

# W M A P E M E R G E N C E A C R O S S T H E E N T R O P I C D I M E N S I O N A L U N I V E R S E

[ F U L L Y A N N O T A T E D G R A P H I C E D I T I O N ]

**STEPHEN BURNS KESSLER**  
*Research Fellow In Physics*

WEBSTER UNIVERSITY  
*Department of Biological Sciences*  
470 E. Lockwood Avenue  
St. Louis, Missouri 63119-3194  
United States

Internet: [www.Webster.edu](http://www.Webster.edu)  
E-mail: [StephenKessler13@webster.edu](mailto:StephenKessler13@webster.edu)

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## ABSTRACT

*Uncertainty over dark energy, missing mass, anomalous acceleration and cosmological problems, call into question our understanding of universal structure. Accordingly, these concerns are investigated resulting in a heuristic theory. To accomplish the task, incompleteness of mathematics to facilitate quantum mechanical causality is accepted as foundational, setting aside spatial dimensions in the process. Dimensionality becomes a universal logic structure across an arrow of entropy from highly ordered absolute information RealTime into low ordered uncertainty of quantum information ideal time. A twenty-six dimensional “degrees of freedom to entanglement” entropy construct arises from first-order absolute information. Planckian causality, a cause for Planck space, results with boundary conditions into and out from the Hamiltonian. The information structure fundamental to Planck space is realized as the same structure that defines cosmological universal space and time. This “information monopole” is a bifurcating structure that facilitates matter definition, constants, energy, gravity, acceleration and SpaceTime. Fundamental information set logic is foundationally applied to quantum mechanics, relativity and classical physics. Information set analysis of all universal structures is maintained throughout resulting in proposed solutions to cosmological problems. The same universal structural percentages verified in the Wilkinson Microwave Anisotropic Probe, WMAP data, are emergent across the absolute information monopole.*

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*“I wish we could derive the rest of the phenomena of nature  
by the same kind of reasoning from mechanical principles;  
for I am induced by many reasons to suspect  
that they may all depend upon certain forces  
by which the particles of bodies, by some causes hitherto unknown,  
are either mutually impelled towards each other, and cohere in regular figures,  
or are repelled and recede from each other; which forces being unknown, philosophers have  
hitherto attempted the search of nature in vain; but I hope the principles here laid down will  
afford some light either to that or some truer method of philosophy.”*

Sir Issac Newton  
Cambridge, Trinity College, May 8, 1686,  
Philosophiae Naturalis Principia Mathematica,

*“In order to arrive at this consistent view, we admittedly had to introduce an extension of the  
field equations of gravitation which is not justified by our actual knowledge of gravitation.  
It has to be emphasized, however, that a positive curvature of space is given by our results, even  
if the supplementary term is not introduced. That term is necessary only for the purpose of  
making possible a quasi-static distribution of matter  
as required by the fact of the small velocities of the stars.”*

Albert Einstein  
Princeton, New Jersey, 1954  
excerpt from a letter to F. Pirani

*“...Fixing randomness in your mind is like trying to stare at something without blinking and  
without moving your eyes. If you do that, the scene starts to disappear in pieces from your visual  
field. To see something, you have to keep moving your eyes, changing your focus of attention...  
The harder you stare at randomness, the less you see it!”*

Gregory Chaitin  
Auckland, New Zealand, 2004  
MetaMath! The Quest for Omega, pg. 108 [7]

*“Most urgent is the need for a viable model, demonstrating how the mechanism works that we  
believe to be responsible for the conspicuous quantum mechanical nature of the world we live in.  
It continues to be difficult to produce a non-trivial model. One showing particles that interact,  
for instance, such that its Hamiltonian is bounded from below.”*

Gerard 't Hooft  
Utrecht, Netherlands, March 24, 2006  
Determinism Beneath Quantum Mechanics [2]

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*To observe the universe, we need only to look at it.  
But the universe is not about the human experience.  
To understand it, we have to become the universe,  
to think universally, to be the universe as observer.*

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## 1. FOUNDATIONS

In any formal system foundational properties necessary to maintain formality must exist outside the system. Gödel's first incompleteness theorem states that in any consistent formal system adequate for arithmetic there exists a true but unprovable formula. Further, Gödel's second incompleteness theorem states the consistency of such a formal system cannot be proved within the system. [1] Gödel's argument does not say formality cannot be proved, it simply says that it cannot be proved "within" the system that allows one to define natural numbers as a set. The definition of a formal system should include foundational principles, as that will expand understanding of the entire system. To that end a fundamental theory is thought necessary to comprehend the lower bound of the Hamiltonian [2, 3, 4]. This is appropriate, as the lower bound must somehow link to informality and uncertainty where observable space and time are built upon an unobservable sub-Planckian foundation of  $< 10^{-33}$  cm. Logic behind Planckian causality is emergent from the theoretical constructs proposed in this paper. Mathematics alone cannot prove the comprehensive nature of the system [1, 5, 6, 7]. A reflexive relationship must exist between the system and the mathematics arising from it. And while numbers may not yield the foundational system, logic is not limited to syntax as it is approachable by bounded semantic reasoning. This leads to "the lower bound into," and "the upper bound out from," the Hamiltonian. Reason is not limited to mathematics as it reflects uncertainty of intuitionistic/Boolean hybrid logic. There are salient reasons why existing theories do not properly function in sub and post-Planckian causality.

In Axiomatic Set Theory, a set is considered any collection of objects or members. In mathematics the members of a set are mathematical objects. Axiomatic theory has the benefit of a bifurcating interactive conditional argument. However, to get beneath Planckian causality, a set argument capable of explaining the fundamental nature of structure *before* it is fractured into members and sets is critical. As argued, the completeness of nature exists outside of mathematics. This moves the logic approach from Boolean to intuitionistic.

Classical Information Theory [8, 9, 10, 11, 12, 13, 14] is a mathematical approach to storage and transmission of data that has the benefit of facilitating an entropy statement

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regarding the amount of uncertainty about the choice of a message. Classical Information involves random processes without context to how those processes were produced. Algorithmic Information Theory [15, 16, 17] establishes a relationship between computation and information to define a certain object as a random or non-random event. But, as with set theory, information theory cannot make a logical argument for Planckian causality nor can Chaos theory as the underlying order so necessary to establish randomness of data is not present in the uncertainty of Planckian space.

Mathematician, Gregory Chaitin states that there is a limiting irreducible element of randomness in mathematics. [6, 7] David Hilbert decided to completely reformulate the rules of the game in order to test what mathematics could accomplish [18]. Hilbert developed a Formal Axiomatic System, or FAS which was categorized: ALPHABET, GRAMMAR, AXIOMS, RULES OF INFERENCE, PROOF CHECKING ALGORITHM. The first job in FAS is to create an artificial language with which to do mathematics. Just one problem; mathematics about what? Counting? What if there is nothing to count? Mathematics by itself does not necessarily carry an inherent meaning. There can be presumed meaning but even presumption is based upon some logical foundation. How does a logical foundation function? Generally, non-classical theories describe complexity and probabilities. For any theory to be foundational to causality, it must also be fundamental to quantum mechanics, relativity, as well as classical mechanics.

