

The Neutron: Modeled as a Fieldstructures

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Field Structure Theory (FST) postulates a plenum composed of chiral loops that when brought together properly weave loops of action together to form waves of energy. To tell the story of the neutron, it is necessary to show how a neutron arises from wave energy in the plenum. FST shows how waves arise, interact to form particles, atoms, molecules and etc. Form and structure in nature can be shown to be fractal hierarchical iterations that follow simple rules of loop association to produce the platforms of reality, i.e., wave, particle, atom, molecule, etc. With chiral loops of action that interact to become chiral energy loops, that interact to become bound stand-alone three-dimensional particles, the neutron is seen as the seventh iteration of this fractal hierarchy. FST further shows that the neutron is made from plenum field energy before the proton and electron are made. The proton and electron arise when the neutron deploys its energy, in a process ill-named as "decay". When the neutron deploys (decays) at or near absolute zero temperature, the kinetic energy of the electron is sufficiently low as to allow the proton to capture it and form hydrogen. This should be laboratory testable. This could only occur in a sun and indicates the core of the sun is at or near absolute zero. This process cannot be shown or justified within the limitations of the Standard Model but can be by considering the structural mechanisms of Field Structure Theory and the topological mechanics of Structural Skew Topology. What is not being told in this story is the mechanics of how loops are made to interact to produce the particles. This information is proprietary. What is being shown are the beginning states and end-states, but not the transitional states of the chiral energy rings.

1. Introduction

Field Structure Theory (FST) postulates that Nature has structure and form at all levels of manifestation. The basic form is a loop and the basic structure is revealed in the dynamics of loop interaction. This is a **deterministic** view of reality that does not rely on **uncertainty** and **probabilities** for its form and structure. The geometry of loop dynamics are described by Structural Skew Topology (SST). Applying SST to physics FST postulates that at the substrate of physical reality is a **plenum** [1] composed of chiral loops with which energy and matter are inseparably linked. If plenum loops are in a state of perfect quiescence, they have no "apparent" energy. It is only through loop interaction that the energy becomes an attribute of the loop. The form of energy as understood in FST is in terms of twisting and bending of the plenum loops when the loops interact in higher (three) dimensions. This paper will discuss first the nature and potentials of the loop, then show how the form and structure of the particle hierarchy is constructed beginning with the electromagnetic wave and ending with a description of how the first generation of particles (neutron, electron, and proton) are formed.

FST agrees with the string theorists who assert the fundamental form is the closed loop string, but takes string theory a step further and asserts that the waves (vibrations) induced into the string arises because of three-dimensional knotting of interacting loops. Energy, that is radiant EM boson energy, is described as a wave. A plenum loop by itself has to form into multiple loops, or join with other loops, to develop the phenomena of energy. FST physics begins with entangled plenum loops interacting in chiral symmetry at the Planck scale. Plenum loops weave together so that they share the same domain and do so without interference. This may sound contradictory, however, the conditions under which this can happen can be modeled. To do this it is easier to

visualize if the interacting loops are shown as separate entities, as if they were made of a material instead of pure energy. Fig. 1 uses closed 'rope-like' forms [2] to show the two chiral loops, which make up a unit of plenum. Woven together, these loops give rise to the phenomena of energy displaying the attributes of frequency and duration ($E = hf$, the energy formula for waves).

Loops are the substrate for material reality. They are the illusive medium with which electromagnetic energy propagates not as separate "pearls on a string", but as *knots on a string*. It is through a system of hierarchical interactions waves knot and morph into matter as well as create the effects of space and time.

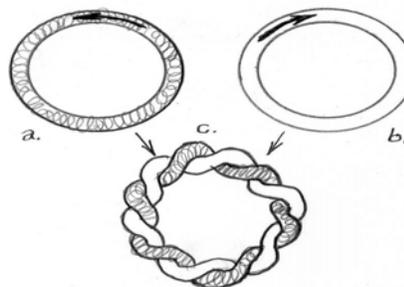


Fig. 1. Two loops weave a wave creating frequency thereby expressing energy. This is why waves wave.

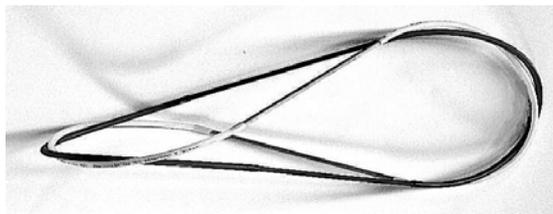


Fig. 2. Two Fig. 1 loops woven together produce a two-dimensional wave form. Discovered circa 1965.

This is a *background dependant* theory as opposed to quantum mechanical and relativistic theory which are the result of *background independant* thinking.

Space and time are the effects of matter and energy. Space and time are neither formless nor without structure as this paper will attempt to demonstrate in telling the story of the neutron.

2. What Can be Done with a Loop?

Answer: Make complexity by weaving and knotting.

Figures 3, 4, 5, 6 and 7 show a few examples of how fieldstructures can generate any 3-D space and complexes of 3-D space, which is to say this topological geometry can define:

1. the structure and form of particles (Fig. 3, 4, and 5)
2. particle/anti-particle (Fig. 6)
3. atoms (Fig. 7 hydrogen)
4. molecules (Fig. 8) showing circuitry of a valance electron

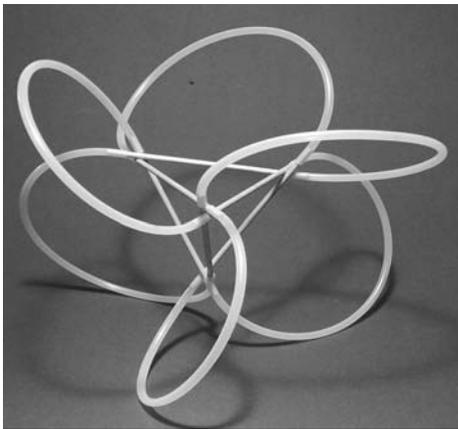


Fig. 3: Three woven Fig. 1 loops forming a tetrahedral knot form called a *Structor*. The two loop strands making up a loop are not shown. Stanley Wsocki, architecture instructor at Pratt Institute, discovered Fig.2 and 3 in 1965 when we were undergraduates.

