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Stereographical Simulation of the Propagation of the Atomic Orbitals f_{-3} & f_{+3} in Spacetime as a Vibrational Wave Over an Ether from Point A to Point B in the "Eternal" Expansion of the Universe

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Abstract: This work is based on a previous published hypothesis which proposed that the solid matter of the universe can be represented as a vibrational wave of energy propagating over an ether or matrix through a mechanism that scrambles the degree of duality in matter: *x%* localized (solid), *y%* delocalized (wave). The main purpose of this paper is to present a two dimensional approximation of the three dimensional structure of the shape of the energy distribution of an atomic orbital to propose a mechanism through which the orbital can be transported as a vibration from a point *A* to point *B* in the matrix. This process requires cycles or oscillations of mounting-dismounting-remounting in which what travels from point *A* to point *B* is the energy forming the orbital and not the solid matter that it can form. The atomic seven dimensional *f* orbital of hydrogen-like atoms is used as a model to show an analogy to the transformations that it can be submitted to when transported over the matrix. The eight lobes or petals of the f_{-3} and f_{+3} sub-orbitals that are allowed by quantum rules to form solidity in matter are approximated with the polar equation $r=sin(100*\theta)$. Successive multiplication of the angle θ by the values 101 to 139 generates harmonic structures that here are interpreted as shapes of the orbitals that are not allowed by quantum rules to form solid objects. The initial shape approximated by $r=sin(100*\theta)$ is re-generated by $r=sin(140*\theta)$. This result suggests that the transportation of the orbitals from point *A* ($r=sin(100*\theta)$) to point *B* ($r=sin(140*\theta)$ may involve a transition state of forty changes in the structure that cannot form solid matter. Mathematical study of the associated $dr/d\theta$ derivatives of each function reveals an underlying order of changes in symmetry and the appearance of a gene-like structure of the mechanism that includes tandem repeats and palindrome sequences. Further discussion considers interpreting the transportation mechanism through templates controlled by quantum coherence and decoherence, and future areas of study.

Keywords: Continuous linear equations; Creation of duality; David Bohm; Discontinuous linear equations; Ether; Explicate order; f atomic orbital; Fourth law of thermodynamics; Fragmentation; Hidden variables; Holomovement; Implicate order; Matrix; Orbetene; Orbitron; Particle of time; Point A to point B; Quantum coherence; Quantum decoherence; Quantum Mechanics; Relativity; Rheomode; Scrambling duality; Sub quantum; Superluminal; Time energy levels; Universal expansion; Wholeness; World tube.

1. Introduction

In the previous publication *The Theory of the Hidden Variable Behind* (HVB): *The Quantization of Duality* under the field of Philosophy of Physics I had clarified that in quantum mechanics the vibrations of atoms are represented by the basic motion of the pendulum and the fundamental mathematical trigonometric function of the sine wave [1]. There it was proposed that the solidity and wave character or duality of matter propagates as a set of instructions comprised of vibrational waves that move as the energy of the domino effect on an ether or matrix from point *A* to point *B* in the "eternal" expansion of the universe ever since the appearance of the Big Bang. The process requires the universe to be subjected to cycles of mounting-dismounting-remounting to be transported as a wave over the matrix medium in which the matter of the matrix forming the universe at a point *A* is not the same matter forming it at point *B*. Instead, the universe is re-built with the matter present at point *B* through a replacement mechanism that is analogous to the central dogma of molecular biology of transcription-replication-translation of DNA in which the creation of a new cell goes through a transformation or metamorphosis.

In the HVB Theory time was hypothesized to be a waveparticle as light but with a different degree of duality setting the stage at which reality is manifested. Waveparticles, such as the electron, have a set of associated energy levels or states through which the energy can be spread, so previously there was a consideration of possible energy levels for time. The quantum treatment of time as light has been previously proposed by other authors [2]. Since time represents the stage at which reality spontaneously occurs, then its energy levels may be organized by allocating the occurrence of any event #1 (the cause) at a *higher* energy level than the immediate occurring event #2 (the effect). A consequence of this model is that traveling in time to the past is prohibited because there is an energy barrier that separates the past from the present, see Figure 1.

In the paper it was stated that Maxwell through the four electromagnetic equations that unify the electric (*E*) and the magnetic field (*B*) seems to explain how particles acquire electric charge: by ending or terminating electric fields [3]. The action of terminating was translated to localizing electric fields in which the electric energy is being confined, squeezed or spread over a *lower* number of energy levels. Since Maxwell did not clarify the origins of mass, I came up with the idea of terminating or localizing magnetic energy to explain how particles acquire mass. There I proposed that there is a parent source of energy made of 100% delocalized (wave-like) and 0% localized (solid-like) electromagnetic energy corresponding to a non-dual pure "ether" universe that has the ability to be distorted through energy localization to form solid objects. In this proposal particles acquire mass and charge by allocating different combinations of localized and delocalized electromagnetic energy through scrambling duality. The process was associated with changing the 90^{o} angle or orthogonality between the electric (*E*) and the magnetic fields (*B*). Thus, the matter of the universe originates from the parent ether composed of distortable pure wave-like energy here called the matrix, because of its mathematical qualities. Through a violation to the limits of the speed of light given by the Theory Relativity of Einstein I described the matrix as capable of spreading energy over an *infinite* number of energy levels (at least from the human point of view) simultaneously by moving it *faster* than the speed of light (~680,000,000 mph, superluminal or tachyon-like).

In the HVB Theory, as in quantum mechanics, atoms and subatomic particles are vibrational waves. This implies based on the de Broglie relation that everything made of waves is also a wave, including you, me, and the entire universe, so that in principle, waves can only make waves. Therefore, we shouldn't be surprised to find common behavior and organization among living and non-living things through repeated patterns in the infrastructure of life set up by the fact that ultimately everything is waves. In this sense, the matrix is the medium in which the wave of dual localized and delocalized energy of this universe propagates. In this theoretical model, our universe is like an eddy or bubble moving slower on the faster moving rushing waters of the river (the ether or matrix). This interpretation implies that the universe appears to be made from slowed-down energy of the matrix somehow *forced* or *manipulated* to become localized. This means that the fabric of the universe is distorted energy of the matrix that is available to be converted on the dual matter that builds atomic and sub-atomic particles. The motion of the universe on the matrix is also analogous to the domino effect in which the falling dominoes are the matter of the matrix, and the universe is the energy moving from domino to domino. I call this process bending or distorting the matter of the matrix.

Very interestingly, the Big Bang in the HVB is considered the creation or startup of duality through a loss of superluminal energy in the matrix that formed luminal energy in our universe (local) as understood in the Einstein's theory of special relativity, which limits the speed of light to a maximum of ~680,000,000 mph in "vaccum". The creation of duality imposes luminality, localization and solidity from non-duality, superluminality, delocalization and wave-like character. In this model, before the Big Bang all energy was non dual or entirely delocalized or 100% wave-like or ethereal concentrated in an infinitely dense point-like structure. This reminds me to state that I agree with the conjecture that the total mass of the universe before the Big Bang was comprised into an infinitesimally small point of "nothing" as long as we agree that the word "nothing" has to be re-difined as *something* that cannot be perceived with our five senses and is beyond instrumental detection limits (hidden). On the contrary, black holes are seen as objects or *machines* in which the reverse effect occurs at a lower scale: non-duality is restored by returning energy from localized (luminal) back into delocalized (superluminal), where the imposed distortional force is lifted.

The motion of the universe as a propagating wave of energy on the matrix like a domino effect has some particular properties worthy of interpretation. Since everything is made of atoms (including humans) and atoms are vibrational waves, then nothing is always made from the same distorted matter of the matrix. This is so, because the universe is always moving from point *A* to point *B* during its "eternal" expansion since the Big Bang. This implies that our matter is frequently replaced by newly-distorted matrix matter at any new point *B* because the law of physics about the propagation of waves implies that the parts of the medium have low or zero net displacement. This means that the solid distorted matter of the matrix forming the universe at a point *A* cannot be transported to a point *B*: the solidity of the universe is not what is traveling from the present into the future. As time passes, the way in which the universe is going to reach any point *B* is by dismounting it at point *A* and re-mounting it at point *B* with the distortable matter of the matrix available at point *B*. This implies that everything solid is going through cycles of mounting-dismounting-remounting as everything moves in time. I call this mechanisms getting *replaced*. In the cyclic theory of the universe this is translated to be subjected to constant cycles of Big-Bang-contraction-Big Bang. This hypothesis suggests that the universe on point *A* is *independent* of the universe on point *B*, see Figure 2. As quoted from Einstein: "That is, the real in one part of space, *A*, should (in theory) somehow "exist" independently of that which is thought of as real in another part of space, *B*. If a physical system stretches over *A* and *B*, then what is

present in *B* should somehow have an existence independent of what is present in *A*" [4]. I should add that the mutual independency of the universes of past (cause) and present (effect) should be considered to exist in a quantum state of entanglement.

The solid universe is most likely formed from additional natural forces to the four already known: the strong force keeping protons in the nucleus of the atoms, the weak force describing radioactive decay, the electromagnetic force, and gravity. These elusive forces "bend" the non-dual, delocalized, and wavy matter of the matrix into dual, localized, and solid matter through a set of instructions that describe how to re-form the universe at *any* new point in the matrix. In other words, what is actually been transported from point *A* to point *B* is the *energy* of the permanent or unchangeable set of instructions that bends matrix matter into the solid objects, substances, and living beings of the entire universe. This process can be seen as a constant execution, repetition, application or operation of the instructions that lead to a periodical re-occurrence of life and the entire universe through "eternity". As expressed in theosophy: "The Universe is the periodical manifestation of this unknown Absolute Essence" [5].