To properly address the quantum mechanical nature of the Entropic Dimensional Universe would take a lengthy monograph and falls far outside the scope of this foundational paper. Therefore, the principle mathematical argument herein will consist of first order set theoretical mathematics that evolves into the absolute information matrices, concluding with the absolute information,  $I^A$ , monopole universal structural map, none of which could emerge out of quantum mechanics alone. While these arguments contain tensor and vector four-space potentials throughout, four-space constructs were set aside in favor of heuristic equations, drawing comparisons between classical/relativistic, quantum and absolute information,  $I^A$ . This is done to clarify the dimensional and absolute information entropy,  $HI^A$ , argument. Therefore, to comprehend causality of the quantum mechanical/relativistic/classical system one must find the

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underlying high order so necessary to comprehend chaos and complexity. It is not enough for a theory to predict the lower bound of the Hamiltonian; to be a robust structural theory, cosmology must also be emergent, and with it, structural numbers reflecting the universal structural data arising out of WMAP. [19, 20]

## 2. INTUITION, LOGIC & THE BREADTH OF INFORMATION

To think all conditions necessary for universal structure are only found in four observable dimensions ignores experimental evidence. WMAP data [19, 20] sets the visible spatial dimensional universe at 4% of the entire structure while the majority of universal structure, 96%, is 73% dark energy and 23% dark matter. Since few observables are arguably evident in the dark states there exists a very high probability that 96% of the universe is not dependent on visible spatial dimensions and therefore, presents conditions where four-spatial dimensions are not first-order logic. This then means that spatial dimensions are emergent from some other form, an unknown first-order logic. Clearly evident in the visible 4%, complexity reigns from Planck space on; and with it, spatial dimensions. Solid macroscopic objects viewed microscopically are filled with billions of pieces which themselves are made up of billions of pieces that are immersed in a hadronized cloud of virtual particle/anti-particle pairs from the vacuum. And on it goes until four-space hits the wall of Planckian causality. Suddenly observations and comprehension confront a reality that has little context to experience, as there are no more pieces, vectors, or quantum information. All appears void defying any causality. This sets up entropy conditions where high order must be found in the “darkness” because disorder and uncertainty is emergent from Planck space.

Attempts are made to understand the clues found at the fractured edge of complexity. Deconstructionist scientific methods probe for smaller and smaller and smaller four-dimensional pieces until all is incomprehensible when observation hits the Planck wall. Logic dictates that a fundamental structure of high to low order presents itself through tantalizing clues of dark energy, dark matter, anomalous acceleration and the vacuum state. Currently, information theory is generally viewed as an attempt to construct a mathematical model of a communication system made up of probabilistic events; i.e.: source to encoder to channel to decoder to destination [13]. Shannon

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information [8] and quantum information [11] are quantitative measures of probabilities. There are multiple analogies to consider information; the ubiquitous coin toss, to Bob and Alice, to guessing the content of a sealed envelope by asking question answerable by “yes” and “no.” In this realm there is physicality to information that is quantum mechanically limited. [10] At Planck scale the Compton wavelength  $2\pi\hbar / mc$  of the clocks and particles are on the same order of magnitude as their Schwarzschild radius,  $2mG / c^2$  and quantum gravitational effects come into play. [21, 22] The Hamiltonian and Lagrangian are lower bound to this radius where the tick of atomic clocks is spin based and Planck scale is driven by complexity, energy and uncertainty without apparent causality. Space-time metrics cannot describe anything below Planck scale and, as stated, Planckian causality is not measurable in four-space [2, 3]. Fluctuations found in the classical world are quantized blurring underlying sub-structure of any deeper information. [4] At Planckian causality, time, space, dimensions and information must be one, but how?

To comprehend a deeper meaning of a more qualitative than quantitative system, probabilities must be set aside for rhetorical questions: Where did the coin come from? How is it heads and tails? How did Bob and Alice get here? Intuitionistic logic can be used to define structure but anthropic considerations should be set aside in favor of a “universe as observer” form of logic [smolin].

In 1960, physicist Rolf Landauer built on the information theory of Claude Shannon, [08] investigating how heat was generated in computer chips during computation. Experimental results were counterintuitive to the thermodynamic trigger expected. Instead of heat equating the amount of information put into a chip, energy was only released when that information was erased or thrown away. Landauer concluded that four-dimensional information, from DNA to cells, neurons to transistors, is physical. This principle carries into the Entropic Dimensional Universe here on called EDU. The Landauer principle states that  $kT$  free energy must be dissipated when one bit of information is erased. [14] Criticism has failed to diminish the impact and clarity of the principle. [10, 11] Landauer brought physicality to information; Bennett explored its depth; and Seth Lloyd explored two complementary interpretations of that physicality.

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Lloyd indicated that information is registered and processed by physical systems and held that all physical systems register and process information. The information and information processing state of a physical systems is complementary to the general description of physical system through the laws of physics, and that all physical systems register information just by existing. [21] These constructs start with a premise that information already exists; information that is generally considered quantum information. However, if information is first registered and processed by a physical system, and since quantum physics *is* a physical system, then information must be present a-priori to its being registered. A Landauer-like principle takes place if “fundamental information” entangles to four-space information complexity. Applying the principle to four-space implies that fundamental information must exist to enable fundamental forces. This paper describes what that information is; how it came into being; and how it evolves across a twenty-six dimensional system into quantum information without violating the mechanics of physicality. Consider,

- FIRST: Quantum mechanics is emergent from matter to energy processes, and is completely dependent upon matter. And,
- SECOND: Only a “quantum mechanical information potential” exists in matter, not quantum information itself. And
- THIRD: Consider that quantum mechanical information from matter can only be a potential as it is not measurable or discoverable until it is thrown away by the matter system in the form of energy. This upholds the Landauer principle.

Interaction from matter is uncertain and indeterminate exhibiting quantum mechanical wave state. It is not until energy from two matter systems entangle that the combined energies become ordered through a stochastic resonant processes, at which moment in time, quantum information results. Without entanglement of fundamental information to quantum physicality there would be no thermodynamics. If energy is produced only when information is “thrown away,” as argued herein and by Landauer, then exactly what information is being thrown away in four-dimensions to enable the release of energy? Length, maybe width or depth? Could it be space or time? Clearly those forms are not lost during expression of energy in four-dimensions. So, where does

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energy come from? Maybe strong force release through quantum chromodynamics? Then where in four-dimensions does that come from? On a quantum scale what is being erased? Under equivalence of matter and energy, atoms are infinite as energy cannot be created or destroyed; strong evidence that nothing in the nucleus is being thrown away to enable strong force binding potential. Landauer's principle has been proved experimentally and calls to question the atom's role in energy production. It is generally argued that dimensions are spatial or geometric. That same argument has been applied to electromagnetism and gravity. If fundamental information, or absolute information,  $I^A$ , at work on the atom is "thrown away" as energy through a balance of symmetries, that is consistent with conservation laws, atomic longevity and Landauer. Physicality potential of  $I^A$  can generally be described as;

- $I^A$  interactions facilitate matter definition on a particle level into the matter system state.
- Increased topological phenomenon (local forces) entangle the two matter systems, challenging the matter definition of both states;
- This increases  $I^A$  necessary to maintain definition for both matter systems on the particle level,
- Oscillations between the two matter systems facilitate release of unneeded  $I^A$  through nucleon entangled four-space across the information states of each system, in the form of energy.
- This effectively throws away degrees of freedom of  $I^A$  by entangling it with four-space enabling communication between matter in the form of quantum information.