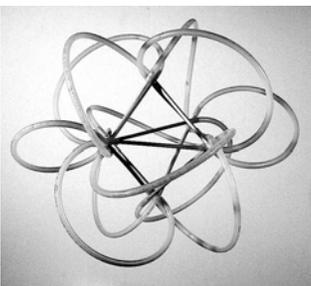


Fig. 4: Octahedron

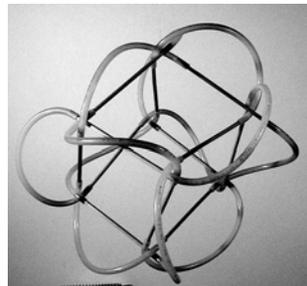


Fig. 5: Cube

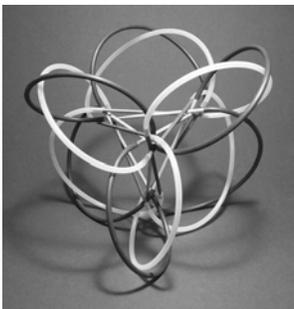


Fig. 6: Right & Left-handed Two tetrahedron Structors domain sharing the same circuit.

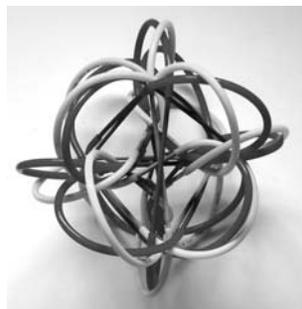


Fig. 7: SuperStructor

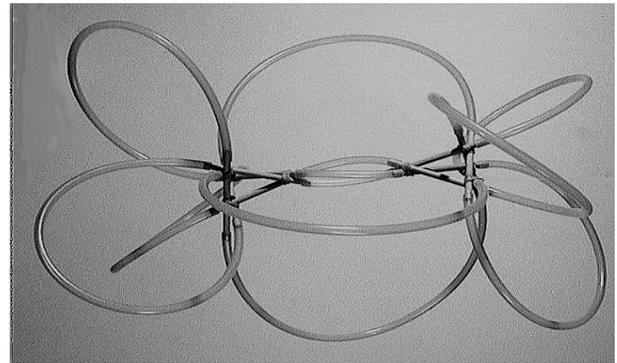


Fig. 8: Two tetrahedrons in separate domains connected by a single circuit, sharing energy. This is the fieldstructure model of a valance electron orbital in a molecule.

Not shown are the fieldstructures that neither model cell and organism structure, nor the fieldstructures of LMOs (large massive objects) like solar and galactic systems). *Note: The fully descriptive topological geometry waits the time when fieldstructures can be computer modeled allowing the transitional morphology of loop dynamics to put "in motion".* The models shown here are before and after "end-states" and do not show the motions of transformation. Seeing the transformation of one form into another will reveal how nature actually "works". What would be seen is how energetic deployed boson wave/loops interact to produce fermion condensed wave/loops. How loops can be made to interact in 3-D is proprietary information.

Figures 3 thru 8 show how loops can interact and produce new phenomena of a higher order of complexity, i.e., waves producing forms that define space, energy (frequency), and mass. Fieldstructure wave interactions can build any 3-D form using only loops, neither glues nor mechanical attachments needed to hold the loops together, nor gluons, nor dark energy or dark matter are needed to explain particle and atomic form and structure.

Fieldstructures rely on the knotting of centripetal and centrifugal forces of bent and twisted loops to achieve stable structure. **Please note: It is, in my humble opinion, that there are no short-cuts to understanding fieldstructures short of actually making them for oneself.** To just look at them and think you know what is going is like looking at a mathematical equation and think you've done the "math". The reason the enquiring community has been so slow in picking up what is being done with fieldstructures is due to the unwillingness of those interested in structure to actually build these structures [3].

2.1. Loops can Bend to Make More Loops

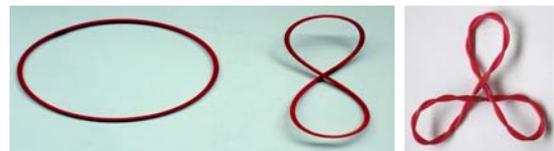


Fig. 9. Bending a loop can make more loops by decreasing the spatial extension of the original loops.

In Fig. 9 the effect is to increase the number of spatial events, which has the effect of creating time. Time is the fractal division of a whole into a subset of multiple iterations. Structurally, time is a set of loops that deploy by un-looping until all the loop itera-

tions have been deployed and a single loop form of the event is achieved. It would be like reading Fig 9 from right to left.

Every event (form) comes packaged with a subset of loops. Humans have set up our perception of time to be composed of hours, each having 60 loops hour subdivided into 60 loop seconds. These loops are seen to un-loop uniformly at the same "time" for each unit governed by a mechanical mechanism of the clock used. We probably get this idea from the fact Nature seems to "unfold" time in a orderly way using the orbital repetitive motions of Natural forms.

From a rest state below which a platform of structure cannot loose loopage, each platform of structure in Nature has a set of loops that deploy (un-loop). From the perspective of a human platform, the smaller the action domain, the faster the domain seems to deploy its loops; the inverse is true for platforms of structure larger than that of the human platform. Time slows to imperceptible motions at the galactic level.