Due to the fact that nature has a tendency to minimize the energy use on every process it is not required spending or *wasting* new amounts of energy to have a solid universe simultaneously at both points *A* and *B* or past and present. The implicit law of energy minimization across all science fields forbids having a solid copy of the universe or universes of past actions simultaneously with a copy of the universe of the present time. In addition, based on the HVB model the re-building of the universe at point *B* occurs at a *lower* energy level of time than at *A* with an *increased* degree of disorder upon rebuilding (positive entropy (ΔS)). Reversing this event may be impossible from the human point of view. This argument provides one reason why our material bodies are getting older from time to time. This is so, because the replacement follows the 2nd law of thermodynamics: the disorder of the universe is always increasing. This means that every time that you, I, and the entire universe gets replaced in the matrix from point *A* to point *B* we are all rebuilt with *greater* disorder, and thus everything will physically reach a day of the greatest disorder or highest degree of entropy that is no longer able to keep the order of life: the day of death.

In the HVB theory it was speculated that the model of the atomic harmonic oscillator explaining the accommodation of electrons in atomic orbitals is a map or a repeated pattern leading to the hypothesis that there exist other universes analogous to the atomic orbitals *s, p, d, f.* Atomic orbitals are obtained by mathematically treating as a standing wave the energy distribution of the electron around the center of the atom. In this model, our three dimensional (3D) universe is analogous to living in the atomic 3D *p* orbital, see Figure 3. It was also proposed that higher universes such as the analogous to the *d* and *f* orbitals are superior because their energy is less confined respectively distributed over five (5D) and seven dimensions (7D) able to be spread over a *larger* number of energy levels. This ability was correlated with a higher degree of freedom, change in duality by allocating more energy into wave and less into solid, and reverse entropy (negative) in which the natural tendency is to get less disordered or more ordered whenever replaced upon moving from point *A* to point *B* in the matrix. The model also suggested that the pure 100% delocalized and 0% localized energy of the matrix can be correlated with the atomic energy level referred to as the continuum or freedom in which the energy is spread over an infinite number of energy levels simultaneously.

2. Materials and Methods

All graphs were generated with a Texas Instruments TI-89 Titanium scientific graphic calculator with Identification Number 09E4-A4B2C-8378, Operating System version 3.10, BIOS version 2.02, and total RAM of 256 kilobytes (Kb). Using the Graph function under the MODE key the POLAR coordinates and angle in RADIAN were selected. To produce a symmetrical function the value of θ_{Max} was set to 4π in the menu under WINDOW and the graphs were plotted using the function ZOOMSQR. All graphs were transferred to a Windows PC computer through a USB communication port and handled with a TI Connect™ Screen Capture Rogue Wave software version 4.0.0.2.1.8.

2.1. Computational Simulation and Results

The contour shape of the quantum energy distribution in the f_{-3} and f_{+3} atomic orbitals appears as eight three dimensional (3D) lobes or petals spread over the *x*, *y* and *z* axes, Figure 4 (UC Davis). This stereological study represents through two-dimensional (2D) polar spherical coordinates the hypothetical transformation of these orbitals when moving in time over a matrix from a point *A* to point *B* as a propagating vibrational wave.

The fundamental 3D shape showing eight petals or a daisy flower can be approximated by the two dimensional (2D) function $r(\theta) = sin\ (100*\theta)$, see Figure 4. The model has the purpose of investigating how many successive multiplication of the fundamental function $r(\theta) = sin\ (A*\theta)$ in which *A* represents the whole numbers 101, 102, 103, …, *n* are required to re-obtained the initial function $r(\theta) = sin\ (100*\theta)$. Figure 4 shows the plots obtained for the consecutive functions *sin (100*θ), sin (101*θ), sin (102*θ), sin (103*θ), sin (104*θ), sin (105*θ), sin (106*θ), sin (107*θ), sin (108*θ), sin (109*θ), sin (110*θ), sin (111*θ), sin (112*θ) sin (113*θ), sin (114*θ), sin (115*θ), sin (116*θ), sin (117*θ), sin (118*θ),sin (119*θ), sin (120*θ), sin (121*θ), sin (122*θ), sin (123*θ), sin (124*θ), sin (125*θ), sin (126*θ), sin (127*θ), sin (128*θ), sin (129*θ), sin (130*θ), sin (131*θ), sin (132*θ), sin (133*θ), sin (134*θ), sin (135*θ), sin (136*θ), sin (137*θ), sin (138*θ), sin (139*θ),* and *sin (140*θ).* Notice that it took a total of forty changes in the shape of the function to re-generate the original eight petals function so that the function $r(\theta) =$

*sin (100*θ)* is *indistinguishable* to the function *r(θ) = sin (140*θ).* This mathematical series can be represented by the summation $r(\theta) = \sum_{A=100}^{140} \sin(A * \theta)$.

Visual observation of the graphical sequence *r(θ) = sin (100*θ)* to *r(θ) = sin (140*θ)* shows the radical changes in the shape of the functions, see Figure 5. Notice that the functions *r(θ) = sin (100*θ)* to *r(θ) = sin (119*θ)* are structurally different and that the function *r(θ) = sin (120*θ)* generates no graph. In addition, notice that the odd functions *r(θ) = sin (101*θ)* to *r(θ) = sin (119*θ)* appear to be the opposite or mirror image of functions *r(θ) = sin (121*θ)* to *r(θ) = sin (139*θ)* so that the blank function *r(θ) = sin (120*θ)* appears to mark a central point. The effect is easier to observe by comparing two images of opposite symmetry generated by multiplying the fundamental function *r(θ) = sin (A*θ)* by an odd whole numbers, see Figure 6. Table 1 summarizes all figures having obvious opposite or anti-parallel symmetry upon visual examination.

The effect of opposite symmetry cannot be easily observed when the value of *A* is an even whole number in the interval 100 to 140. In these cases it can be assumed that the trend in opposite symmetry upon visual observation is cancelled and that the apparent opposite functions are equivalent, see Figure 7 and Table 2.

The absence of a horizontal symmetry plane in odd functions suggests that functions obtained from even values of *A* have a greater degree of symmetry. Consider for example the functions *r(θ) = sin (101*θ)* and *r(θ) = sin (102*θ)* shown in Figure 8. In the figure of the function *r(θ) = sin (101*θ)* the petal pointing upward along the vertical symmetry plane has to be divided in half to have a symmetrical arrangement of half petal to the left and half to the right, and two full petals to each the left and the right. However, it does not have a petal pointing downward along the same horizontal axis, and therefore, the function lacks of vertical symmetry. Unlike *r(θ) = sin (101*θ),* the function *r(θ) = sin (102*θ)* has a symmetry plane through both the vertical and the horizontal axis. To investigate the relationship between the successive harmonic functions and the change in symmetry a detailed study was conducted on the number of petals and derivatives dr/dθ associated with the minimum and maximum points on each structure see Table 3.

The data shows that changes in the number of petals and derivatives follow cycles of decrease-increase-decrease, and that the two patterns or trends correlate with each other, see Figure 9. In addition, the difference between them reaches zero at the central figure given by the no graph function *r(θ) = sin (120*θ).*

Notice that the changes in the number of petals between the consecutive even values of *A*= 100, 102, 104, 106, 108, 110, 112, 114, 116, and 118 follow a trend of increasing values of four: 8, 12, 16, 20, 24, 28, 32, 36, 40, 44. The changes in the number of petals between the consecutive odd values of *A*= 101, 103, 105, 107, 109, 111, 113, 115, 117, and 119 follow a trend of increasing values of two: 5, 7, 9, 11, 13, 15, 17, 19, 12, and 23. The order of changes in derivatives between the consecutive even values of *A*= 100, 102, 104, 106, 108, 110, 112, 114, and 116 follow the palindrome sequence: 40-36-32-44-21-44-32-36-40 having 21 at the center. The order of changes in derivatives between the consecutive odd values of *A*= 101, 103, 105, 107, 109, 111, 113, 115 follow the palindrome sequence 23-23-21-23-23-21-23-23 having no central point. These orders are for half of the transformation because the values of *A* = 121-140 after the central function when *A* = 120 are the opposite and equivalent functions of those when *A* = 100 to 119. Therefore the values for *A* = 118 that was not included in the palindrome of the even derivatives forms part of the larger overall symmetry transformation described by the palindrome sequence obtained when all the functions obtained for *A*= 121 to 140 with opposite and equivalent symmetries are included, see Figure 10.

Table 4 shows that the trend in the change of the number of petals (Δ Petals) across all values of *A* = 100 to 140 reveals a symmetrical palindrome sequence that changes by a factor of two. Repeated values are grouped and labeled by distinct color shades. The positive sign in the change of number of petals indicates that the figure given by an even number of *A* has a higher number of petals than a consecutive figure with an odd number of *A* and a negative sign is for the opposite case. The same order is true for the change in the number of derivatives with the difference that the trend follows a palindrome sequence with variable change across consecutive functions. On the right of Table 4 is the complete sequence of number of derivatives per petal per picture across all values of *A* from 100 to 140. Notice the similarity or analogy between the shaded patterns in the sequences and those coding for genes in DNA based on the sequences of the nitrogenated bases Guanine (G), cytosine (C), Thymine (T) and Adenine (A) in nucleic acids.