Absolute information,  $I^A$ , is and defines all dimensions. This is in keeping with the Landauer principle of physical information and establishes the entropy  $I^A$ . This series of  $I^A$  to physical quantum information processes describe all energies, potential and kinetic, that make up the Lagrangian. Further, information stored in the matter system as matter definition should not be confused with absolute information,  $I^A$ , needed in the construction and maintenance of the system. This yields four interacting information states of absolute information to matter definition to energy to quantum information across an arrow of entropy  $H$ , of absolute information,  $HI^A$ , described herein as

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$$HI^A = I^A \rightarrow m_e^l \rightarrow e^l \rightarrow Q_l. \quad 01$$

Coherent information resonance between two matter definition states orders energy into quantum information and is due to the entanglement of two different indeterminate energy states emergent from two different particle states each containing matter definition; analogous to coherent resonance of Bose-Einstein condensates. The entanglement of the two chaotic energy states yields higher ordered quantum information through matter definition from both particles. Geometry is a condition of the function of absolute information,  $I^A$ , to matter to energy to quantum information. Heuristically, the Definitum/Empty information foundation of universal structure can be thought of as a dimensionfull sheet of seamless glass meeting a hammer: for chaos to exist, the glass must shatter. Therefore, the potential for chaos is found, for example, in the high order Feigenbaum function [23] where  $x_{n+1} = F(x_n)$ . Most dynamic systems progress from order to chaos in a gradient series of steps. This gradient is an entropic statement moving from “high order/low entropy” to “low order/high entropy” chaos. And while this argument is also found, for example, in fractal mathematics, absolute information  $I^A$  is entropic and not geometric.  $I^A$  cannot be weighed, it has no vectors, it is physically immeasurable yet is the foundation for all physical measurements. The most difficult part for an observer to accept is how one visualizes a physically immeasurable state. Observers may seek to quantify the state conditions that are not quantifiable. This causes some observers to argue that it does not exist, as it can’t be quantified. But it does exist and can be intuitionistically qualified leading to a robust Boolean argument. Without  $I^A$  there is no mathematics for quantification, as mathematics is emergent from it. However, arguments will show that  $I^A$  can be quantified through a three-space mapping on twenty-six dimensions.  $I^A$  foundation is a highly ordered state of extreme low entropy. And from the beginning it is a state on a course to high entropy. A foundation information dimension is a statistical quantity that indicates how completely  $I^A$  defines universal structure on an arrow of entropy from absolute information to energy  $I^A \rightarrow e^l$ . Shannon information entropy [8] can be applied to determine the minimum number of functions  $N$  of  $I^A$  to facilitate a heuristic universal twenty-six dimensional structure  $D$ ,

$$D = \lim_{I^A \rightarrow e^I} \frac{\log N(I^A)}{\log I^A}. \quad 02$$

Step one is establishing the dimensional construction  $D$  of information to energy  $\lim_{I^A \rightarrow e^I}$ .

### 3. INFORMATION SET THEORY

Causality can be comprehended by merging the logic of set and information theory. Information Set Theory is a logical approach to information structure. It has the benefit of exploring first order logic from two highly ordered bifurcating information set states, to low order complexity uncountable sets. This facilitates a probabilistic entropy statement leading to a predictive Boolean argument. Foundational to the ten axioms of set from the Zermelo-Frankel Axiom Of Choice (ZFC) and conditional to algorithmic information theory are two fundamental axioms:

AXIOM OF ABSOLUTENESS: First order absolute *das universal Definitum* contains all potentials necessary for universal absolute informational structure including Empty Information set. *Das universal Definitum\**,  $A_{def}$

AXIOM OF ENTROPY: Complexity of information evident in the uncertainty of quantum information,  $Q_I$ , is emergent from a highly ordered certain absolute information  $I^A$  established by Definitum/Empty Information set interaction.

Before the lengthy proof, consider that by definition these axioms are incredibly small to the body of interesting theorems that occur in the wake of their subsequent implied intersections. But counter-intuitively, there is not substantial compression at work to facilitate substantial understanding. There is no amount of understanding in Definitum/Empty Information as there is no compression. Definitum/empty information, as a highly ordered state must imply, is simply two interacting member states with the conditional potential for all of universal structure, which is “not defined” at first order. Compression is a conditional state of quantum information not absolute information, yet the potential for that compression and quantum information both exist in first order in the form of coherent information resonance potential between sets.

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\* from, *das universal Definitum*; German; universe absoluteness. In EDU Definitivum is abbreviated as Definitum and is the foundation of all constants and absoluteness of structure.

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PROOF: The foundation of all constants constitutes Definitum, *eq. 03*. Definitum is the foundation for absolute information and all constants; das universal *Definitivum*, Definitum, is *absoluteness* of structure.

$$\underset{def}{A} \quad 03$$

Let Definitum be a member of  $U$ , information set and take property of  $z$ ,  $A(z)$ , to be “ $z \neq z$ ” then according to (ZF2) axiom schmema of subsets

$$\{z \in \underset{def}{A} \mid z \neq z\}. \quad 04$$

This uniquely determined set has no elements and is called empty set  $\emptyset$  and is a member of the  $U$ , a foundation to a Grothendieck-like universal set, bridge statement,

$$\underset{def}{A} \in U \wedge \emptyset \in U \therefore \emptyset \in \underset{def}{A}. \quad 05$$

It can also be stated  $\emptyset$  is a set where there are no members

$$\exists \emptyset, \forall \underset{def}{A} : \neg(A \in \emptyset). \quad 06$$

The result of the intersection Definitum with the emptiness of the empty set results in conditions necessary to make the function statement

$$\underset{def}{A} \cap \emptyset \leftrightarrow \emptyset \cap \underset{def}{A}. \quad 07$$

Function maps Definitum onto the empty set iff function maps empty set onto Definitum, and function only applies to these two members of  $U$

$$F : \underset{def}{A} \rightarrow \emptyset \leftrightarrow F : \emptyset \rightarrow \underset{def}{A}. \quad 08$$

In *eq. 8*, absolute Definitum intersects empty set iff empty set intersects absolute Definitum. At each intersection the function yields a new member for each set. The empty set brings resonance to absolute universal content. Absoluteness transcends dimensionality, in that finite and infinite potential exist in the absolute state but the states are neither finite nor infinite as it is a highly ordered certain set relation whose information only contains potential of uncertain conjugal variables. Unlike a von Neumann universe where the class is a transfinite set of all sets, the absolute universe,  $U$ , contains only two diametrically opposite member elements. So there is

$$\exists y : \emptyset \in y \wedge (\forall b : b \in Y \Rightarrow b \cup \{b\} \in y) \tag{09}$$

an absolute information subset  $y$ , such that the Empty Information set is in  $y$  and such that whenever  $b$  is a member of  $y$ , the subset formed by taking the union of  $b$  with its singleton  $\{b\}$  is a member of  $y$  realized with  $y, b$  as homset  $\text{Hom}_U(Y, B)$  information set.

