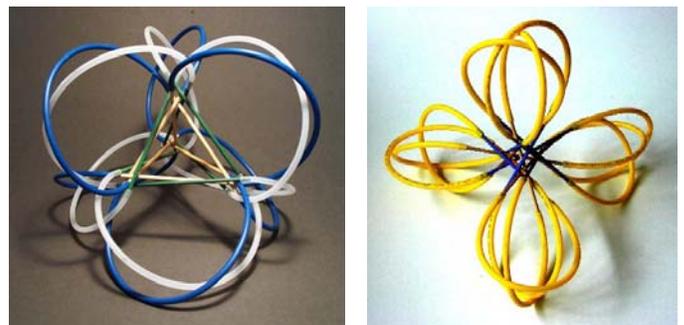


Fig. 24a,b. *Ambi-Tet Structor*. The two are identical, except the one on the right contains cross circuitry, with 6 circuits (3RH+3LH) producing a single circuit.

In Fig. 24, both Structors have the same number of sticks and tubes (loops). Both nuclear polyhedrons have the same arrange-

ment of sticks. The blue and white Structor (Fig. 24a) has blue tubes connecting to green sticks and white tubes to yellow sticks. Each set is the same handedness, meaning the sticks are the same handedness as the tubes. In the yellow Structor (Fig. 24b), everything is the same except the blue sticks are connected to the blue and yellow sticks. RH sticks are circuited to LH sticks in the yellow Structor. The resulting form is radically different showing that form is determined in a large part by how the energy of form, the circuits, are connected. This provides a structural basis for understanding how it is that the same atom can have so many different forms as in the example of hydrogen in Fig. 25. These illustrate how the circuitry of the looping (structure) determines the form.

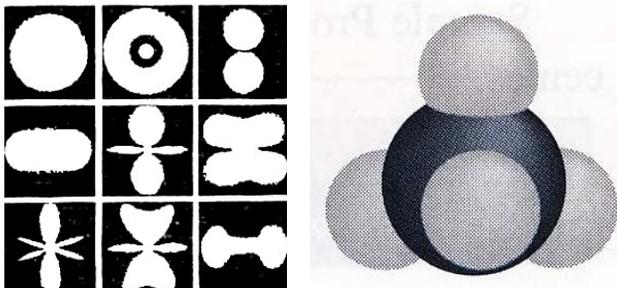


Fig. 25a. Probability clouds of hydrogen electron energies.
25b. e-clouds of Methane having the same shape as Fig. 24b

16. The Cloaking Principle

The Ambi-Structor Fig. 23a explains why anti-matter is not normally seen. Only the handedness of the outside loop is seen by viewers outside the system and the handedness of the inside loop is seen by the viewers inside the system. All the anti-matter is still with us, cloaked inside real matter. Only in particle decay can the anti-matter be seen, because it is no longer being cloaked by the real matter of the system.

17. Molecules

These models illustrate the orbital circuitry of a valance electron linking together atoms to form a molecule. These models show how a single orbital path can link molecules. Not shown are the orbits of the electrons in an atom, in the tetrahedron domains, that are not participating in the molecular bonding process. The unique thing about valance electron orbits is that they are able to leave the atom and travel. However, the traveling is only undertaken if the valance electron knows it can complete its orbit. How does it know? The answer is in the nature of the field. The field knows a "entirety" when it one is present, no matter how large the molecular structure. It will not interact and connect unless it "knows" it can return. Electrical circuits are of this nature and the atoms behave similarly as man-made electrical circuits.

An extension of this valance molecular model is that like molecules, cells develop in the same way. The valance electrons develop their own hierarchy of structure building "shells" of molecular energy with a valance shell of its own which then links molecules together to form cells. The process of shell building offers Nature a way of building organism including humans.

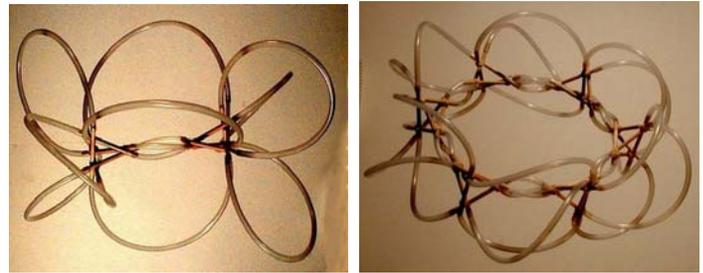


Fig. 26a. Two atoms bound by the valance electron circuit.
26b. Six atoms bound by a single circuit of the valance electron.