To observe simultaneously how the change in the number of petals per function is related to the distribution in the number of derivatives Table 5 and Figure 11 correspond to the rate of number of derivatives per petal. A regression statistical analysis revealed that the plot of the value of *A* in *r(θ) = sin (A*θ)* versus the rate can be 91 % explained by a logarithmic data fit.

3. Discussion

Modern theories sustain that there is no consistent notion about the universal constitution and structure of matter [6]. A major discovery in science is that particles such as the photon and the electron also manifest as waves so that they can move discontinuously. The Dirac's equation sustains that all particles of matter move at the speed of light through jagged patterns that produce the illusion that matter moves slower than the speed of light [7]. A particular property of Newton mechanics and Maxwell's electrodynamics is that the methodology is deterministic, one that can predict the position and motion of an object in the future once some initial information such as position, velocity, and forces acting on the object are given. These theories before relativity and quantum mechanics represent the physics of the macro that successfully describe the motion of planets, trajectories of projectiles and even the diffraction of light. Unlike these theories, quantum predictions of the micro are statistically originated and only

deterministic when referring to large aggregates, bundles or clusters of electrons and indeterministic when referring to individual electrons. This is demonstrated by the Brownian "random" motion of individual smoke particles which statistical laws are consistent with the existence of deeper hidden laws acting at a sub-quantum level. This is so because based on the fundamental postulates of the quantum theory there is no wavefunction that can describe a state in which the physically significant components of a system are dispersionless or sharply defined free from statistical fluctuation.

It is also claimed that the view of the universe as a continuous field also becomes discontinuous so that the actual behavior of the universe has been undermined. Unfortunately it appears that what has been important to modern physics is the development of mathematical equations that allow to control and predict the behavior of large particles aggregates, which is what some recognized scientists apparently think is all that human knowledge is about. One major problem of modern physics is that the image of particles that scientists have used to come up with their calculations appears highly confused by the fact that particles are waves that can move discontinuously. The basis of the correct mathematical predictions of quantum mechanics remains uncertain and it is quite likely that new clarifications and treatments of physical problems may still come from theories involving hidden variables, especially those of very short distance of the order of 10^{-13} cm and of very high energy of the order of 10^{9} ev. The concept of hidden variables acting on the background infrastructure of nature has been a discussion ground for scientists including Einstein, Rosen, Podolsky [8], de Broglie [9, 10], Bohm [11], and Vigier [12] who theoretically had expressed rationale arguments to contradict those of von Newmann against hidden variables in the orthodox version of quantum mechanics [8, 13-16].

The order of physics based on the Cartesian rectilinear and the relativity curvilinear grids analyzes the world into particles and field elements that exist separately. The serious problem of the separation into elements in the Cartesian analysis is that, although they differ greatly in the notion of order, both relativity and quantum mechanics imply that the actual order of the universe is determined by unbroken wholeness. To be clear about the concept of continuity and discontinuity, each of these theories refers to unique notion of static and fragmentary modes of existence to extend the analysis of the universe into separate parts, particularly beyond the limit to which this is appropriate. This is an attempt to divide to what is ultimately indivisible, a raw approximation. This is so because these forms are really abstractions taken from a deeper level with little or no meaning when observed as autonomous and separated from each other [6]. This analytic form was adequate for the fundamental physics put forth by Galileo and Newton but it is not really relevant or consistent for modern physics where the emphasis of general relativity on *continuity of fields*, and the two concepts Brownian motion and the quantum properties of light involving *discontinuity* are relevant.

The Theory of Relativity refers to separate events connected through signals in which movement is continuous, causally determinate and well defined. The Theory of Quantum Mechanics refers to well-defined quantum states in which movement is discontinuous, not causally determinate and not well defined. In this sense both theories remain fragmented unable to explain a deeper reality where unbroken wholeness prevails [6]. It is claimed that the modern relativistic quantum field theory has severe difficulties including doubts about its own internal self-consistency like the divergences (infinite results) of calculations about the interactions between different particles and fields [6]. A physics theory faces the need for a fundamental change if at very short distances and very high energies its calculations do not converge. A special exception in the status quo is for electromagnetic interactions where the divergences are avoided through the process called renormalization.

A great obstacle to scientific progress is the fact that in the 21st century there is no definite concept of matter. This stagnant lack of new approaches to knowledge and understanding supports the continuing call for a change in the overall way of thinking in which the human mind operates in a more harmonious way with nature. Such a higher level of order has been correlated with a more stable society. This is so because fragmented thoughts and language are related to contradictions and worldwide crises at the level of politics, economics, ecology, psychological, etcetera. Thoughts and language can be restructured away from fragmentation by processes like the rheomode which allows the verb to play a primary role rather than the noun [6]. I am particularly convinced that the fragmentation practice is greatly responsible for the false conflict that irresponsible and non-expert minds have cast upon science and religion, evidenced by the historical facts that early East civilizations like in India had philosophical and religious views of wholeness and not fragmentation [17]. In fact there are very rationale claims of parallels between physics and mysticism [18]. True unity within an individual, between man and man, and man and nature can result from actions that do not fragment the whole of reality. It is claimed that this higher level can only be achieved through a continual flow of notions about reality and abandonment of the unconscious habit of confusion around fragmentation. The true order in nature could be ultimately undefinable because it pervades our nature through language, thoughts, feelings, actions, learning, and everything we say and do in our daily lives [6].

The work presented here is a new kind of theory underlying the philosophy of the ***implicate*** or ***enfolded*** order of the universe of unbroken wholeness. At this deeper level of order space-time is *not* the factor controlling the dependence or independence of separate elements and therefore different basic connections can be made between "separate" elements. What humans conceive as separate and independent objects or fragments are illusory forms abstracted from this deeper order of wholeness called the *holomovement* coined from the word *holonomy:* the law of the whole. The idea that the self and the universe are separated fragments is an illusion that leads into confusion. Fragmented questions based on fragmented knowledge leads to fragmented answers. The apparent "independent" and "separate" objects with which humans have interaction in daily life are referred to as the *explicate* or *unfolded*

order. This order arises from the sense perception of reality and the experience with its content. What we perceive and reason as forms, proportions, and ratios are some sort of veil covering the true reality that cannot be perceived by the five senses, is beyond instrumental detection and of which nothing can be said or thought [6]. In this sense measure is a form of insight created by man to bring about harmony and order in life. It is interesting to mention here that thought experiments like the "Schrödinger's cat" question the true identity of nature. An example is the paradox consequence of quantum calculations that gives to a system multiple acceptable states or *choices* in the form of wavefunctions prior to its observation. In this experiment a hypothetical cat is placed in a box which will trigger the release of poisonous gas if a particular quantum event occurs like a radioactive decay of an isotope or the emission of light photons during fluorescence. In terms of quantum mechanics prior to opening the box to check the status of the cat, it must be considered both alive and dead simultaneously. Weaknesses in the interpretation of quantum mechanics leave open the question if anything can actually be known about the system if it is not observed. Furthermore, since everything is made of waves, there is the possibility of quantum *entanglement* between the observer and the observed supporting the claim that the original dis-entangled state cannot be directly observed or measured. As taken from the publication of the HVB Theory: "An evidence to this and a confirmation to the Heisenberg uncertainty principle apparently comes from the double-slit experiment and the well-known problem of observer interference with the measurement of quantum states [19] in which the observation action of a human being and an instrument interferes with the natural state of the observed system, see Figure 12.

In the particular case of the light double-slit experiment the conclusion is that a photon behaves as a wave if it is not observed and as a particle if it is observed [7]". This suggests that nature cannot be observed at its pure form, at least from the human point of view, and that there could unfortunately be no direct things that man can do to understand the immeasurable. However, in 2012 the Nobel Prize in physics was awarded to two scientists who developed a new method for observing the quantum states of photons avoiding interference or destruction of the natural quantum state by the act of observation [20]. Their method allows observing the "cat state" of the system in which a particle like a photon exists as both a particle and a wave simultaneously.

The atomic theory, first envisioned by Democritus more than 2,000 years ago, itself supported the idea of fragmentation or compartmentalization where matter is supposed to be composed of small units called atoms. In the view of wholeness, however, one can no longer make a division between the observer and the observed. Instead they both become *entangled* into one reality indivisible and unanalysable. The Theory of Quantum Mechanics does *not* consider entanglement. Instead of looking at the universe made up of essential atomic building blocks the world is better viewed in terms of universal flux of *events* or potentialities [21] and processes so that entities like particles are rather seen as what is called *world tubes.* Bohm has mentioned that the theory of relativity implies that the view of objects as point particles or quasi-rigid bodies cannot be considered as primary concepts [6]. The view of reality as a process goes back to Heraclitus who said that everything flows. Whitehead has expanded this view in modern times [22]. Everything is changing and all is a flux. This view quite implicitly defines an ether or matrix as a fundamental fabric of the universe. This is so because it considers wave-like entities as vortex structures in a flowing stream whose substance is constantly changing. This claim parallels the previous publication of the HVB theory which compared the universe to a slow moving eddy in the rushing waters of a river, to the energy traveling from domino to domino in the domino effect, and in the concept that the solidity of an object is replaced when transporting it from a point *A* to a point *B* in time, see Figure 13.