2.2. Loops can Twist

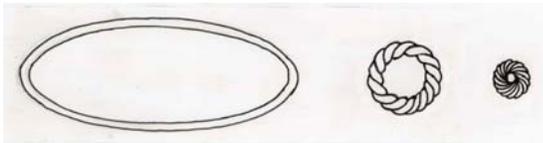


Fig. 10. Loop twisting.

Twisting a loop inputs energy into the loop (torque) and decreases the spatial extension of the form; a loop appears to shrink to a point and does this by increasing its energy, which is accomplished by increasing frequency of the loop (twisting).

2.3. Summary of Loops

1. Loops can link to create space (Fig. 3, 4, 5, 6).
2. Loops can bend to make more loops (Fig. 9)
3. Loops can twist and become energetic (Fig. 10)
4. Looping and twisting produce a circle of causation.

Twisting induces bending. Bending creates loops. Adding loops increases frequency. When a loop un-twist it's force is centrifugal and responsible for deploying energy (entropy), while looping is centripetal and responsible for condensing, compacting and storing energy (extropy).

Fig. 1 shows how a wave can be right or left-handed. Chirality is an inevitable product of twisting. When loops are woven together (*loop-lapping*), waves arise. Waves have frequency and duration and are formulated by the boson wave energy equation $E = hf$. In FST, The h is accounting for the number of loops and f for the number of twists on the loop (Fig.1). For every loop there is a number of twist allowed (E) and to find the amount of energy in a given wave, the number of loops (h) is divided into the total energy (E) of the event. This equation is a potential. To manifest this potential it is necessary for this wave to entangle with a fermion structure having mass or entangle with itself to form a mass. The equation for fermion energy becomes $E = mc^2$. This equation introduces the notion of time and space since c is a number that combines time and space. Ideas about time and space arise with the formation of the fermion mass. Boson energy is timeless and spaceless until boson energy effects fermion mass. If the wave never encounters a fermion or until a wave obtains

high enough energy to transform itself into a fermion, there is no way of telling what the energy of the wave could be. The potential becomes kinetic and measurable only when it impinges upon matter or becomes a part of a mass.

2.4. Rope Studies of Waves Reveal Natural Laws Applicable to All Scales of Structure

1. Energy (boson energy) is chiral, having a right and left-handed form. EM energy is chiral.
2. For a wave/loop to carry energy it must have frequency, which means it must be a weaving together of chiral loops. This is called "*looplapping*" i.e., light is chiral.
3. If two loops are woven together one automatically becomes right-handed and the other left-handed, even though which is which cannot be easily discerned as long as the waves are deployed.
4. If we agree that electromagnetic (EM) energy (light, etc.) is the energy aspect of reality, then all forms of energy, fermion energy included, are made form chiral light, from EM energy.
5. It thereby follows that matter is **condensed** EM energy (light).

This conclusion can be modeled structurally by studying how waves, deployed as boson energy, can condense and compact when the correct conditions are present.

3. How a Deployed Wave Condenses

... or, as QM would say, "how a wave collapses".

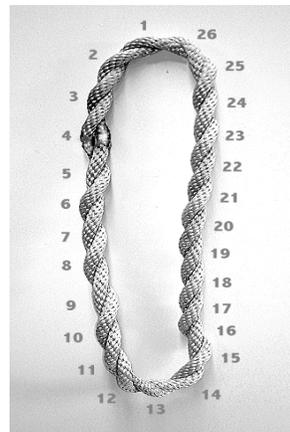


Fig. 11: Deployed wave (26 frequency wave)

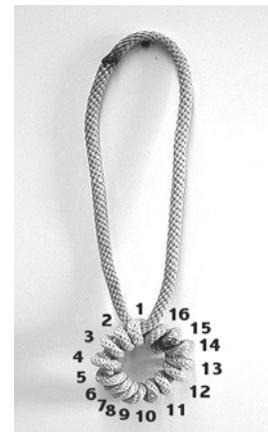


Fig. 12: Condensed wave (16 frequency wave)

Fig. 11 is a two looped [4] deployed wave set having the classic form of a wave where in the nodes of frequency are distributed evenly. There is no place that does not show wave-like undulation and oscillation. In Fig. 12 all the nodes of both waves have been transferred to the loop that has condensed. This models EM wave collapse wherein the energy of the wave set condenses around one of the two loops and concentrates at one place on that loop. The ability of all the energy to collapse to a point and take on "particle-like" attributes can be easily seen and understood in this model. The problem with the point particle notion of quantum physics is that it fails to recognize the field properties that remain attached to the collapsed wave that has become a particle.

Figs. 11 and 12 model the mechanics of wave-particle duality. When the deployed boson wave of EM energy encounters an object having mass, it collapses all the energy of the wave to that object (Fig. 19). The energy of the entire wave is condensed to one place (the atom). In this manner, energy becomes a particle having locality and the particle has a field supporting it in the form of the deployed loop that has not condensed but remains attached and integral to the particle (Figs. 11 and 12).

However, without a way to fix the collapsed energy to a locality, the condensed energy is perfectly free to return to its deployed wave-form (Fig. 11). This collapse/deployment oscillation goes on incessantly as atoms take on EM radiation and expels it as a normal course business for the atom. In Nature, the EM deployed wave is constantly condensing and deploying energy into and out of the atom billions of times a second. Only those frequencies of the wave that are integral to the structure of the atom will be retained by the atom. The frequencies that are integral to the atom are the dark lines of the atom's spectral display.