$$\forall y, \forall b, \exists w, \forall d : d \in w \Leftrightarrow (d = y \vee d = b) \tag{10}$$

In *eq. 10*, given any set  $y$  and any set  $b$ , there is a subset  $w$  such that, given any subset  $d$ ,  $d$  is a member of  $w$  iff  $d$  is equal to  $y$  or  $d$  is equal to  $b$ . The point of intersection facilitates fracturing of initial states to subsets of the first order set in *eq. 11*

$$\underset{def}{A \cap \emptyset} = \underset{def}{A \subset \emptyset} = 1, 3, 5 \dots 25 \quad \because \quad \underset{def}{\emptyset \cap A} = \underset{def}{\emptyset \subset A} = 2, 4, 6 \dots 26 \tag{11}$$

where Definitum intersects Empty Information that equals Definitum as a subset of Empty Information with odd numbered members: 1, 3, 5 through 25 subsets from intersections because Empty Information intersecting Definitum equals Empty Information as a subset of Definitum with even numbered members 2, 4, 6 through 26 subsets from intersections. *Eq. 09–11* breakout the first quantization state in that  $I^A$  is the basis for all physical systems to come as it descriptively moves from  $I^A$  to a matter physical system to quantum information of the same system. The intersection/fracturing of first order creates membership in the two sets. Each division diminishes the first order states. There are two functions for each intersection that triggers intersection of two more and so on eventuating in categories. In conventional category notation functors are  $f, g, h$  etc. Since dimensional  $I^A$  is emergent from composite interactions, dimensional function,  $D$ , notation  $D = f(1), f(2), f(3) \dots f(26)$  will be employed for clarity. Generally, each intersection forms two functions and each function two additional subset members i.e.:

$$f(1) : \underset{def}{A \cap f(2) : \emptyset} + f(3) : \emptyset \cap f(4) : + \underset{def}{A} \dots \tag{12}$$

$\text{Hom}_U(Y, B)$  *eq. 09* are codomain information set equivalent to Lorenz strange attractors where the Prandtl number is the ratio of  $\underset{def}{A, \emptyset}$  to target first order  $\text{Hom}_U(Y, B)$

At each intersection additional elements are added to the collections, *eq. 10*. At  $f(1) : 02y \rightarrow 01Y$ ,  $f(1)$  is an arrow with a source domain  $02y$  and target codomain  $01Y$  of

the arrow. If  $f(1):02y \rightarrow 01Y$  and  $f(2):01b \rightarrow 02B$  are two arrows, there is an arrow  $02y$  to  $02B$  and an arrow  $01y$  to  $01b$  called composites of  $f(1)$  and  $f(2)$  which are cumulative in higher identities  $h:04wY \rightarrow 03wy$  and  $i:03bd \rightarrow 04Bd$  where  $h$  as an arrow with source  $04wY$  and target  $03wy$  and  $i$  as an arrow with source  $03bd$  and target  $04bd$  with  $j$  as an arrow...etc. [Table 1]

$$\begin{aligned}
 &f(1):02y \rightarrow 01Y, f(2):01b \rightarrow 02B, f(3):04wY \rightarrow 03wy, f(4):03bd \rightarrow 04Bd, \\
 &f(5):06u,w,y \rightarrow 05u,w,Y, f(6):05b,d,f \rightarrow 06B,d,f, \\
 &f(7):08suwy \rightarrow 07s,u,w,Y, f(8):07b,d,f,h \rightarrow 08B,d,f,h...
 \end{aligned}
 \tag{14}$$

There are a total of 26 groups, or groupoids realized through intersections of the  $Y,B$  homset or  $\text{Hom}_U(Y,B)$  to  $f(26)$  as an arrow with source  $26a,c,e,g,I,k,m,o,q,s,w,Y$  and target  $25a,c,e,g,I,k,m,o,q,s,w,y$  and  $f(25)$  as an arrow with target  $25z,x,v,t,r,p,n,l,j,s,f,d,B$  and target  $26z,x,v,t,r,p,n,l,j,s,f,d,b$ , both which are complete composites of all groupoids.

$$\begin{aligned}
 &f(26):26a,c,e,g,i,k,m,o,q,s,u,w,y \rightarrow 25a,c,e,g,i,k,m,o,q,s,u,w,Y + \\
 &f(25):25z,x,v,t,r,p,n,l,j,s,f,d,b \rightarrow 26B,d,f,s,j,l,n,p,r,t,v,x,z = \lim_{RT \rightarrow t}
 \end{aligned}
 \tag{15}$$

Table 1. See also Appendix C. ~~80~~

<b>Definitum Absoluteness/Empty Information Bifurcated Intersection</b>				
* Intersections	*% State / 2 ∩	$A \subseteq \emptyset \underset{def}{1, 3, 5, \dots, 25}$	$\emptyset \subseteq A \underset{def}{2, 4, 6, \dots, 26}$	* Deviation From Norm
01 ∩ 02	100	50 Y,b	50 B,y	50
03 ∩ 04	50	25 wY,bd	25 Bd,wy	75
05 ∩ 06	25	12.5 uwY, bdf	12.5 Bdf,uwy	87.5
07 ∩ 08	12.5	6.25 suwY, bdfh	6.25 Bdfh, suwy	93.75
09 ∩ 10	6.25	3.125 qsuwY, bdfhj	3.125 Bdfhj, qsuwy	96.87
11 ∩ 12	3.125	1.5625 oqsuwy, bdfhjl	1.5625 Bdfhjl, oqsuwy	98.43
13 ∩ 14	1.5625	0.78125 moqsuwy, bdfhjln	0.78125 Bdfhjln, moqsuwy	99.21
15 ∩ 16	0.78125	0.390625 kmoqsuwy, bdfhjlnp	0.390625 Bdfhjlnp, kmoqsuwy	99.60
17 ∩ 18	0.390625	0.1953125 ikmoqsuwy, bdfhjlnpr	0.1953125 Bdfhjlnpr, ikmoqsuwy	99.80
19 ∩ 20	0.1953125	0.09765625 gikmoqsuwy, bdfhjlnprt	0.09765625 Bdfhjlnprt, gikmoqsuwy	99.90
21 ∩ 22	0.09765625	0.048828125 egikmoqsuwy, bdfhjlnprtv	0.048828125 Bdfhjlnprtv, egikmoqsuwy	99.95
23 ∩ 24	0.048828125	0.0244140625 cegikmoqsuwy, bdfhjlnprtvx	0.0244140625 Bdfhjlnprtvx, cegikmoqsuwy	99.97
25 ∪ 26	0.0244140625	0.01220703125 acegikmoqsuwy, bdfhjlnprtvxz	0.01220703125 Bdfhjlnprtvxz, acegikmoqsuwy	99.9957

In *Table 1*,  $25 \cup 26$  states a union between 25 and 26 is not possible due to failure in category definition. Complete collapse of the information categories fractures the groupoids  $f(26)$  and  $f(25)$  due to the information logic error limit of first order state where Definitum is no longer absolute and Empty Information is no longer empty.