The figure is a depiction of an "object" represented as an abstracted pattern of movement of the more invariant matrix. A realistic analogy is like having a conveyor belt like a jogging treadmill in which an "object" like an electron is a *localized* indentation caused by a force on the moving belt. As previously published in the HVB Theory, this implies that "objects" formed with matrix matter in this fashion are stable but not composed of the same matrix matter as time passes. This means that the matter of the matrix forming the object at point *A* is *not* the same matter of the matrix forming it at point *B.* I have called this transportation process a *replacement* in which the "object" passes in time through cycles of mounted at point *A*, dismounted for transportation, re-mounted at point *B.* I have explained before that this will make much more sense if scientists implement a "new" 4^{th} law of thermodynamics. Although ubiquitous across all science fields and implicit in the 1^{st} law, we must make clear that energy use is always *minimized.* This is not exactly equal to "energy is conserved", because energy can be conserved like in a chemical reaction in which the energy of the reactants equals the energy of the products, however, the process is not necessarily the one spending the lowest amount of energy as compared to others achieving the same product. This is well exemplified in organic chemistry, where several syntheses lead to the same product through different energy pathways. Under normal conditions nature like in biological reactions chooses the pathway spending the *lowest* energy. We must define the 4^{th} law of thermodynamics as: Energy use is *always* minimized (of course whenever possible). This argument lead in the HVB Theory to propose that there is *only one* set of "cosmic" instructions of how the universe is "moved" from point *A* to point *B* in the matrix as a vibrational *distortion* in the otherwise undisturbed matter of the matrix. This also led to the conclusion that there is only one solid universe at a time *t:* the one of the present time where the only set of instruction is distorting the matrix, so that traveling to the past is *forbidden* because there is no solid universe left in the past. Although modern views in physics theorize about the possibility of traveling in time to the past by moving *faster* than the speed of light, Bohm emphasized that the Theory of Relativity from the point of view of atomic structure implies that our constituent atoms would fall apart and disperse because they would be traveling faster than the electromagnetic fields that hold them together. The past in the HVB Theory is a *wrinkle* in the matrix containing a "permanent" record of what it once formed at certain time

just as claimed by the Zero Point Energy Field of String Theory: a record or collection of some sort of electromagnetic radiation of all universal and human past and present actions, thoughts and events. This is a result of the hypothesis that the universe occupies more than the three known dimensions of space and the one of time (4D). In particular String Theory hypothesizes that the universe exists in about a total of eleven dimensions (11D) in which the other seven dimensions are wrapped up or entangled at a scale small enough to be compacted and undetected by human measures. The Hindus referred to it as the Akasha Record.

The "indentation force" of the entire universe is a *unique* set of physical/chemical/biological instructions or a blueprint including electromagnetic rules, particles/atoms/molecules assembly, gene sequences, and etcetera needed to form the universe as we know it at any point in the matrix. I am implying that the world tube "objects" like an electron (individual) or the entire universe (collection) goes in time through constant cycles of mounting-dismounting-remounting that makes it periodically change from solid to not-solid back to solid "eternally". This process was found to have an analogy with the central dogma of molecular biology of transcription-translation-replication in which the analogous to the DNA must be some kind of *gene-like* structure describing the "object" and the analogous to the RNA's must be the actual process of reading and assembling of the "object" with matrix matter symbolizing a copy of the instruction. I proposed that this "mitosis" of the transportation of the "object" could be accomplished by considering the hidden variable of scrambling the duality in matter in which the "object" goes through cycles of varying the percentages of localized (solid) and delocalized (wave) energy in the object. Scrambling duality in nature was hypothesized to be accomplished by changing the orthogonal 90^0 angle or orientation between the electric (E) and the magnetic (B) fields. Solidity or granularity can be achieved through orthogonality [23]. It was also proposed that the Big Bang started duality from the *non-dual* matrix whose chaotic field fluctuation is associated with having its energy 100% delocalized (pure wave energy), 0% localized (solid), and a 0^0 angle or parallel orientation between electric (E) and the magnetic (B) fields (not granular).

Attempting to eliminate a vortex without changing the activity of the stream is absurd. The ether or matrix creates, maintains, and dissolves vortex structures described in quantum mechanics through a mathematical wavefunction Ψ assumed to represent a real field in rapid random and chaotic fluctuations that makes the values of Ψ used in the theory an average over an interval of time τ. The scientific value of the wavefunction Ψ is that its square function Ψ^2 provides a probability distribution of finding an electron in certain atomic orbitals (like an *f* orbital, the subject of the work presented here) called the electron density, so that an electron, rather than a point-like structure, is really a cloudy distribution of energy around the nucleus of the atom that becomes fuzzy at the edges rather than a point-like structure. Mathematically the wavefunction Ψ is a vector in the Hilbert Space, an abstract vector based on Euclidean space used to describe spaces with any finite or infinite number of dimensions. The mean behavior of Ψ is determined by the Schrödinger equation related to the total energy of the system like an electron by incorporating the wave-like and particle-like properties. This has been subject of attempts to be solved (Spiros). The waveparticle acts on the matrix through a classical potential $V(x)$ and a quantum potential given by Equation 1 where $\hbar$ is the Planck constant (6.63×10^{-34} Joules.second), $\boldsymbol{\nabla}^2$ is the Laplacean operator in polar spherical coordinates, m is the mass, and R is the radial function. The quantum potential communicates the fluctuations of the field to the particle so that it does not follow a regular trajectory but rather a track resembling that the Brownian motion. This track contains an average velocity given by Equation 2 over the field fluctuations in the interval of time τ affecting the position of the particle. Calculations show inside the random motions the particle spends the mean fraction of the time in the volume element dV given by Equation 3, in which S is a phase function of Ψ when the wavefunction is written as in Equation 4 with R and S real. The field given by Ψ can be used to determine the motion in the matrix through Equation 2 and the quantum potential through Equation 1.

$$U = \frac{-\hbar^2}{2m}\frac{\boldsymbol{\nabla}^2 R}{R} \quad \textbf{(1)}$$

Equation 1: The quantum potential acting on a particle.

$$\upsilon = \frac{\boldsymbol{\nabla} S}{m} \quad \textbf{(2)}$$

Equation 2: The velocity vector of the particle.

$$P = |\Psi|^2 dV \quad \textbf{(3)}$$

Equation 3: The probability of finding Ψ in the time volume element dV.

$$\psi = Re^{iS/\hbar} \quad \textbf{(4)}$$

Equation 4: Phase function S for the wavefunction Ψ.

At the short distances considered at the quantum level the field is affected by violent fluctuations of what is called the "zero-point energy" of the "vacuum", an effect that is neglected in classical physics. Therefore the field operator ϕ_μ (like a mathematical operation on the wavefunction Ψ such as the integral or derivative that provides some information about the system such as position or velocity) that is sharply defined at a point **x** (in the ether, matrix or Hilbert Space) having all interactions between fields at that point is not continuous. The theoretical calculations assign properties to the "vacuum" state and then apply perturbation theory. In this way definite values can be assigned to the discontinuous functions of the field variables which "fill" the space densely while

simultaneously leaving a dense space of "holes" [6]. Quantum fluctuations can be treated by a set of field equations determining the changes of the field with time sufficiently non-linear to allow coupling between wave components so that with the exception of approximations the solutions cannot be linearly superposed. The non-linearity of the equations means that the fields will continue to be coupled to inner fluctuations that cannot be neglected. It is indeed non-linearity what makes possible localized "objects" because localized world tubes cannot be formed from linear equations whose solutions can be added together to obtain even more solutions. In addition, the Unified Field Theory attempts to unify the gravitational and the quantum fields based on non-linear equations [6]. The discontinuity of the fields in the smallest regions is allowed by the significant excitation of the field in the "vacuum" from turbulent motion causing high degree of randomness in the fluctuations. In the HVB theory the "vacuum" is re-interpreted as the ether or matrix or fabric of the universe.

The principal difference between the foundations of hidden variables is that von Newmann mechanics is based on wavefunctions *Ψ's* valued on actual quantum observables, whereas hidden variables have in addition the assumption that particles like the electron have more properties than those than can be described by the so-called "observables" [6]. Although this interpretation has been subject to serious criticism, the HVB Theory regards it as an excellent conceivable schematic of a modern model with a self-consistent structure of a newer physical idea. The representation of particles as world tubes with properties beyond the observables does not imply that the atomistic view is erroneous. Let us realize that theories are not true descriptions of reality but, rather, forms of insight subjected to constant changes. All of these arguments further clarify that in terms of wholeness and implicate order the atomic theory is an abstract simplification valid to some extent in the realistic world in which observers and instruments making measurements unite in one totality just as indicated by the foundations of both relativity and quantum mechanics. This different insight is referred to as *Undivided Wholeness in Flowing Movement.* This implies that flow is prior to the things that can exist in the flow dissolved as ripples, waves and vortices. In summary, wholeness means that everything that we see as separated in the universe like galaxies, stars, planets, objects, living organisms, molecules, atoms, particles, etcetera are connected into an unseen universal flow of wholeness. The flow cannot be explicitly defined but can be approached implicitly through the explicit definition of forms and shapes with distinct degree of stability that can be abstracted from the universal flux [6]. Indeed, this philosophy of wholeness can be traced back to the Greek philosopher Aristotle who considered the universe as a single organism made by parts that interact with the whole.