3.1. Summary of Wave Deployment

1. Chiral waves can condense or deploy energy (Fig. 11 & 12)
2. A condensed wave has locality (Fig. 12).
3. A deployed wave has totality (Fig. 11).
4. When a wave condenses, it compacts around the deployed wave leaving the deployed way with only nominal energy. (Fig. 12) All the nodes of frequency have been transferred to the condensed loop. In careful studies, it has been discovered that the deployed wave is in fact twisted, but the twisting does not produce a wave having nodes. The deployed wave has its twist in the form of a wave potential. The frequency is not discernible, other than the fact they cause a particle traveling on (in) the wave to rotate. Hence there could be no such thing as a particle that does not rotate when in motion.
5. A condensed wave has manifest (discernible) frequency, but the deployed wave has rotational frequency without being manifest. In other words, the loop of the deployed wave rotates, but the nodes of frequency have been transferred to the condensed wave. This is why particles rotate. They follow the deployed twist of their line of action. These are Louis de Broglie's matter-waves. The frequency potential of the deployed wave determines the orbital path of a moving object and the energy of the orbital object (particle). This mechanically explains why a particle rotates in transit, it being linked to the energy/frequency of the deployed field.
6. The deployed loop comprises the action field (charge field) and the condensed wave forms the energy field (mass field).
7. Together the two waves form a "Field Order" comprised of a deployed action wave with potential energy and a condensed energy wave with kinetic energy. See Figures 13 & 14.

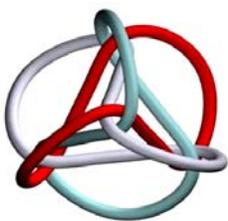


Fig. 13: Structor/particle



Fig.14: Fields of Structor/particle

The condensed energy mass field in dark grey and action charged field deployed in light grey. CAD drawing by Joe Clinton.

4. Building a Fermion from Boson Waves

Unless we can show the mechanism for making EM energy a permanent part of a particle, or atom, we can neither explain particle production nor have a complete description of the neutron, the goal of this paper.

Fermions are waves of energy that stay within a finite field (of action). The rest state is the amount of energy necessary to maintain the integrity of the particle, an amount of energy below which the particle will not lose energy. Fermions are nature's perpetual motion machines [5].

How waves condense energy to a locality has been explained. Figures 11 and 12 show how energy from a wave is condensed to a locality, a small area. What needs to be shown is how Nature keeps the energy of a mass permanently in a condensed state.

Waves in water can pass through one another without diminishing their power. Light waves constantly and from every direction pass through one another without the least difficulty. How can wave collapse be justified? Furthermore, how can a wave be made to stay condensed in a locality? Field Structure Theory can explain this mysterious mechanism.

EM waves only collapse if they encounter matter, which to say from the structural point of view, when the EM was encounter an organization of action whereby the energy in following lines of action of the same frequency are topological knotted. Concurrently, another natural process of wave collapse occurs when EM traveling through the plenum knots of its own accord. This can happen when the frequency of a plenum loops equal the frequency found in fermion particles. On the one hand, when EM encounters a fermion knot of matter, the EM wave becomes entangled and bound. On the other hand, *because the plenum itself is a knot*, when the frequency of the EM wave reaches the same frequency as that of a fermion knot particle, the EM wave will condense into a particle of its own accord; which particle it becomes is determined by the frequency. The fact this EM can form fermions indicates that the plenum is itself knotted and can serve as a fermion making topology. This has far-reaching cosmological implications.

It has been shown in this paper (Figure 12) how a wave collapses. Figure 12 shows the collapse of one loop of a loop/wave set. A prerequisite for this collapse in nature is that the frequency of the wave/loops be of sufficiently high energy (greater than 10^{19} Hz) in the gamma range. For this collapse to become permanent, three such waves have to interact in such a way that they knot and stay collapsed. It may be that a wave cannot have sufficient energy to collapse in and of itself since it takes three waves to form a fermion. This is yet to be confirmed. This collapse becomes permanent if the loops knot together; that is, each loop penetrates and wraps around the other loops in all three x , y , and z axis of three-dimensions. How that occurs is proprietary information. To restate the process, when the knotting has been made, the loops composed of a right and left handed wave woven around each other, can separate so that one wave collapses to form the nucleus taking all the energy of the wave with it to the

nucleus, leaving the other wave that remains deployed in the charge field with only a nominal amount of energy (Fig. 14).

In real-matter (as opposed to an anti-matter), the condensed wave is left-handed and to the observer outside the form it appears to move in a clockwise direction. The wave that remains deployed is right-handed and moves counter-clockwise. The chirality of a real-matter atom has the electron moving in a right-handed direction counter-clockwise (ccw) and the proton, being left-handed, moves clockwise (cw).

If the observer is outside the fieldstructure, the chirality will be one way, as humans are when we observe the behavior of molecules, atoms, and particles. If the observer is inside the fieldstructure looking out, the chirality of motions will be reversed, as when a human being inside the fieldstructure observes from his earth platform, the cosmos.

Field Structure Theory maintains that the same line of action that we call an electron is the same line of action around which the energy of the proton arises. The e^- and p^+ are structurally linked being different aspects of the same EM wave/loop set. The EM wave when it encounters other waves in a specific way, separates out to form what physics regards as distinct and separate particle when in reality what has happened is that the wave has specialize its chiral potential to form a condensed state proton and a deployed state electron.

The proton, centered in a nucleus, is not subject to energy changes. That is because the proton is already energy saturated, while the electron in the EM field of the atom is in a deployed state and thus subject to energy inputs and outputs.

The idea that the electron and proton could be two phases of the same wave will no doubt be hard to image. Field Structure Theory supplies a model to help with this visualization. To simply the model, Figure 15 shows in 2-D how the right and left-handed motions of a chiral closed wave (a wave having both right and left handed loops woven together) can coexist.