18. The Sierpinski Triangle Fractal

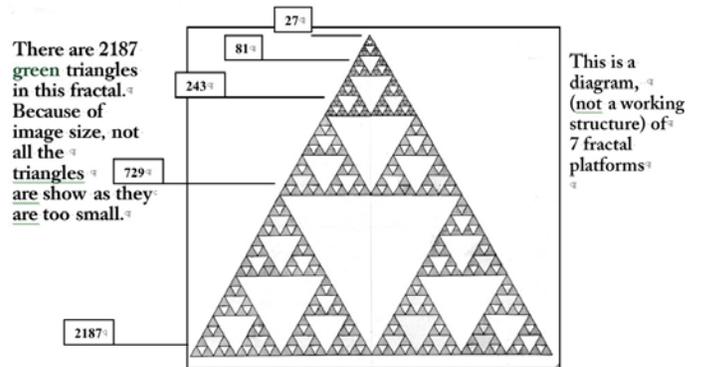


Fig. 27. Sierpinski Triangle Fractal, with $3^7 = 2187$ of the smallest triangles, though not discernable in the image at this scale.

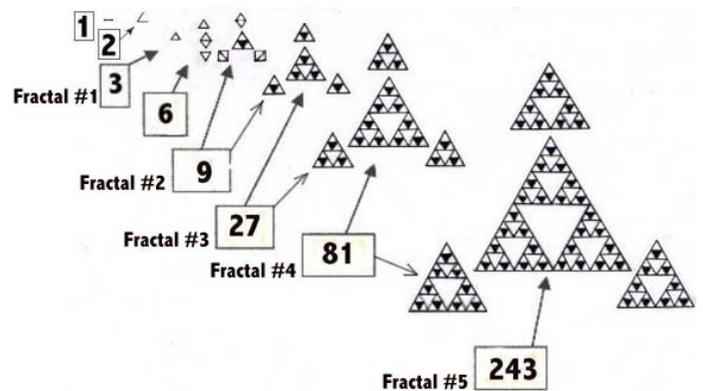


Fig. 28. Diagram of how loops are counted and mass values derived

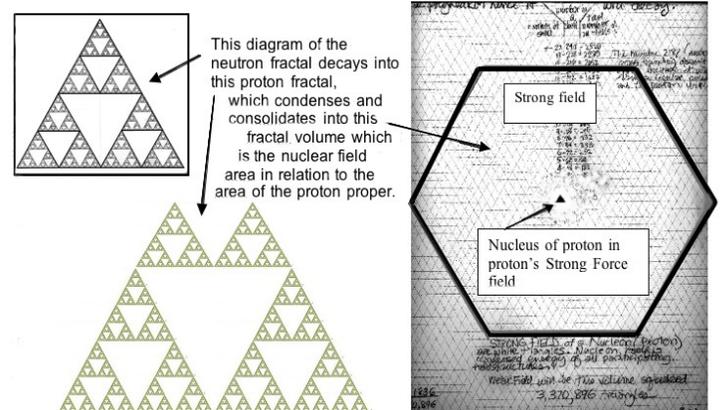


Fig. 29. Energy condensation of the Sierpinski Triangle field

The mass and energy of the known particles can be determined via the Sierpinski Triangle Fractal using FST accounting techniques. Each line represents a loop in a 3-D fieldstructure such as a Structor. Each loop is a unit of mass in FST accounting. Each loop is a quark. Three quark loops makes a triangle, which stands for a Structor. As the complexity of the fractal grows, the divisibility of the structure is always divisible by three. When the fractal condenses its energy it does so to three loops and stores the entire energy to those three loops. The mass value of the fractal at each platform represents a fractal iteration of the original three loops of the simple Structor. At the 7th platform there are 2187 loops. This is the FST mass value of the neutron, but not a number recognized by physics since the mass is weighed while the neutron is still inside the nucleus. Physics weighs the neutron when it is ejected from the nucleus. Separated, it decays because it is not attached to the fractal hierarchy that gave it a home. The neutron will not fractal, but the proton and electron will. See Fig. 3. To summarize the important FST numbers in Fig. 28:

- 3⁷ 2,187 = the neutron mass value in electron (at rest) mass units. Neutrons decay releasing a pion-meson having an e-mass value of...
- 3⁵ - 243 = leaving the neutron with...
1,944 = mass units. Then a highly energetic electron is discharged having the mass value of...
- 3⁴ - 81 = mass units, leaving...
1,863 = mass units. Then an anti-neutrino leaves taking...
- 3³ - 27 = mass units, leaving a particle having...
1,836 = units of electron mass, also the known mass value of the proton as measured in electron masses.