In the philosophy of fragmentation versus wholeness a stable and relatively autonomous atomic particle like the electron is not in reality an independent and permanently existent rigid object. It is rather a cloudy hybrid entity of solid and wave formed in the whole flowing movement into which it will ultimately dissolve back. More precisely, in the ether or matrix fabric of the universe the electron is a world tube product of particular vibrations or stable and conserved excitations of the matrix propagating as a wave of energy from point *A* to point *B* in the "eternal" expansion of the universe through cycles of mounting-dismounting-remounting (replaced). Elementary particles are dynamic movement mutually dependent that ultimately merge and interpenetrate in the flow of the wholeness represented by the matrix. In essence, the vortices, waves, ripples, and splashes kind of world tube forms in the flowing stream represent the creation, annihilation, and transformation of elementary particles. Particles get registered at large-scale levels where human instruments are sensitive to those features of the matrix field that last long but not to those fluctuating too rapidly. Instruments register the motions that retain their features for a long time without losing it to the infinitely random fluctuations that average zero on a higher level. The wave-like motion of particles have harmonic oscillating amplitudes that take the form of localized packets with discrete and well-defined values of energy, momentum, spin, charge, mass and other properties providing the essential characteristics of the particle. In this way the oscillations of different amplitudes become deterministic over a certain change of time and distance. These rules imply that action is quantized and there is such a thing as the quantum of action which may be defined as the minimum energy fluctuation or packet in which action can occur.

4. Conclusion

Modern physics continues the effort to overcome difficulties and elucidate great unknowns about the Theory of Relativity, black holes and the beginning of the universe, the real size of sub-atomic particles like the proton, the crisis in supersymmetry, holographic effects from other dimensions, the early universe and the "theory of everything", gravity waves and the beginning of time, and hidden worlds of dark matter [24-31]. The work presented here is a new approach to contribute with modern understanding of the nature of matter. I represented here the atomic f_{-3} and f_{+3} sub-orbitals as a world tube described by the polar function $r(\theta) = \sin(100*\theta)$. Its transportation in the matrix from a point *A* ($r(\theta) = \sin(100*\theta)$) to a point *B* ($r(\theta) = \sin(140*\theta)$ was interpreted as an event going through cycles of shape changes represented by the functions $r(\theta) = \sin(101*\theta)$ to $r(\theta) = \sin(140*\theta)$. The intermediate functions $r(\theta) = \sin(101*\theta)$ to $r(\theta) = \sin(139*\theta)$ between point *A* and point *B* were interpreted as a transition state through which the shapes of the energy contour of the *f* orbitals are not allowed to form solid objects. This process can be compared to a *metamorphosis* occurring through quantum jumps very similar to what is described by the theory of quantum tele-transportation. Current research investigates how the concepts of continuity and discontinuity could be associated with the individual forty one functions and the transition state. I hypothesize that the capability of transporting an atomic orbital like the *f* from point *A* to point *B* in time as a stable and localized excitation of the highly fluctuating or chaotic random and discontinuous motions of the matrix can be further

clarified applying the concepts of templates controlled by quantum coherence and decoherence described by Stapp on the quantum cognitive theory of consciousness [32].

The generation of gene-like structures describing the symmetry of the consecutive polar functions $r(\theta) = sin\ (100*\theta)$ to $r(\theta) = sin\ (140*\theta)$ support the hypothesis that there exists a set of "cosmic" instructions carrying information on how to bend or distort matrix matter into localized "objects". This evidences the claim of the HVB Theory that everything has a tendency to behave similar because there are repeated patterns in nature due to the fact that everything is made of atoms, and ultimately, atoms are vibrational waves. We may coin the name *orbitene* for the gene-like sequences shown in different colored shades in Figure 8 in charge of *coding* the transformations of the atomic f_{-3} and f_{+3} sub-orbitals upon transportation on the matrix. We may also coin the name *orbitron* for the chromosome-like structure carrying the DNA-like entity of objects of the universe.

We may consider that the orbetene of a particular structure is described in terms of number of petals and derivatives associated to certain characteristics of linearity/non-linearity given by the corresponding energy distribution, stability, and symmetry of the shape. The clarification of this association requires future investigations. An interesting concept arises from the question of why and how the changes in the structure pass through cycles of breaking and restoring certain symmetry planes. Current research includes studies on linearly superposed structures, in which particular superpositions of the polar functions $r(\theta) = sin\ (A*\theta)$ could reveal a hidden knowledge related to symmetry conservation and breaking. For example, Figure 14 shows the superposition or overlap of the two consecutive odd functions $r(\theta) = sin\ (103*\theta)$ and $r(\theta) = sin\ (105*\theta)$ each with lower symmetry than the middle even function $r(\theta) = sin\ (104*\theta)$. The degree of symmetry in the horizontal plane appears to be increased to mimic the full horizontal symmetry of the even function.

The central issue of all this argument remains on discovering theoretically and experimentally hidden interconnections and forces acting on continuity, discontinuity, shapes, symmetry, energy distribution, duality, mass, charges, velocity, time, electric and magnetic fields, etcetera that can demonstrate that every object in the universe including human beings are subjected to constant assembling and disassembling under the influence of increasing disorder upon re-assembling. This could indeed be associated with keeping constants like "energy conservation", the speed of light, and Planck's. Think that every time the whole universe at once gets re-built with new matter on any point *B*, that triggers the re-set of universal constants. This has been suggested before [23]. At what rate is this happening? Is there something in the quantum of the *p* orbital which by analogy resembles our 3D universe "hidden" that can shed light into this question?

Notice that this is the same as saying that we are living in a cartoon, passing frames after frames at a speed that *fools* the brain so that you cannot see the changes in frames. This is exactly was movies are all about. The file extension in computers called MPEG used to compress videos stands for "*moving pictures* expert group". Humans mimic motion by taking pictures of subjects (frames) and then passing the frames fast enough to avoid the brain register the frame changes. What the brain registers is a *flow* of motion that builds the *wholeness* of the *event* "ignoring" what happens at the quantum (and sub-quantum) level. Notice that this is creation of flow from fragmented "individual" still pictures. We have seen before that this is not precisely the correct approach. Now, from where humans got the idea of making video out of taking pictures and passing the frames fast? And the answer is: from life! That is because the process is a repeated pattern in the infrastructure of nature and it is exactly how we are transported in spacetime through the "eternal" expansion of the universe. As mentioned before: everything behaves equally regardless of the scale of the system because everything ultimately is made of waves. This arguments inevitable leads to the ugly conclusion that our universe is not the best because the explicate order in which we live comes from a natural fragmented organization with a tendency for disorder. Could there be a universe that its reality is organized straight from the implicate order? Could that universe become more *ordered* upon replacements in the matrix or shall it get no replaced at all but "eternally" constant like living flat in the conveyor belt of time with no distortion? Is that what is meant by being everywhere at the same time? Can we make an analogy for better higher universes with the *d* and *f* atomic orbitals as I did for ours and the *p* orbital? If so, then what is the meaning of the universe of the "continuum"? Is that the religious Heaven or the mystical Nirvana? Is it true that each universe has a different setup of localized (solid) versus delocalized (wavy) energy so that some are more *ethereal* and less solid than others? I have previously clarified that these other "independent" universes may reverse entropy and provide better quality of living because the (vibrational) energy required to live in them is higher and spread over a *larger* number of dimensions simultaneously; that is; less confined, see Figure 2. In the *f* orbital model we may interpret that the transition structures from point *A* to point *B* is a sort of sub-quantum process related to the actual changes in "frames" of the matrix required for "transportation". The possibility that sub-quantum interactions could explain the concepts where quantum becomes indeterministic suggests the existence of a lower level of a hidden implicate order still undetected by man.

As cited before in the previous publication of the HVB Theory, the existence of an ether fabric of the universe has been considered since the antiquity by Greeks and also more recently [33]. In my opinion the matrix or ether and the different levels of distortions representing objects, universes and forces that it can form through scrambling duality could clarify ideas about the origins and function of time, dark energy and dark matter. This would make our reality a complex combo of distortions in the form of vibrations of a matrix that forms it all at once. We live inside this matrix and philosophically we must give it the benefit of the doubt that if the matrix is

what is called “God”, then we may be living inside of “God”, like if we were part of a cosmic functioning “biological organ” that connects to higher levels of assembly. Perhaps an excellent philosophical, wise and moral closing argument that I could mention is an intriguing question: If you had the power and the knowledge to bend matrix matter to form solid universes that can sustain life and propagate in time as presented here, would you create new universes for good or for evil?

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Figure-1. The solid universe (here represented by a dot) may move forward in time spontaneously and uni-directionally from the present into the future like "slinky going downstairs". The solidity of the universe manifests on each energy level of time or steps of the ladder or stairway. Since moving forward in time can be seen as a spontaneous process, then every event or the cause (located at Level 1) happens at a higher energy level than the effect (Level 2), and so on. This model suggests that traveling back in time is a non-spontaneous process and therefore the total energy to reverse this natural process may *not* be available in the entire universe.

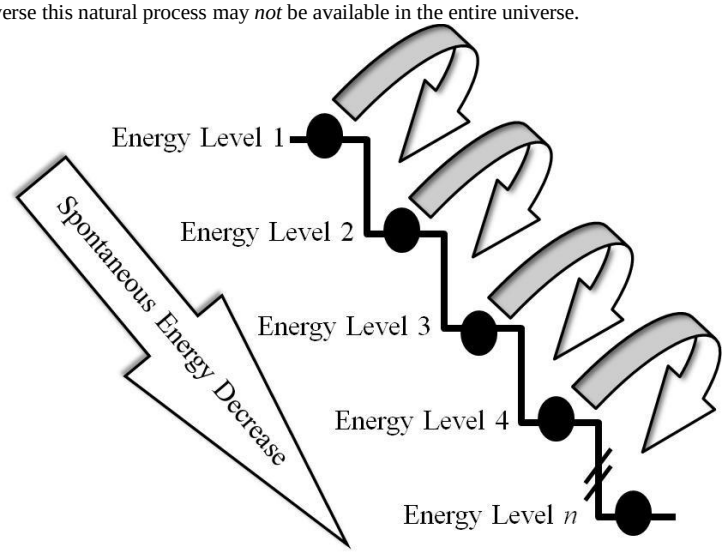

Figure-2. When the universe moves into the future from the present it spontaneously falls into a lower energy level of time in cycles of mounting-dismounting-remounting, a process called replacement.