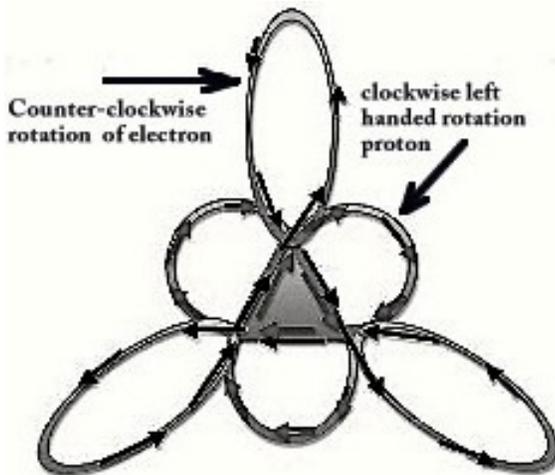


Fig. 15. Chiral Wave showing how the electron orbital can rotate ccw while the proton orbital can be cw and yet when traveling parallel to each other in the nucleus travel in the same direction adding amplitude to the nucleon's energy.

Shown in Fig. 15, the nucleus region (grey triangle area) has both the e^- (electron) and p^+ (proton) going in the same direction even though from the point of view of the entire orbitals of each particle, e^- goes ccw and p^+ goes cw. Because the e^- loop and p^+

loop are the left and right-handed loops of an EM wave and given the fact an e^- can stand alone from the p^+ means the two loops can be separated or share the same domain without causing interference. That seems to indicate that the right and left EM can be separated, even though they prefer to be entangled. Field-Structure Theory (FST) shows that the two waves can exist independently as stable structures or entangled in the same domain.

4.1. Spin

Figure 3 is a left-handed stable stand-alone fermion structure with $\frac{1}{2}$ spin. Boson EM waves, on the other hand, have a spin of 1 because both right and left-handed loop/waves are present and inseparable, even though either wave can condense (figures 11 and 12). The ability of the fermion to be structural is due entirely to the fact the three waves making up the fermion are knotting together. The secret to mass is the topological property of boson waves to form knots when interacting in three-dimensions.

The particle and atom factories of the universe are its LMOs (Large Massive Objects), i.e., stars, which have the conditions necessary to convert EM radiation into stable fermion structures having a rest mass. The purpose of galaxies, on the other hand, is to return fermion mass to boson energy, which in turn fuel the star's ability to convert boson energy back into fermion matter.

4.2. Summary of Spin Structures

1. For a chiral wave, one wave collapses to form a nucleus when three (or more) waves share the same domain of interaction.
2. If the collapsed wave is left-handed, a proton is created.
3. If a right-handed wave collapses, an anti-proton is created.
4. The left-handed loop of the chiral EM wave is the positron side of the EM wave and the right-handed is the electron side. A collapsed positron becomes a proton. A collapsed electron becomes an anti-proton.
5. The electron and positron are knotted, deployed EM waves. As a part of the same quantum system, the two waves do not interfere, but if separated, should they meet, they unknot each other and become entangled radiant EM waves (gamma rays).
6. The handedness of a particle is only understandable in the context of its interactions. That is why an electron can in the context of an atom be integrally involved with the nucleus.
7. The Bohr model of the atom having sun/planet structure is false. The fieldstructure model replaces the false solar system model with integrated particle field orbitals.



Fig.16: Simple loop

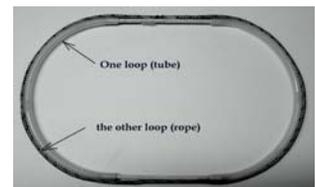


Fig.17: Two loops



Fig.18: One loop deployed and one collapsed

5. Particle Structure

The basis for a structural understanding of how an EM wave can collapse and form a nucleon has been discussed. The mechanism for holding that collapsed energy to form a fermion having rest mass has been suggested as being the result of chiral wave/loops knotting in three-dimensions. The “wiring together”, so to speak, of the three EM contributing loops that form the nucleus, allows the condensed loops to “short circuit and join together to form a single loop instead of remaining three separate loops. This is what gives stability to the proton once formed from the condensed EM positron wave. While the three deployed loops remain distinct, the three condensed loops fuse into a single loop that powerfully bind the three deployed loops together. The nucleons are bound not only by topological knotting, but by fused orbitals. These three loop sets that make an atom of hydrogen are the hypothetical **quarks** proposed in the Standard Model. The reason the quarks do not appear outside the nucleus is because while inside the nucleus they are fused together and constitute the proton. The reason the proton does not decay into quarks is because the quarks are actually compressed EM waves and it is these EM waves that are seen in proton annihilation, which only happens in a proton/anti-proton collision.



Fig. 19. The Fieldstructure Atom: Shows how the chiral loops of an atom are related. The hydrogen atom.



Fig. 20. The nucleus at the center of the hydrogen atom

In Figure 20 the part of the loops that form the nuclear polyhedra of the deployed e- and condensed p+ waves are the straight sections of the fieldstructure model in figure 19. This is where the condensed wave portion of the chiral wave set is fixed in an atom. The nucleus in Fig. 20 is a detail of the clump of loops at the center of Fig. 19.

The right-handed loops (positron wave) side of the chiral EM wave) are condensed. Fig. 20 shows the condensed wave bundled into the nucleus. The positron portion of the EM wave has collapsed and the three contributing loops (quarks) have looplapped into one left-handed loop braid, the proton. The electron chiral EM wave is the outer tetrahedron see in Fig. 19. It has the condensed positron portion of the EM wave spiraling around the electron orbital which is not twisted. This deployed positron wave (twisted rope) has been acquired from the environment by incoming light entangling in the electron's charge field.

Figure 20 showing the three loops (quark loops) braided together. The positron loops when nucleated have “short-circuited” in the sense that the loop found a way to shorten its orbital path. *Note: In the actual model the three loops each have their own color making the image much clearer to understand; unfortunately this is a black and white publication.*

Starting with a chiral EM wave comprised of right and left-handed loops woven together (Fig. 3), three of these loop/waves interact so that the left-handed loop condenses to a nuclear polyhedron (Fig. 19).