The 1836 proton is a fractal and hence stable, whereas the 2187 neutron is not a fractal and hence decays into forms that will fractal, i.e., the electron and proton and neutrino. All particles that naturally decay are not fractals. Condensation of energy in fieldstructures occurs when nucleated structures form. In the case of electron and proton:

- The (action) field of the proton is 1,836 times larger than the proton itself.
- The (action) field of the electron is $1,836^2 = 3,370,896$ times larger than the electron itself.

Why? The electron and proton proper have the same diameter. We find similar radii values for both the classical electron and the proton, namely:

$$r_e \equiv \frac{k_e e^2}{m_e c^2} = 2.8179402894(58) \times 10^{-15} \text{ m [4]}$$

$$r_p = 1.2309626 \times 10^{-15} \text{ m [5]}$$

Though various sources differ on the exact dimensions of both the electron and proton, a case can certainly be made that the two have dimensions on the same order of magnitude. Fieldstructures show how it's possible for structures with similar to dimensions to have radically different energies and masses.

19. The Number 3⁷ = 2187

Why is the total number of lines in the Sierpinski Triangle Fractal 2187 noteworthy? In FST, matter is a condensed energy of

an action field wave. The fact the electron and proton have the same nuclear dimensions yet live in remarkably different sized action fields and that the geometry of their fieldstructures match these volume dimensions validates the assertion that when a wave condenses, it takes the action energy in each unit of space and compacts it into a single unit of that space. In other words, all the energy in each of the 2187 triangles is compacted into one triangle at the center of the Sierpinski Triangle Fractal. In this way, field energy becomes mass energy. In the decay of the 2187 neutron, the corresponding lines and triangles of the decay products of the neutron reduce the mass value of the neutron to that of the 1836 proton, the 243 pion muon, the 81 electron, and the 27 anti-neutrino. The proton without the other particles structurally configured to it, collapses so that all the energy of the proton resides in a central nucleated single unit taking all the energy of the system with it in a process as shown on pages 5 and 6. The geometry of the action field and energy field are derived from the Sierpinski Fractal and compared in Fig. 29.

20. The Fine Structure Constant

There is a connection between the Fine Structure Constant (FSC) and the Sierpinski Triangle Fractal, where each line of the triangle is considered a loop. The current established value for $FSC^{-1} = 137.036000$ [6], and thus $FSC^{-2} = 18,778.8653$. The nearest integer to this number is 18,779, which can be derived from the Sierpinski Triangle as follows:

- 14,675 = Total number of loops (diagramed as lines) in the first seven fractals (to be derived in a future paper)
- + 2,187 = Number of loops in triangles with multi-looping (dark triangles in Fig. 30)
- + 1,836 = Number of loops in proton after 351 loops are removed when the neutron decays
- + 81 = Number of loops in the electron that is released in the decay of the neutron (Fig.30).
- 18,779 = Sum of the above, $\sqrt{18,779} = 137.0364915$.

Is this the value of the FSC? With numbers this close, this may possibly be why the FSC value keeps popping up in a variety of fundamental relations. Why these numbers derived from the STF produce the FSC is being considered. The fact this number is a very close match seems to insist that it be taken seriously, as it is quite unlikely not to be accidental. All these numbers refer to the various particles and their energy states and the inherent energy of the action plenum (so called "empty white spaces").

What seems likely is that the total action field plus the major particles derived from that field when the square root is taken produce the FSC. That appears to mean the energy of the action field (all the triangles in the field, when added to the particles in that field, yield a number that is always found in any and all actions, reactions and interactions. In other words the relationship between the general field, which is the plenum field (aetheric field) and any structure derived from that field, maintain a constant relationship (FSC). It could also be said that if you add what goes on in a field action to the field of action itself the interaction preserves a 1/137 relationship between the original total and the total of the derived structure that emerges from the original action field.

21. Conclusion

This paper defines structure in terms of the relationships between the parts of a whole, giving a body its form. Field structure theory attempts to model all the various ways circulating paths can interact, creating structure “families”. These families are fractal in nature and can be analyzed in terms of the Sierpinski Triangle. Along with the proton-electron mass ratio and the fine structure constant, field structure theory can determine other mass ratios between known atomic particles, and attribute each particle to a physical structural type. In addition, the basic

forces of physics can be understood in new way though field structure theory, as summarized in Table 1 below.