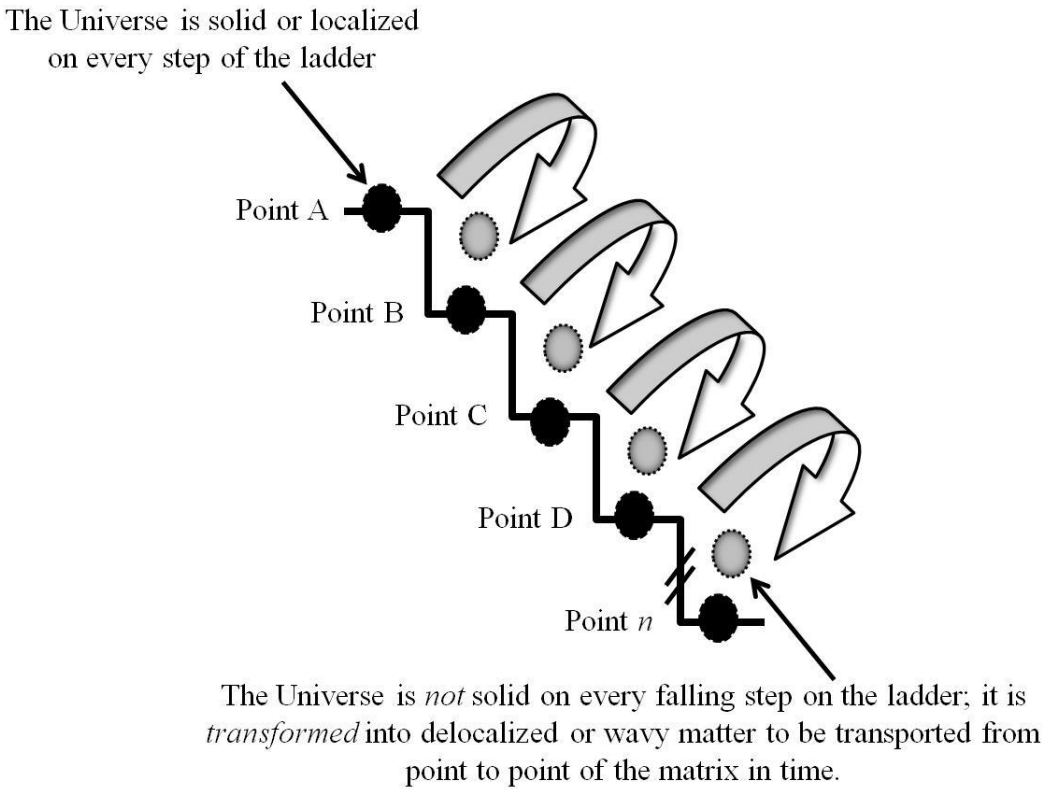

Figure-3. Extrapolation of the quantum mechanics atomic harmonic oscillator model of the electron in the hydrogen atom to explain human life on Earth. Each energy level or universe or vibrational "bubble" represents a unique distortion of the parent ether or matrix with a unique value of speed of light, Planck-like constant, entropy, and duality given by a wavefunction Ψ_{dual} obtained from linear combinations of $\psi_{delocalized}$ and $\psi_{localized}$ that creates material building blocks or particles to build independent universes. The model suggests that universal order is achieved with greater energy spreading.

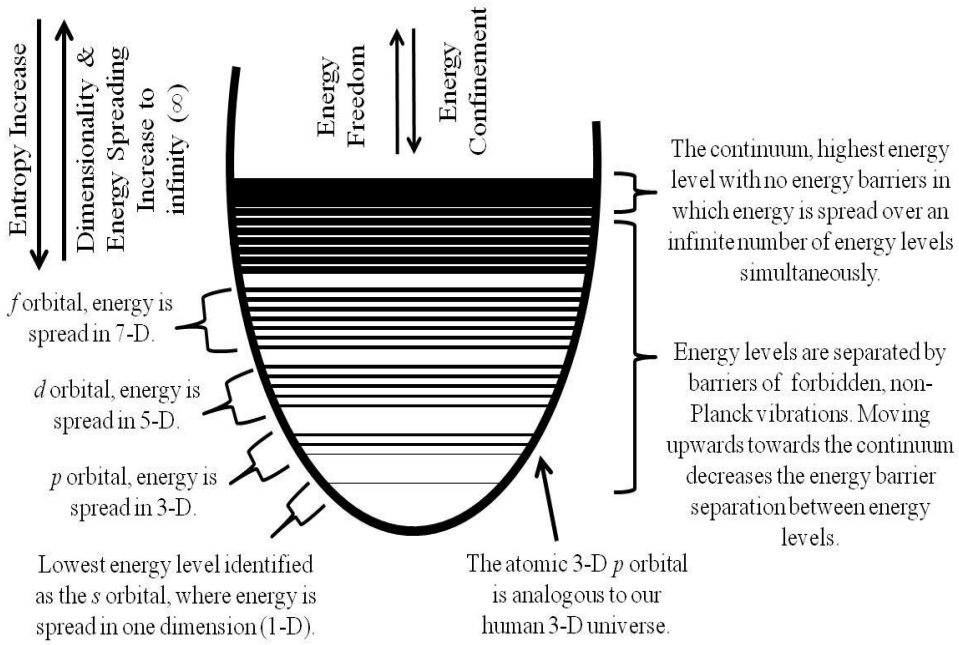

Figure-4. The graph of the atomic f_{-3} and f_{+3} orbitals in hydrogen-like atoms distribute the energy of the electron into eight three dimensional lobes or petals over the *x*, *y* and *z* axes.

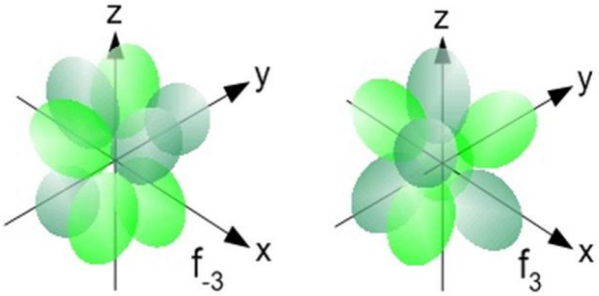

Figure-5. The change in the shape of the energy distribution of an electron in the orbitals f_{-3} and f_{+3} is approximated by consecutively multiplying the fundamental function $r(\theta) = \sin(\theta)$ by the whole numbers 100 to 140 to obtain a family of harmonics.

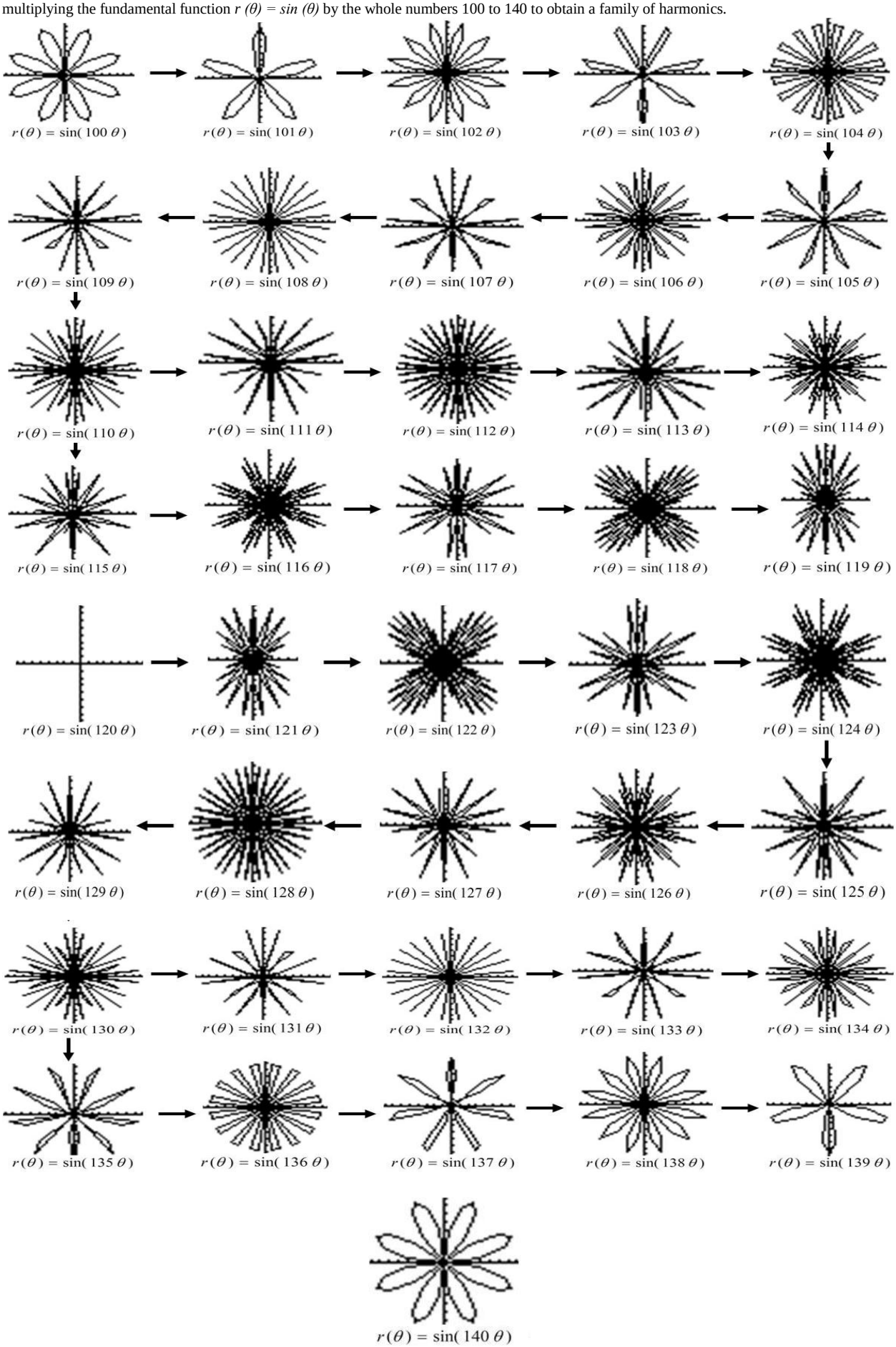

Figure-6. The two odd functions *r(θ) = sin (101*θ)* and *r(θ) = sin (139*θ)* show opposite symmetry. Notice that the vertical axis separates the shape with two full lobes to the right and to the left, and half of the lobe pointing up or down to the left and half to the right. The horizontal axis does not show symmetry because the lobe pointing up or down does not have a counterpart lobe pointing down or up.