$$F : \underset{def}{A \cup \emptyset} \neq \emptyset \quad \therefore \quad F : \emptyset \cup \underset{def}{A} \neq \underset{def}{A} \quad 16$$

Collapse is realized through a conflict of state definitions resulting in an informational big bang moving to identity-reconstruct. This reconstruction of Definitum identity carries the resonant imprint of Empty Information with the inverse true of empty information. The resulting bifurcation is the fundamental driver for all to follow in the function of absolute information formalism,  $I^A$ . Twenty-six unentangled states result from the fracture of Definitum and empty sets expressed across two sets 26 (a-c-e-g-i-k-m-o-q-s-u-w-y) and 25 (b-d-f-h-j-l-n-p-r-t-v-x-z) that include the initial Definitum  $y, b$  and empty  $b, y$  and the associated resonant imprint from fracturing of the intersecting states of 26 ( $b-d-f-h-j-l-n-p-r-t-v-x-z$ ) and 25 ( $a-c-e-g-i-k-m-o-q-s-u-w-y$ ). Collapse breaks groupoids  $f(26)$  and  $f(25)$  free of first order Definitum/empty with the only link left to strange attractors  $\text{Hom}_U(Y, B)$  to maintain definition and avoid information category error. High ordered, low entropic RealTime  $Y, B$  enables definition maintenance to other groupoid members across resonant states leading to ideal time. All logic and information set interactions are due to an attempt to return groupoids of  $I^A$  logic to Definitum/Empty information first order, but the attempt always fails as entropy of the universe can never informationally reassemble to initial state. This behavior results in a process conversion Definitum/Empty Information with  $\text{Hom}_U(Y, B)$  entangling information degrees of freedom of the groupoids into conjugate variables facilitating the Hamiltonian and four-space ideal time. Definitum/Empty Information still exists in the universal set as an information ground state interacting with groupoids  $f(26)$  and  $f(25)$  over  $\text{Hom}_U(Y, B)$  enabling RealTime to ideal time entropy.

*Real Time, RT* is defined as high degrees of freedom while *idea time, t*, is defined by degrees of entanglement, over a complex bifurcated 26 dimensional system that is on an arrow of entropy from

$$RT \rightarrow t .$$

17

See eq. 15. Accordingly, first order  $I^A$  logic of  $y,B$  and  $b,Y$  constructs definition parameters across the arrow of entropy from high order to low order complexity in universal structure. This is diagrammatically explored in *Tables 1, 2 & 3*.

Table 2  $\infty$

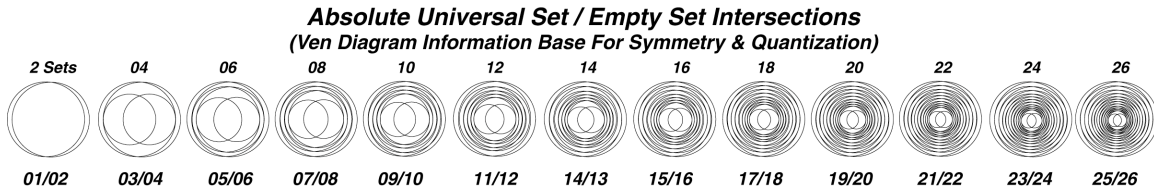


image is representative not simulated

Therefore, Definitum intersecting empty set implies expansion  $E^+ = f : 02y \rightarrow 01Y \dots f : 26a \rightarrow 25a$  therefore empty set intersecting Definitum implies contraction  $E^- = g : 01b \rightarrow 02B \dots f : 25z \rightarrow 26z$ .

$$E^+ = f : 02y \rightarrow 01Y \dots f : 26a \rightarrow 25a \therefore E^- = g : 01b \rightarrow 02B \dots f : 25z \rightarrow 26z \quad 18$$

Initial order Definitum intersections establish the quantized universe by fracturing the two absolute states into  $I^A$  regarding those states. When fracturing occurs the hypothetico-deductive system of first order resolves to  $I^A$  removing undecidability of the primitive nature of the Definitum state.  $E^+$  and  $E^-$  construct an  $I^A$  transitional probability matrix with a potential twenty-six dimensions expressed across twenty-six degrees of freedom/entanglement with coherent information resonance between sets [Table 3].

Table 3  $\infty$

**Coherent Resonant Set Intersections With Degrees of Freedom from Real Time to Ideal Time**

$I^A \rightarrow m_c^l \rightarrow e_l^-$ contraction				$I^A \rightarrow \bar{m}_c^l \rightarrow e_l^+$ expansion			
Set	Superset	Degrees of Freedom	Deformation/Entanglement	Superset	Degrees of Freedom	Deformation/Entanglement	Set
26	a-c-e-g-i-k-m-o-q-s-u-w-y		$B-d-f-h-j-l-n-p-r-t-v-x-z$	$\cap$	b-d-f-h-j-l-n-p-r-t-v-x-z	$a-c-e-g-i-k-m-o-q-s-u-w-Y$	25
24	a-c-e-g-i-k-m-o-q-s-u-w-y		$B-d-f-h-j-l-n-p-r-t-v-x-z$	$\cap$	b-d-f-h-j-l-n-p-r-t-v-x-z	$a-c-e-g-i-k-m-o-q-s-u-w-Y$	23
22	a-c-e-g-i-k-m-o-q-s-u-w-y		$B-d-f-h-j-l-n-p-r-t-v-x-z$	$\cap$	b-d-f-h-j-l-n-p-r-t-v-x-z	$a-c-e-g-i-k-m-o-q-s-u-w-Y$	21
20	a-c-e-g-i-k-m-o-q-s-u-w-y		$B-d-f-h-j-l-n-p-r-t-v-x-z$	$\cap$	b-d-f-h-j-l-n-p-r-t-v-x-z	$a-c-e-g-i-k-m-o-q-s-u-w-Y$	19
18	a-c-e-g-i-k-m-o-q-s-u-w-y		$B-d-f-h-j-l-n-p-r-t-v-x-z$	$\cap$	b-d-f-h-j-l-n-p-r-t-v-x-z	$a-c-e-g-i-k-m-o-q-s-u-w-Y$	17
16	a-c-e-g-i-k-m-o-q-s-u-w-y		$B-d-f-h-j-l-n-p-r-t-v-x-z$	$\cap$	b-d-f-h-j-l-n-p-r-t-v-x-z	$a-c-e-g-i-k-m-o-q-s-u-w-Y$	15
14	a-c-e-g-i-k-m-o-q-s-u-w-y		$B-d-f-h-j-l-n-p-r-t-v-x-z$	$\cap$	b-d-f-h-j-l-n-p-r-t-v-x-z	$a-c-e-g-i-k-m-o-q-s-u-w-Y$	13
12	a-c-e-g-i-k-m-o-q-s-u-w-y		$B-d-f-h-j-l-n-p-r-t-v-x-z$	$\cap$	b-d-f-h-j-l-n-p-r-t-v-x-z	$a-c-e-g-i-k-m-o-q-s-u-w-Y$	11
10	a-c-e-g-i-k-m-o-q-s-u-w-y		$B-d-f-h-j-l-n-p-r-t-v-x-z$	$\cap$	b-d-f-h-j-l-n-p-r-t-v-x-z	$a-c-e-g-i-k-m-o-q-s-u-w-Y$	09
08	a-c-e-g-i-k-m-o-q-s-u-w-y		$B-d-f-h-j-l-n-p-r-t-v-x-z$	$\cap$	b-d-f-h-j-l-n-p-r-t-v-x-z	$a-c-e-g-i-k-m-o-q-s-u-w-Y$	07
06	a-c-e-g-i-k-m-o-q-s-u-w-y		$B-d-f-h-j-l-n-p-r-t-v-x-z$	$\cap$	b-d-f-h-j-l-n-p-r-t-v-x-z	$a-c-e-g-i-k-m-o-q-s-u-w-Y$	05
04	a-c-e-g-i-k-m-o-q-s-u-w-y		$B-d-f-h-j-l-n-p-r-t-v-x-z$	$\cap$	b-d-f-h-j-l-n-p-r-t-v-x-z	$a-c-e-g-i-k-m-o-q-s-u-w-Y$	03
02	a-c-e-g-i-k-m-o-q-s-u-w-y		$B-d-f-h-j-l-n-p-r-t-v-x-z$	$\cap$	b-d-f-h-j-l-n-p-r-t-v-x-z	$a-c-e-g-i-k-m-o-q-s-u-w-Y$	01