(*Note: Only tetrahedron polyhedrons are shown, but any polyhedron can be similarly used*). When this happens the condensed particles have a left-handed “positive” spin, which accounts for the positive charge of the proton and positron. **Electrical charge in FST refers to the handedness of the loops.** Fermion spin $\frac{1}{2}$ refers to whether or not all the loops are of the same handedness. Whichever handed it is decides the real-matter or anti-matter gender of the particle. Real-matter particles are electron, proton and neutron. The electron will be right-handed, the proton left-handed and the neutron will have both real-matter right-handed condensed electron and a real matter condensed proton. A negative charge means the particle and its field is right-handed while a positive charge is a field that rotates a particle in a left-handed manner. A neutral particle (the neutron) is a particle where both right and left-handed twisted looping is present in the deployed charge field of the particle/atom.

The electron remaining as the deployed portion of the EM wave forms the electromagnetic “cloud” of the atom. The deployed electron wave/loop has only a nominal amount of energy, until new EM waves having energy joins the electric field (of the atom) as shown in the outer tetrahedron of Fig. 19.

(*Reminder: EM wave means a chiral wave having both electron right-handed and positron left-handed waves.*) [6]

When an incoming EM wave contacts an atom which already has a condensed positron acting as a proton, it is the left-handed portion of the wave (the positron portion) that condenses in the deployed charge field. The incoming positron side of the EM wave does not immediately go into the nucleus, but rather it remains in the expanded polyhedron that is in the EM cloud surrounding the nucleus in figure 14. The condensed positron wave is the twisted “rope” portion in Fig. 19 of the EM cloud on the

large tetrahedron. It should be noted that the proton's energy in the atom is fixed, unlike the electron in the atomic cloud, which is where the energy fluctuates and changes insistently. Instead of protons storing bits of energy as does the deployed EM field, the atom stores energy in the EM field surrounding the nucleus and waits till the electron/positron EM wave in the field has accumulated enough energy to become a proton and then condenses the energy into the nucleus to make a new proton. In the normal life of an atom, inputs and outputs of energy, which are in the form of EM radiation, occurs only in the atomic cloud of the atom and not normally from the nucleus. If a non-radioactive nucleus admits radiation it is due a catastrophic external input of energy.

When the EM field of the atom becomes saturated with twist, the positron portion of the wave collapses and forms either a new proton, or if the electron portion of the wave collapses also, a neutron is formed in the nucleus. In the case of the neutron, the right-handed electron wave collapses as well as the left-handed positron portion, thereby making a neutron a combination of a condensed highly energized, highly twisted, positively charged positron and a nominally energized negatively charged electron plus the anti-neutrino [7].

6. The Sierpinski Fractal Triangle diagramming the hierarchy of particle mass/energy

BUT, we've skipped something important... It has not been shown how an electromagnetic wave (EM wave) accumulates energy. Where does the energy come from that forms the EM wave in the first place? To explore this it is necessary to go back to where we began this paper and look at the structure of the plenum, which in FST is the DNA of structure & form and the source of all energy (twist).

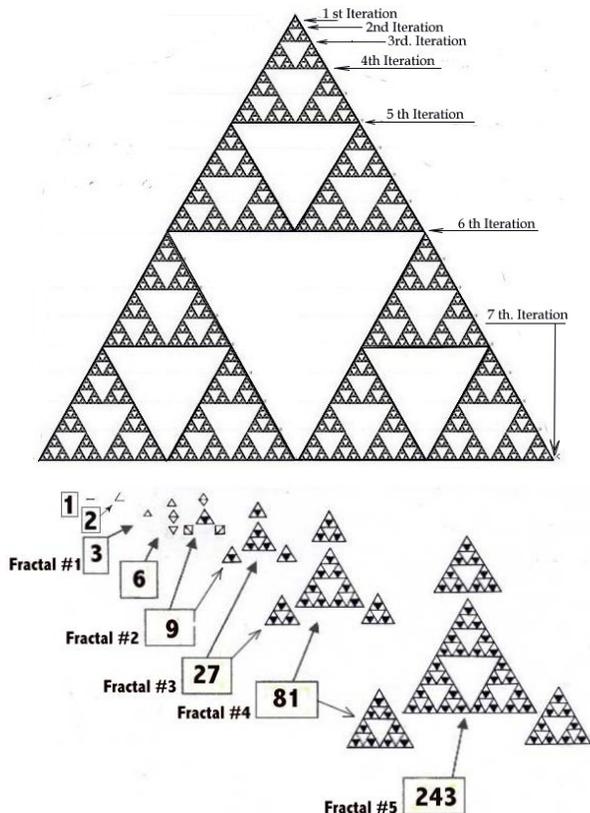


Fig. 21. Sierpinski Triangle Fractal having 2187 lines

FST postulates that all the energy in the universe is derived from the energy inherent in the plenum. Loops naturally iterate to build fractal hierarchies because energy seeks to radiate, to expand, to dissipate and obtain homeostasis all encompassed by the process of entropy. The mechanism for distributing energy across the universe is to trade energy for space (spatial extension). Chiral loops interact to become chiral EN energy loops (Fig.1), which can then deploy their twist to fuel the expansion process and the formation of structural complexity. Nature has seen to it that there is more energy in a form than the form needs to sustain itself. So Nature creates a form and then uses the excess energy of the form to interact with other forms to create new higher more complex organizations, going from particle to atom to molecule to cell to organism, etc. The contributing particles to an atom have more energy independently than they do when combined to form an atom so it either radiates the energy away or uses that energy to construct links to other atoms and create molecules. **The important point about this process is that the Nature always, ALWAYS, has energy to spare to build complexity.** The more complex the organization the less energy is needed by a single contributing unit. This structural imperative applies to particle physics as much as it does to the activities of human society.

The diagrams of the Sierpinski Triangle Fractal (Fig. 21 & 22) show how Nature builds the mass and energy hierarchy. The numeric relationships in the Sierpinski Triangle Fractal determine the fractal iteration of loops and twist. Loops account for the mass values and twists for the energy values.