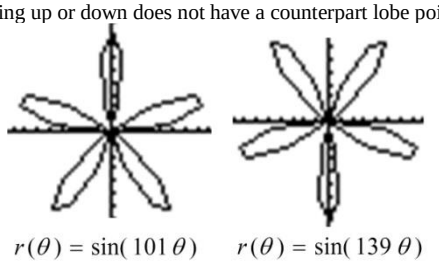

Table-1. Odd values of *A* in *r(θ) = sin (A*θ)* in the interval 100 to 140 where the shape of the function shows obvious opposite symmetry to another function.

	$r(\theta)=\sin(A*\theta)$									
Value of *A*	101	103	105	107	109	111	113	115	117	119
Opposite	139	137	135	133	131	129	127	125	123	121

Figure-7. The two even functions *r(θ) = sin (102*θ)* and *r(θ) = sin (138*θ)* show equal symmetry. Notice that the both the horizontal and vertical axes separate the shape with six lobes to the left, right, up and down.

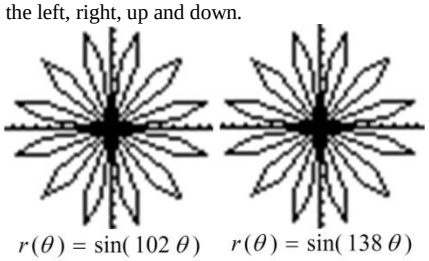

Table-2. Even values of *A* in *r(θ) = sin (A*θ)* in the interval 100 to 140 where the shape of the function does not show obvious opposite symmetry to another function but rather appears equivalent to another function.

	$r(\theta)=\sin(A*\theta)$									
Value of *A*	100	102	104	106	108	110	112	114	116	118
Equivalent	140	138	136	134	132	130	128	126	124	122

Figure-8. The similarity between the two functions *r(θ) = sin (101*θ)* and *r(θ) = sin (102*θ)* is that they share the vertical symmetry plane that divides the two functions in two equal sides. The difference in the symmetry is that the function *r(θ) = sin (101*θ)* cannot be divided into two equal sides along the horizontal axis as the function *r(θ) = sin (102*θ).*

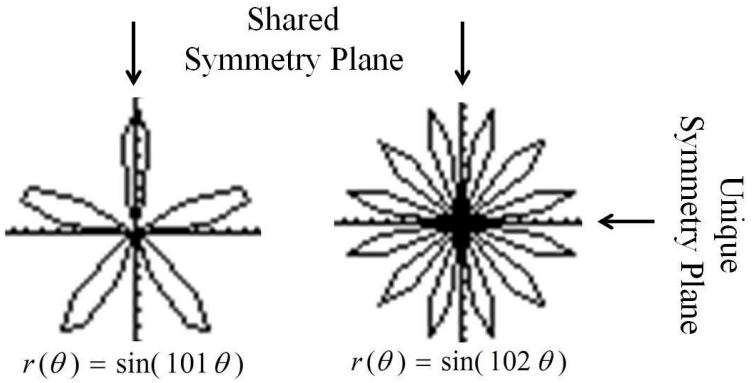

Table-3. From left to right, the first column is the value of *A* in *r(θ) = sin (A*θ)*, the second is the total number of petals per function, the third and fourth are a split indicating that some functions had petals with different amount of *dr/dθ* derivatives, the fifth is the difference in the number of petals between consecutive functions, the sixth is the total number of *dr/dθ* derivatives, and the seventh is the palindrome tandem repeats associated with the order of derivatives.

A	Total Petals	Split		Total dr/dθ	Sequence
		Petals	dr/dθ		
100	8	8	5	40	55555555
101	5	2	4	23	45554
		3	5		
102	12	12	3	36	33333333333
103	7	5	3	23	3343433
		2	4		
104	16	16	2	32	2222222222222222
105	9	6	2	21	232232232
		3	3		
106	20	16	2	44	22322223222232222322
		4	3		
107	11	10	2	23	22222322222
		1	3		
108	24	24	1	21	111111111111111111111111
109	13	7	1	23	1222211111222211
		8	2		
110	28	12	1	44	12212211221221122122112212211
		16	2		
111	15	9	1	21	121211212112121
		6	2		
112	32	32	1	32	11111111111111111111111111111111
113	17	11	1	23	11212112211211211
		6	2		
114	36	36	1	36	111111111111111111111111111111111111
115	19	15	1	23	11121112111211121111
		4	2		
116	40	40	1	40	1111111111111111111111111111111111111111
117	21	21	1	21	111111111111111111111
118	44	44	1	44	11111111111111111111111111111111111111111111
119	23	23	1	23	11111111111111111111111
120	0	0	0	0	

Figure-9. Consecutive *r(θ) = sin (A*θ)* harmonic functions for *A* values 100-120 show a correlating pattern of decrease-increase-decrease changes in the number of petals and derivatives which become zero at the point *r(θ) = sin (120*θ)*. The arrows show the location of repeated values of the number of derivatives per function.

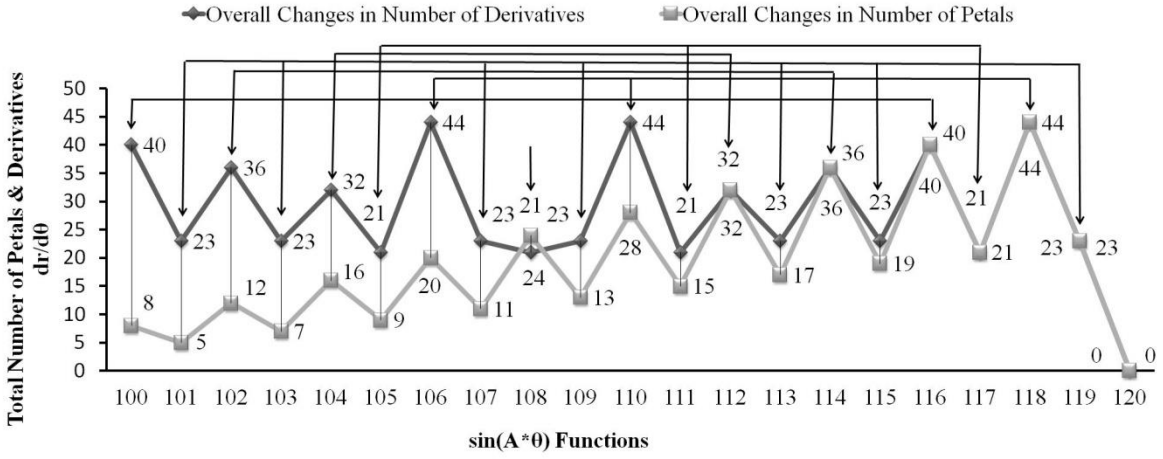

Figure-10. The symmetry of the harmonic functions $r(\theta) = sin\ (100*\theta)$ to $r(\theta) = sin\ (120*\theta)$ show the overall correlating trend of increase-decrease-increase in both the number of petals and derivatives. The difference between consecutive values decreases until becomes zero around the central figure of the symmetry given by $r(\theta) = sin\ (120*\theta)$ and increases from the central point on. The whole series represents the re-generation at $r(\theta) = sin\ (140*\theta)$ of the model figure of the atomic f_{-3} and f_{+3} sub-orbitals given by the initial function $r(\theta) = sin\ (100*\theta)$.

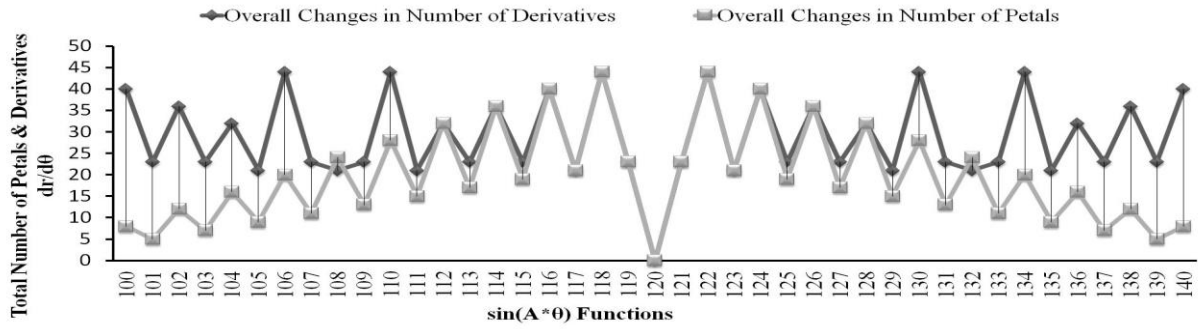

Table-4. The change (Δ) in the number of petals across all values of A = 100 to 140 shows a palindrome tandem repeat sequence varying in multiples of two while the changes in the total number of derivatives also shows a palindrome tandem repeat sequence with a variable degree of changes among consecutive A values. Repeated values are labeled with variable shades of white, black and gray.