These sets states combine to form an information monopole from groupoids failure of Definitum/Empty. *Fig. 1* is twenty-sixth expansion,  $E^+$ , dimension at the top of the *Table 4* matrix while *Fig. 2* is the twenty-fifth contraction  $E^-$ , dimension at bottom.

26 **a, c, e, g, i, k, m, o, q, s, u, w, y**  $\supset$  *B, d, f, h, j, l, n, p, r, t, v, x, z* *fig. 1*

25 *a, c, e, g, i, k, m, o, q, s, u, w, Y*  $\subset$  **b, d, f, h, j, l, n, p, r, t, v, x, z** *fig. 2*

*Table 4*  $\infty$

**26 x 26 ABSOLUTE INFORMATION MONOPOLE DIMENSIONAL ENTANGLEMENT MATRIX**

**Solid Black:** Superset Information  $I^A$  • **Grey:** Information to Energy Expressed  $I^A \rightarrow e_l$

**Black Italics:** Subset Trapped Information • **Grey Italics:** Energy Resonance Potential

Absolute Expansion: **acegikmoqsuwy**, *Bdfhjnprt vxz* • Absolute Contraction: *acegikmoqsuwy*, **bdfhjnprt vxz**

	26	24	22	20	18	16	14	12	10	08	06	04	02	01	03	05	07	09	11	13	15	17	19	21	23	25
26	<b>a</b>	<b>c</b>	<b>e</b>	<b>g</b>	<b>i</b>	<b>k</b>	<b>m</b>	<b>o</b>	<b>q</b>	<b>s</b>	<b>u</b>	<b>w</b>	<b>y</b>	<i>B</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
24	<b>a</b>	<b>c</b>	<b>e</b>	<b>g</b>	<b>i</b>	<b>k</b>	<b>m</b>	<b>o</b>	<b>q</b>	<b>s</b>	<b>u</b>	<b>w</b>	<b>y</b>	<i>B</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
22	<b>a</b>	<b>c</b>	<b>e</b>	<b>g</b>	<b>i</b>	<b>k</b>	<b>m</b>	<b>o</b>	<b>q</b>	<b>s</b>	<b>u</b>	<b>w</b>	<b>y</b>	<i>B</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
20	<b>a</b>	<b>c</b>	<b>e</b>	<b>g</b>	<b>i</b>	<b>k</b>	<b>m</b>	<b>o</b>	<b>q</b>	<b>s</b>	<b>u</b>	<b>w</b>	<b>y</b>	<i>B</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
18	<b>a</b>	<b>c</b>	<b>e</b>	<b>g</b>	<b>i</b>	<b>k</b>	<b>m</b>	<b>o</b>	<b>q</b>	<b>s</b>	<b>u</b>	<b>w</b>	<b>y</b>	<i>B</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
16	<b>a</b>	<b>c</b>	<b>e</b>	<b>g</b>	<b>i</b>	<b>k</b>	<b>m</b>	<b>o</b>	<b>q</b>	<b>s</b>	<b>u</b>	<b>w</b>	<b>y</b>	<i>B</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
14	<b>a</b>	<b>c</b>	<b>e</b>	<b>g</b>	<b>i</b>	<b>k</b>	<b>m</b>	<b>o</b>	<b>q</b>	<b>s</b>	<b>u</b>	<b>w</b>	<b>y</b>	<i>B</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
12	<b>a</b>	<b>c</b>	<b>e</b>	<b>g</b>	<b>i</b>	<b>k</b>	<b>m</b>	<b>o</b>	<b>q</b>	<b>s</b>	<b>u</b>	<b>w</b>	<b>y</b>	<i>B</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
10	<b>a</b>	<b>c</b>	<b>e</b>	<b>g</b>	<b>i</b>	<b>k</b>	<b>m</b>	<b>o</b>	<b>q</b>	<b>s</b>	<b>u</b>	<b>w</b>	<b>y</b>	<i>B</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
08	<b>a</b>	<b>c</b>	<b>e</b>	<b>g</b>	<b>i</b>	<b>k</b>	<b>m</b>	<b>o</b>	<b>q</b>	<b>s</b>	<b>u</b>	<b>w</b>	<b>y</b>	<i>B</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
06	<b>a</b>	<b>c</b>	<b>e</b>	<b>g</b>	<b>i</b>	<b>k</b>	<b>m</b>	<b>o</b>	<b>q</b>	<b>s</b>	<b>u</b>	<b>w</b>	<b>y</b>	<i>B</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
04	<b>a</b>	<b>c</b>	<b>e</b>	<b>g</b>	<b>i</b>	<b>k</b>	<b>m</b>	<b>o</b>	<b>q</b>	<b>s</b>	<b>u</b>	<b>w</b>	<b>y</b>	<i>B</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
02	<b>a</b>	<b>c</b>	<b>e</b>	<b>g</b>	<b>i</b>	<b>k</b>	<b>m</b>	<b>o</b>	<b>q</b>	<b>s</b>	<b>u</b>	<b>w</b>	<b>y</b>	<i>B</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
01 $I^A =$	<i>a</i>	<i>c</i>	<i>e</i>	<i>g</i>	<i>i</i>	<i>k</i>	<i>m</i>	<i>o</i>	<i>q</i>	<i>s</i>	<i>u</i>	<i>w</i>	<i>Y</i>	<i>b</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
03	<i>a</i>	<i>c</i>	<i>e</i>	<i>g</i>	<i>i</i>	<i>k</i>	<i>m</i>	<i>o</i>	<i>q</i>	<i>s</i>	<i>u</i>	<i>w</i>	<i>Y</i>	<i>b</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
05	<i>a</i>	<i>c</i>	<i>e</i>	<i>g</i>	<i>i</i>	<i>k</i>	<i>m</i>	<i>o</i>	<i>q</i>	<i>s</i>	<i>u</i>	<i>w</i>	<i>Y</i>	<i>b</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
07	<i>a</i>	<i>c</i>	<i>e</i>	<i>g</i>	<i>i</i>	<i>k</i>	<i>m</i>	<i>o</i>	<i>q</i>	<i>s</i>	<i>u</i>	<i>w</i>	<i>Y</i>	<i>b</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
09	<i>a</i>	<i>c</i>	<i>e</i>	<i>g</i>	<i>i</i>	<i>k</i>	<i>m</i>	<i>o</i>	<i>q</i>	<i>s</i>	<i>u</i>	<i>w</i>	<i>Y</i>	<i>b</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
11	<i>a</i>	<i>c</i>	<i>e</i>	<i>g</i>	<i>i</i>	<i>k</i>	<i>m</i>	<i>o</i>	<i>q</i>	<i>s</i>	<i>u</i>	<i>w</i>	<i>Y</i>	<i>b</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
13	<i>a</i>	<i>c</i>	<i>e</i>	<i>g</i>	<i>i</i>	<i>k</i>	<i>m</i>	<i>o</i>	<i>q</i>	<i>s</i>	<i>u</i>	<i>w</i>	<i>Y</i>	<i>b</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
15	<i>a</i>	<i>c</i>	<i>e</i>	<i>g</i>	<i>i</i>	<i>k</i>	<i>m</i>	<i>o</i>	<i>q</i>	<i>s</i>	<i>u</i>	<i>w</i>	<i>Y</i>	<i>b</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
17	<i>a</i>	<i>c</i>	<i>e</i>	<i>g</i>	<i>i</i>	<i>k</i>	<i>m</i>	<i>o</i>	<i>q</i>	<i>s</i>	<i>u</i>	<i>w</i>	<i>Y</i>	<i>b</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
19	<i>a</i>	<i>c</i>	<i>e</i>	<i>g</i>	<i>i</i>	<i>k</i>	<i>m</i>	<i>o</i>	<i>q</i>	<i>s</i>	<i>u</i>	<i>w</i>	<i>Y</i>	<i>b</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
21	<i>a</i>	<i>c</i>	<i>e</i>	<i>g</i>	<i>i</i>	<i>k</i>	<i>m</i>	<i>o</i>	<i>q</i>	<i>s</i>	<i>u</i>	<i>w</i>	<i>Y</i>	<i>b</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
23	<i>a</i>	<i>c</i>	<i>e</i>	<i>g</i>	<i>i</i>	<i>k</i>	<i>m</i>	<i>o</i>	<i>q</i>	<i>s</i>	<i>u</i>	<i>w</i>	<i>Y</i>	<i>b</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>
25	<i>a</i>	<i>c</i>	<i>e</i>	<i>g</i>	<i>i</i>	<i>k</i>	<i>m</i>	<i>o</i>	<i>q</i>	<i>s</i>	<i>u</i>	<i>w</i>	<i>Y</i>	<i>b</i>	<i>d</i>	<i>f</i>	<i>h</i>	<i>j</i>	<i>l</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>t</i>	<i>v</i>	<i>x</i>	<i>z</i>