6.1. The Mass and Energy of Elemental Particles with FST and the Sierpinski Fractal

1. Each line in the diagram represents a loop of EM energy. Each loop (line in the fractal) is composed of a right and left-handed loop woven together into a set. (see figure 1). In this diagram the right and left loops are generalized for ease of reading as being a single line.
2. Each loop is twisted, but the twisting is not shown.
3. The number of twists in a loop is the square of the total loop count, i.e., three loops have nine twists. Nine loops have 81 twists, 2187 loops have 4,782,969 twist, etc. This would mean a single EM loop, an electron, would have 4,782,969 times less energy than a neutron.
4. In Figure 21, in the **First Iteration** of the fractal there are three lines in the top most triangle representing three loops. In FST, a line is a loop and a loop has the mass value of one electron.
5. In the **Second Iteration**, three triangles have nine lines.
6. In the **Third Iteration**, three of the 2nd iteration forms join to make a form having 27 lines.
7. In the **Fourth Iteration**, three 3rd iteration forms circuit together to make a form having 81 lines.
8. In the **Fifth Iteration**, three 4th iteration forms circuit together to make a form having 243 lines.
9. In the **Sixth Iteration**, three 5th iteration forms circuit together to make a form having 729 lines.
10. And finally in the **Seventh Iteration**, three 6th iteration forms bond together to make a form having 2187 lines.

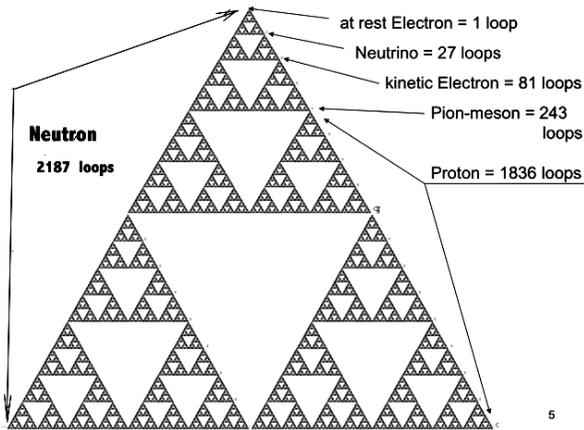


Fig. 22. Loop counts for particles

Each iteration is associated with the energy of an electron shell:

Shell number			Number of loops in electron in shell
0	Free electron		1
1	K or 1st	2	3
2	L or 2nd	8	9
3	M or 3rd	18	27
4	N or 4th	18	81
5	O or 5th	18	243
6	P or 6th	32	729
7	Q or 7th	32	2187

Fig. 23. Electron shell and loop relation: 7 shells and 7 fractal patterns. Energy chart for each iteration of the fractal and how they correspond to atomic shells.

The system is a series of seven energy stages, each of which is a particle that can be found in the first generation of particles from electron to neutron, neutron being the heaviest of the first generation particles. In another paper I have shown what stages of energy can be found in the pion, meson, muons. These momentary particles rapidly decay into lower energy states ending in purely energetic EM having no particle aspect.

The EM wave has a series of energy levels that comprise the first six iterations of fractal. Each level corresponds to the various energies of the electron shells. After fulfilling the energy of the 7th shell, the energy is sufficient to collapse into a neutron. It does not first collapse into an electron, pion, meson or proton because these stages of energy accumulation cannot reach the energy necessary for the creation of a fermion, the requirement being that the energy be contained in a symmetrical spatial and durational balance. In the seven platforms of the Sierpinski Fractal, only the seventh fractal, the neutron with 2187 loops, is spatially and durationally symmetrical. Other particles associated with the other fractal platforms may form, but only for an instant whereupon they collapse back into EM energy. As we know, EM energy is only stable when the energy collapses into a neutron. BUT, the neutron is not stable. To achieve stability it has to deploy into a proton/electron atom and form hydrogen. Hydrogen, in this way, can be seen as a deployed neutron.

Since the EM wave is not an electron fermion until it has been deployed by the neutron, it does not arise chronologically in the

creation cycle until the neutron has been created. The same can be said for the proton. By following how the fractal iterates, it can be seen how the neutron has to come before the proton or electron. There is not enough energy in the 6th iteration to create a proton and too much energy in the 7th iteration. So the 7th iteration, the neutron, deploys energy into a larger space where a balance between energy and the space it needs to live in is achieved. The space in which the neutron is stable is the hydrogen atom. It can be seen that the electron and proton of hydrogen is the stable form of the neutron. The reason it deploys is to get the proper balance between amount of energy and amount of space for this energy to live in. I like to think of it as the neutron has too much energy for the space in which it lives. It solves the problem by deploying energy into a larger structural space, that of the hydrogen atom, to achieve stability.

If true, this leads to the need to re-evaluate what the neutron is all about. In the laboratory, neutron "decay" seems like an applicable description. Laboratory neutron decay is "hot", because the neutron is dislodged from a nucleus by a violent high-energy collision. In that situation the kinetic energy of the electron and proton far overpower the charge attraction the e⁻ and p⁺ naturally have for each other and the two particles go their separate ways.

Hot neutron decay is not normal. In normal "cold decay" where the process occurs at or near absolute zero, the electromagnetic attraction between electrons and protons is not overridden by the high kinetic energy found in hot decay. What happens to the neutron normally is not a decay process, but rather a **deployment** process. The neutron's heat is low enough to allow the e⁻ and p⁺ to set up a stable atomic structure. The small amount of excess energy carried off by the neutrino (anti-neutrino actually) does not interfere with the charge attraction between e⁻ and p⁺. In fact, it facilitates it. The neutron decay, to my knowledge, has been studied exclusively in the laboratory under "hot" conditions, hence we have not witnessed the gentler neutron deployment process that creates hydrogen. We have only seen protons and electrons flying off independently at great speed and energy. It would seem the hypothesis that neutron deploy to produce hydrogen could be tested in a laboratory. This view of the process might be of interest to proponents of cold fusion, since neutron deployment liberates EM energy that could be put to productive use with technology.