A	Total Petals	Δ Petals	Total dr/dθ	Δdr/dθ	
100	8	START	40	START	55555555
101	5	3	23	17	45554
102	12	-7	36	-13	33333333333
103	7	5	23	13	3343433
104	16	-9	32	-9	2222222222222222
105	9	7	21	11	232232232
106	20	-11	44	-23	22222322222
107	11	9	23	21	1111111111111111111111
108	24	-13	21	2	122221111122221
109	13	11	23	-2	1221221122122112212211221221
110	28	-15	44	-21	121211212112121
111	15	13	21	23	11111111111111111111111111111111
112	32	-17	32	-11	11212112211211211
113	17	15	23	-13	11111111111111111111111111111111111
114	36	-19	36	13	1112111211211112111
115	19	17	23	13	11111111111111111111111111111111111111
116	40	-21	46	-17	1111111111111111111
117	21	19	21	19	11111111111111111111111111111111111111111
118	44	-23	44	-23	1111111111111111111111
119	23	-21	23	21	0
120	0	23	0	23	1111111111111111111111
121	23	-23	23	-23	11111111111111111111111111111111111111111
122	44	-21	44	-21	1111111111111111111111
123	21	23	21	23	11111111111111111111111111111111111111
124	40	-19	40	-19	1111111111111111111111111111111111111
125	19	21	23	17	1112111211211112111
126	36	-17	36	-13	11111111111111111111111111111111111
127	17	19	23	13	11212112211211211
128	32	-15	32	-9	11111111111111111111111111111111
129	15	17	21	11	121211212112121
130	28	-13	44	-23	1221221122122112212211221221
131	13	15	23	21	122221111122221
132	24	-11	21	2	1111111111111111111111
133	11	13	23	-2	22222322222
134	20	-9	44	-21	22322223222232222322
135	9	11	21	23	232232232
136	16	-7	32	-11	2222222222222222
137	7	9	23	9	3343433
138	12	-5	36	-13	33333333333
139	5	7	23	13	45554
140	8	-3	40	-17	55555555

Table-5. The rate of derivatives to number of petals per figure.

A	Total Petals	Total dr/dθ	Rate (dr/dθ)/Petals
100	8	40	5.0000
101	5	23	4.6000
102	12	36	3.0000
103	7	23	3.2857
104	16	32	2.0000
105	9	21	2.3333
106	20	44	2.2000
107	11	23	2.0909
108	24	21	0.8750
109	13	23	1.7692
110	28	44	1.5714
111	15	21	1.4000
112	32	32	1.0000
113	17	23	1.3529
114	36	36	1.0000
115	19	23	1.2105
116	40	40	1.0000
117	21	21	1.0000
118	44	44	1.0000
119	23	23	1.0000

Figure-11. The rate of number of derivatives per petals (dotted line) can be 91% statistically fit by a logarithmic regression curve.

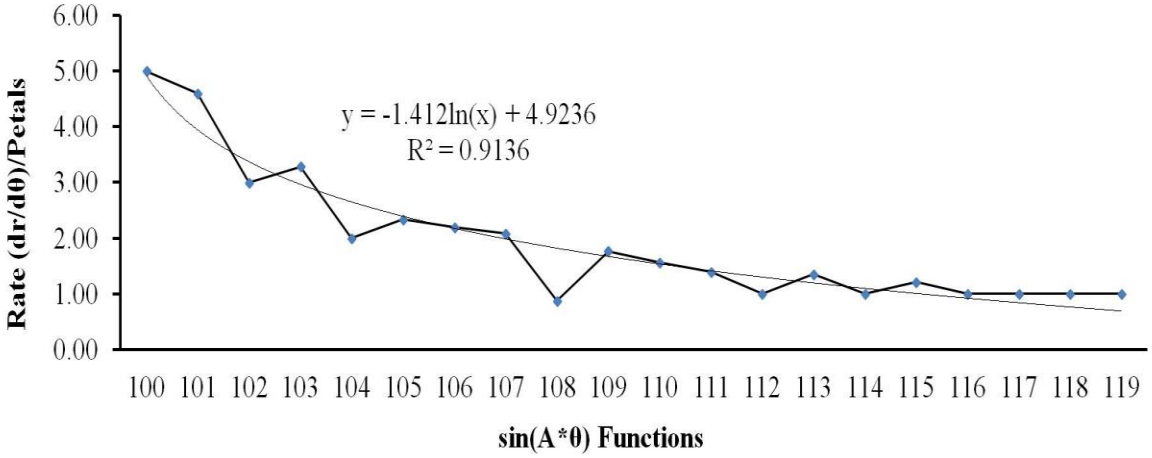

Figure-12. In measurements at the quantum level the object measured, the instrument used to make the measurement and the human become entangled, an effect that cannot be disregarded in calculations.

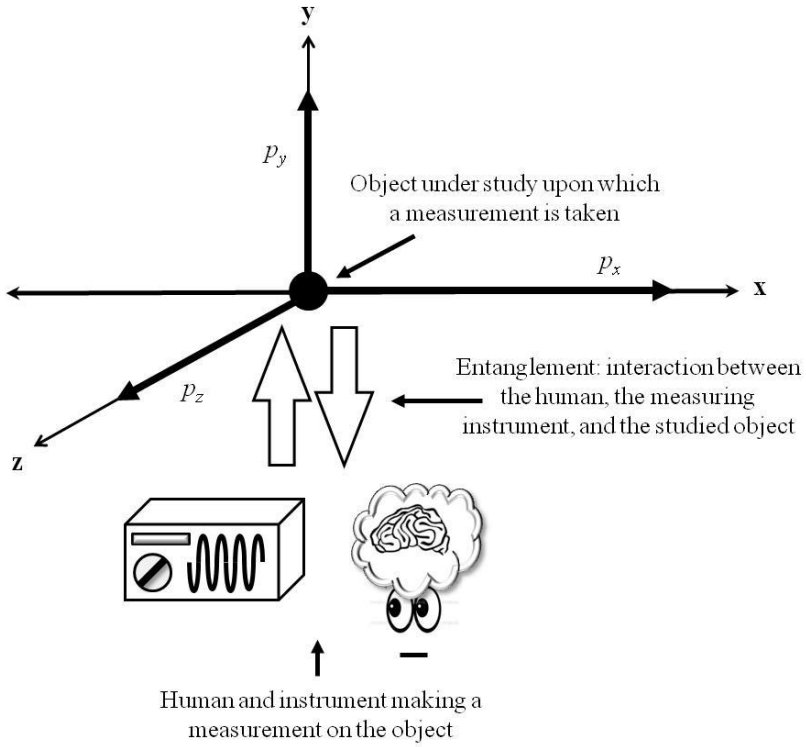

Figure-13. A World Tube is any localizable structure like a wave or a waveparticle in the matrix represented as an infinitely complex process of a vortex-like structure in movement and development centered in a region of boundaries in the tube resembling a stable wrinkle or distortion of the natural flux. The model replaces the common view of waveparticles as rigid objects.

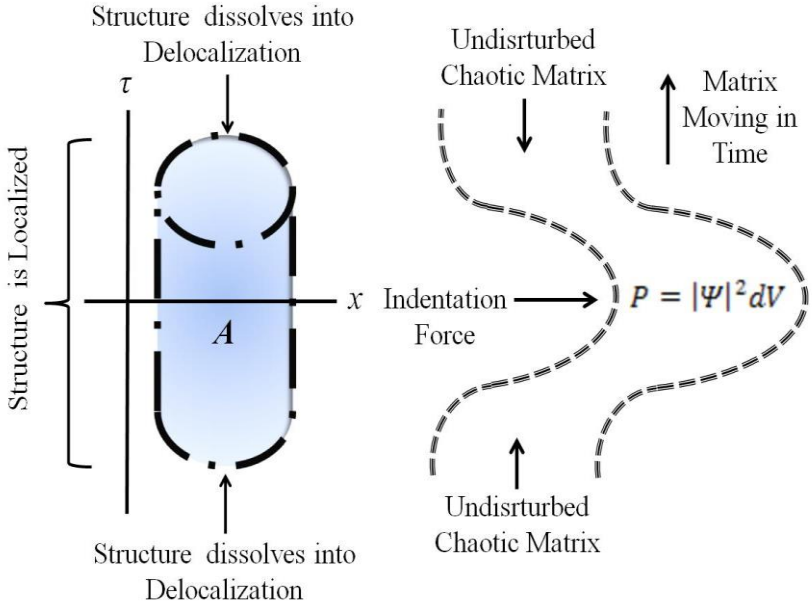

Figure-14. The higher degree of symmetry in the even function *r(θ) = sin (104*θ)* is restored by the overlap of the lower symmetrical functions *r(θ) = sin (103*θ)* and *r(θ) = sin (105*θ)*.