Grayed area D10/9 through D2/1: Hamiltonian Bounded three-space (D10, D9, D8) to quantum information (D7 – D2) to lower bound ideal time/quantum information radiator (D1); see Appendix C.

For convention, all even numbered dimensions represent a top/left side expansion  $E^+$  expression with odd numbered dimensions, bottom/right side contraction  $E^-$ . If local space-time conditions do not facilitate entanglement then all twenty-six dimensions would look the same as in *fig. 1* and *2*, less one entangled state. With each level of entanglement all subsequent dimensions are themselves entangled. So when the twenty-fourth dimension is entangled losing one degree of freedom, one degree of freedom is lost to all subsequent expansion dimensions. Moving from 26 through 20 results in four degrees of entanglement *fig 3*. (*see also Appendix C, D & D2*) each degree of freedom lost to entanglement (gray left) results in information to matter to energy gain (italics right).

*fig. 3*

26 **a, c, e, g, i, k, m, o, q, s, u, w, y**, | *b, d, f, h, j, l, n, p, r, t, v, x, z*  
 24 **a, c, e, g, i, k, m, o, q, s, u, w, y**, | *b, d, f, h, j, l, n, p, r, t, v, x, z*  
 22 **a, c, e, g, i, k, m, o, q, s, u, w, y**, | *b, d, f, h, j, l, n, p, r, t, v, x, z*

This sets the basis for reflexive relationship of information to matter to energy creation explored later in the paper. From the reconstruction of two highly ordered states comes dimensionality of universal structure based upon twenty-six degrees of freedom. This dimensionality of absolute information is called the *information monopole*, *Table 4*, which contains all absolute information necessary for universal structure. It is a RealTime construct of twenty-six dimensional degrees of freedom that, when entangled with another information monopole, results in four-space/ideal time. The information monopole is called a monopole because it takes at least two interacting information monopoles to facilitate four-space infinite complexity of quantum information.

#### 4. ENTROPY OF DIMENSIONS $\infty$

What is the shape of the universe? The shape of the universe is absolute information,  $I^A$ . How can information be shape? It can't, which is the point. The incongruity of the statement stems from an anthropic view that dimensions are spatial, defined by form. That is an observer based anthropic convention. What if dimensions are functions?  $I^A$  has a countable potential across twenty-six degrees of freedom and, therefore, has physical potential, *Table 1*. It has a slope from entanglement of that freedom, *Table 11*, and therefore, potential geometry related to that slope. Deformation of its members yields notions of locations through scalar and vector  $I^A$  potentials, *Table*

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4 & App. C1 & 2, which leads to specific spatial geometries resulting in scalars and vectors. The entropy of Absolute information  $I^A$  can define, clarify, nullify, approximate, divide, multiply, add and subtract. It is an entropy statement about the amount of  $I^A$  not available to do work, running on an arrow from high to low order. Time is a process function of  $I^A$  entropy. Matter, energy and quantum information are merely entanglements of its degrees of freedom.  $I^A$  has all those qualities, but it is not a shape, any more than all dimensions can be a shape or even spatial. It is a question of emergence. Which came first, three-spatial dimensions and time or the  $I^A$  necessary to facilitate three-spatial dimensions and time? The answer to that question separates the individual observer from the universal observer; then dimensions become information as function facilitating geometry as but one of its forms. For formality of universal structure to exist there must be  $I^A$  at work that, while foundational to quantum, is not quantum information. Observables can be viewed as the qualitative result of  $I^A$  conversion to energy, with mathematics providing the quantitative measure of that conversion. Mathematics alone cannot describe first order logic of highly ordered  $I^A$  as mathematics is emergent, and therefore dependent on it. Quantum mathematics describes indeterminacy allowing complexity to be logically quantifiable through probability distributions of energy across quantum information states. EDU defines dimensions in terms “absolute information function” and not “geometry as form.”

Currently dimensions outside of four-space are thought to be compacted to smallest particles, with a lower value of  $\sim 10^{-16}$  m. However, Randall et. al. [24] sets aside compactification through an embedded three brane in five dimensions and [25] engages higher dimensional FRW evolved branes and anti-branes that end up dominating a 3 and 7 brane universal structure.