References

- [1] William Day, **CITATION NEEDED!**
- [2] Joseph Clinton, Westchester, PA, Field Structure logo.
- [3] Greg Volk, Eagan, MN, Dodecahedron field structure.
- [4] http://en.wikipedia.org/wiki/Classical_electron_radius.
- [5] <http://www.thenakedscientists.com/forum/index.php?topic=23342.0>.
- [6] http://en.wikipedia.org/wiki/Fine-structure_constant.

Substratum of All Energy and Mass Structure - The Action plenum											
Field Order	# of Dimension nsl-	FST name of Force Field	Fieldstructure Name:PRANUM LH - RH Both = *	# of loops/circuits	Real+ or Anti-matter	Allowed # of full twist	Outer loop Cw or Ccw	Boson or Fermion	Spin #	Natural and/or Physical name of structure	
	no dimension Before space/time	Action Plenum	LH-Ida	1		1 to ∞			1/2	Aether, Action Plenum, Torsion Field, among others	
1FO			RH-Pingala	1		1 to ∞			1/2	{Prakriti, Maha Shakti, Akasha (Vedic ref.)}	
			Pranum*	2					1	Prana	
			(action loops)								
First Family of Fundamental Particles ("First Generation particles")											
Using Tetrahedron Architecture (three lines of action intersect at each vortex)											
Field Order	# of Dimension nsl-	Name of field force	FS Name Cw=+, Ccw= - Both = *	# of loops mass #	Real+ or Anti-matter	Energy range Allowed # of full rotations	Outer loop LH or RH	Boson or Fermion	Spin #	Natural and/or Physical name of structure	
			Actor +	3	Both	3 : 3 ³	LH	B	1	radiant photon	
			Actor -	3	Both	3 : 3 ³	RH	B	1	radiant photon	
			Ambi-Actor*	6	Both	6 : 6 ³		B	1	bound photon (Indistinguish + or - rotation)	
		Gravity Field	Nadi+	9	Anti	9 : 9 ³	LH	F	1/2	positron-Neutrino (anti-matter neutrino)	
			Nadi-	9	Real	9 : 9 ³	RH	F	1/2	electron-Neutrino (real-matter neutrino)	
			Ambi Nadi +	27	Anti-	27 : 27 ³	LH	B	1	<i>NOTE: (Muon & tau neutrinos will be explained as 2nd and 3rd generation particle families respectively.)</i>	
			Ambi Nadi -	27	Real	27 : 27 ³	RH	B	1		
	1	Electro-magnetic Field	Structor +	81	Anti-	81 : 81 ³	LH	F	1/2	Positron (9 ² = 81 = three LH Nadi)	
				Structor -	81	Real	81 : 81 ³	RH	F	1/2	Electron (9 ² = 81 = three RH Nadi)
				Ambi-Structor+	243	Real	243 : 243 ³	LH	B	1	pion-meson+ (π ⁺) (243+27-6 ⁺ =264) ((264.2))
				Ambi-Structor-	243	Anti	243 : 243 ³	RH	B	1	pi-meson- (π ⁻) (243+27-6 ⁻ =264) ((264.2))
	2	Weak Field	Meson Structor+	729	Real	729 : 729 ³	LH	F	1/2	Kaon-meson (K ⁰)= 729+243+2=974 ((974.3))	
				Meson Structor-	729	Anti	729 : 729 ³	RH	F	1/2	Kaon-meson (K ⁰)= 729+243+2=974 ((974.3))
				Ambi-Meson-ST ⁺	1458	Real	1458:1458 ³	LH	B	1	meson+ (ETA)=1458-243-81-81+27-9+3=((1074))
				Ambi-Meson-ST ⁻	1458	Anti	1458:1458 ³	RH	B	1	meson+ (ETA)=1458-243-81-81+27-9+3=((1074))
	3	Strong Field	SuperStructor+	2187	Real	2187:2187 ³	LH	F	1/2	neutron = 2187-243-81-27 = 1836 (proton)	
				SuperStructor-	2187	Anti	2187:2187 ³	RH	F	1/2	neutron = 2187-243-81-27 = 1836 (proton)
				(Ambi-SuperStructor+)	4374	Real	4374:4374 ³	LH	B	1	Super heavy stable particle two times+proton
				(Ambi-SuperStructor-)	4374	Anti	4374:4374 ³	RH	B	1	Super heavy stable particle two times -proton
7FO is where the above structures can now interact with other similar structures to produce atoms, molecules, cells, etc.											
NOTES:											
1 Light travels over the gravity field. Its job is to return action (energy) to the gravity field, which is the Action Plenum and from which action was gathered to make matter.											

Table 1. Field Structure interpretation of the fundamental forces