7. The Source of Hydrogen in the Universe is from Cold Neutron Deployment

But where do we find this process in Nature? FST suggests the creation of hydrogen, the most abundant element in the cosmos, occurs in extremely cold conditions, when extremely high energy EM gamma energy is found. We know stars to be the atom factories of the cosmos and it makes sense to look there for matter creation. To do so, we will have to revise our understanding of star structure. FST suggests that the interior of a star and perhaps smaller LMOs such as earth size planets are at their core, contrary to popular myth, extremely cold places and in this cold place neutrons are formed from EM energy, which then deploys to create hydrogen gas and begin the chain of transformations

that result in the periodic table of elements. Unfortunately, there is a lot more of this idea that will have to await a future paper.

If the interior of a LMO (star, etc.) is cold, extremely cold, would that not contradict the presence of the high EM energies needed to produce a neutron? Can there be high energy and no temperature? Is "cold" energy an oxymoron? The answer is NO. Cold energy is not an oxymoron. Heat is only meaningful if there is matter to heat. If the interior of the sun has no mass, but only EM energy, it would be theoretically absolutely cold. If matter is present, the EM energy would, of course, heat it. Energy has no temperature in and of itself, thank goodness or we would be fried instantly given all the EM energy that fills the universe. Once the neutron is created by the collapse of the both sides of an EM wave, the EM energy is now contained in the neutron. There is too much energy in the neutron so it deploys itself into the larger spatial domain of the hydrogen atom discharging an anti-neutrino in the process. Hydrogen is a stable form of the neutron and, being a fermion set, will now be heated by the ambient EM energy. Heated by the EM energy, the usual processes of thermodynamics ensues turning a star's fermion content into a furnace sufficiently hot as to begin fusion of the hydrogen in the outer material regions of a star, leaving the interior absolutely cold so that neutron formation can occur. Sunspots are cold regions on the surface of a star. It is not too hard to imagine that sunspots are windows into the frigid core of the star out of which EM loops erupt.

This suggests that the fusion is not the driving force of a star, but rather a secondary process that occurs after neutron generation from EM energy. The dominate force in the universe responsible for all form and structure is electromagnetic energy. According to FST, the dominate state of matter is plasma and the dominant structural system is loop fractal dynamics.

8. Conclusion

1. Neutrons are collapsed right (electron) and left-handed (positron) EM wave/loops.
2. Since all the energy of the EM wave set is in the collapsed positron side, only a nominal amount of energy is left in the deployed electron side of the EM wave. This type of wave collapse produces the hydrogen atom.
3. When the neutron forms, the right-handed electron side of the wave collapses along with the positron wave, but the electron wave collapse brings only a nominal amount of energy to the neutron's formation while the positron's side brings energy sufficient to make the proton. The similar mass values of the proton and neutron would confirm this hypothesis.
4. This model preserves charge relationships, spin, and handedness values of all the particles since all particles are products of EM wave.
5. This explains why and where real-matter and anti-matter are to be found, and how EM wave collapse can account for the two types of matter switching realities from real to anti and back again as being the result of EM wave collapse.
6. It is KTS (known to science) that an EM wave has both right and left-handed aspects. FST suggests and demonstrates how when the EM wave collapse proton and neutron's form.

References and Notes

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- [1] **Plenum:** A term popularized by Erwin Lazlo to replace the term ether (aether), which while both are used to describe the ultimate "stuff" of the universe. Ether is thought of as medium that remains unattached and separated from "stuff", i.e., matter.
 - [2] In Sanskrit, the ancient language of the Indian Vedas, a chiral plenum loop is called "*akasha*" and the energy it manifest is called "*prana*". The loop that rotates clockwise is called "*Ida*" and the counter-clockwise rotating loop is called "*Pingala*". Interestingly, these primal forms have been indentified thousands of years ago without the aid of science as we know it today.
 - [3] Unfortunately, structure is a stand-alone science in its own right and remains to be fully expounded, something I have been pursuing for the last 40 years and hope to complete in the coming years.
 - [4] There can be a single loop wave, two loop (as shown), three, four or any numbered loop wave. Each has their own dynamics and unique properties. This paper will confine itself to the two loop wave form.
 - [5] Notwithstanding the patent office's insistence that there is no such a thing as a perpetual motion machine, Nature, it would seem, knows better.
 - [6] The fact we do not see the positron side of an EM wave is due to the fact our sensorium and its mechanical extensions are made of real matter materials that can't see anti-matter phenomena. Real matter cloaks the anti-matter.
 - [7] **Anti-neutrino:** The anti-neutrino, which emerges with neutron deployment (decay), comes from the fact there is an neutrino loop/wave (in this decay an anti-neutrino loop/wave) that is carried along with the EM wave, but being intrinsic rather than extrinsic, is not normally considered due to its almost ghost-like presence. Neutrinos are interesting and though they seem to play a minor role in the particle picture are the most abundant structure in the universe being found in all EM radiation. A paper on the neutrino is planned for the future.
- Wikipedia on the tritium:** While tritium has several different experimentally determined values of its [half-life](#), the [National Institute of Standards and Technology](#) lists $4,500 \pm 8$ days (approximately 12.32 years).^[1] It decays into [helium-3](#) by [beta decay](#) as in this nuclear equation: and it releases 18.6 [keV](#) of energy in the process. The [electron's](#) kinetic energy varies, with an average of 5.7 keV, while the remaining energy is carried off by the nearly undetectable [electron antineutrino](#).