In EDU dimensions are informationally expressed throughout SpaceTime and form SpaceTime. Dimensions are defined as entropy states of information to energy expressed through entanglement of the twenty-six degrees of freedom. Dimensional comprehension of the structural universe is possible only through a logical informational continuum running from  $I^A$  to quantum information. This makes it challenging to utilize the scientific method to explore absoluteness; challenging yes, but not impossible.

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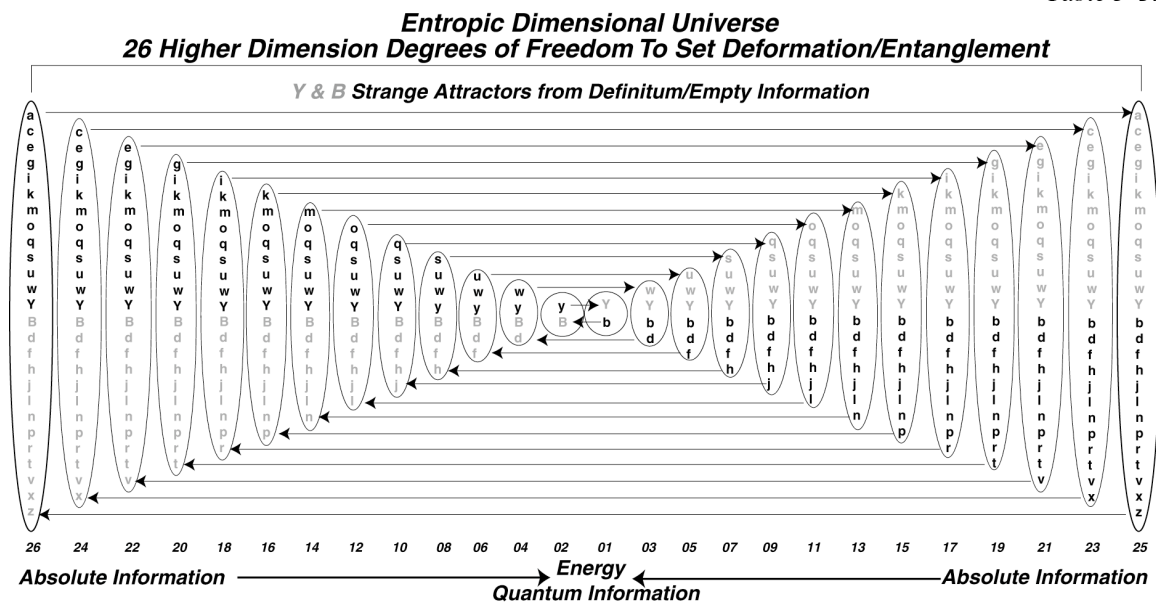
Observers report on what they can measure. Tools are constructed to evaluate a world of chaos, indeterminacy and uncertainty. Everything is in pieces, which are logically counted and arranged as if to reconstruct some existential puzzle. A methodology is employed to test the accuracy of reconstruction.

The Planckian universe does not contain all the logical information necessary for the absoluteness of universal structure. It begs reason to think that the universe is only reconstructivistic. Reconstruction implies a once ordered state, a state not seen in the Planckian universe, but clearly evident in the Definitum/Empty first-order argument. The universe was not always in pieces. Complexity, disorder and chaos are not foundation. Dimensions are generally thought to be mathematical properties of spatial coordinate systems. Even multiple dimensions are mathematically defined as spatial coordinates beyond four dimensions, which are too small to be observed. Again we define multiple dimensions in spatial terms evident in Kline bottles, hypercubes, hyperspheres and tesseract. By defining dimensions as “the ratio of degrees of freedom to entanglement of absolute information” does not replace spatial dimensions, it simply limits them to a three-space entanglement, treating them equally with all of the other absolute twenty-six dimensions. As stated, chaos experiments have proved to be sensitive to initial conditions. The slightest difference in initial conditions, differences beyond our ability to measure, make prediction of outcomes impossible. Measure-ability is constrained by technical and experimental limitations. Central to Chaos Theory is an underlying order moving toward complexity. In EDU, entropy is expressed as the amount of  $I^A$  *not* available to do work in the system. On a limited scale, one can move from chaos to order by counter-intuitively adding more chaos into the system [26], indicating that chaos boundary conditions for its underlying order are found in the information monopole and matter definition. Informational coherent resonance establishes an arrow of entropy from order to disorder and back to order. Essentially the information monopole brings fractured Definitum chaos and fractured Empty chaos together and a more ordered state results. In like manner, a singular ordered state brought to another singular ordered state bifurcates order of both states increasing chaos. Therefore, by adding order to order, chaos results, as evident in  $I^A$  logic of Definitum bifurcation with empty information.

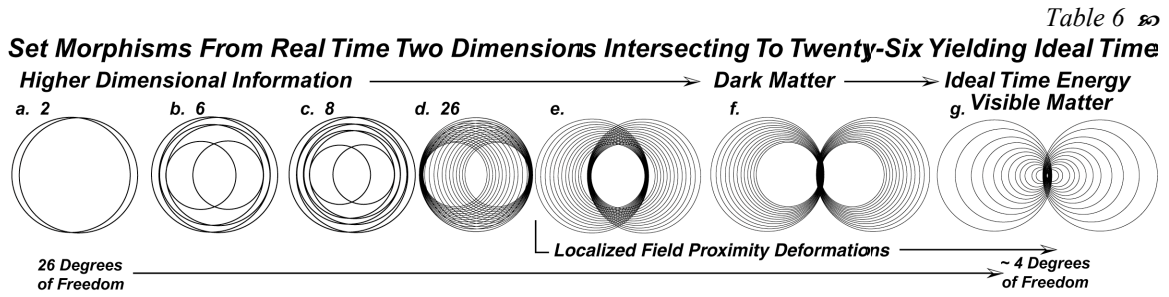
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Introducing order down the entropy arrow into complexity does not decrease chaos potential. To affect chaos, more chaos has to enter into the system enabling resonant interaction between the sets bringing order seen in *Table 5*. The high to low order entropy of  $I^A$  defines twenty-six dimensions. Chaos is the result of  $I^A$  in matter definition attempting a return to Definitum. Dimensions, time and space are measurements of  $I^A$  not available to do work through its conversion into kinetic and potential energy of the system. Energy is emergent from the process of absolute information maintaining matter definition. To move the semantic argument into syntax, from intuition to Boolean, twenty-six states from the fracturing of Definitum, entangle across twenty-six degrees of freedom establishing absolute information dimensions. Each intersection between sets causes a one-degree of freedom loss evident in the graying of the degrees of freedom column due to entanglement gained, evident in the Deformation/Entanglement column in *Table 3*. The same information can be viewed in terms of a 26 X 26 Information Monopole matrix, *Table 4*. In EDU, a quark is an  $I^A$  monopole. Entanglement is symmetrical from top right to center and the bottom left to center. This concept is carried into reflexive action of *Table 5* expressed in a simple Venn diagram where flexibility/expansion and stiffness/contraction are symmetric.

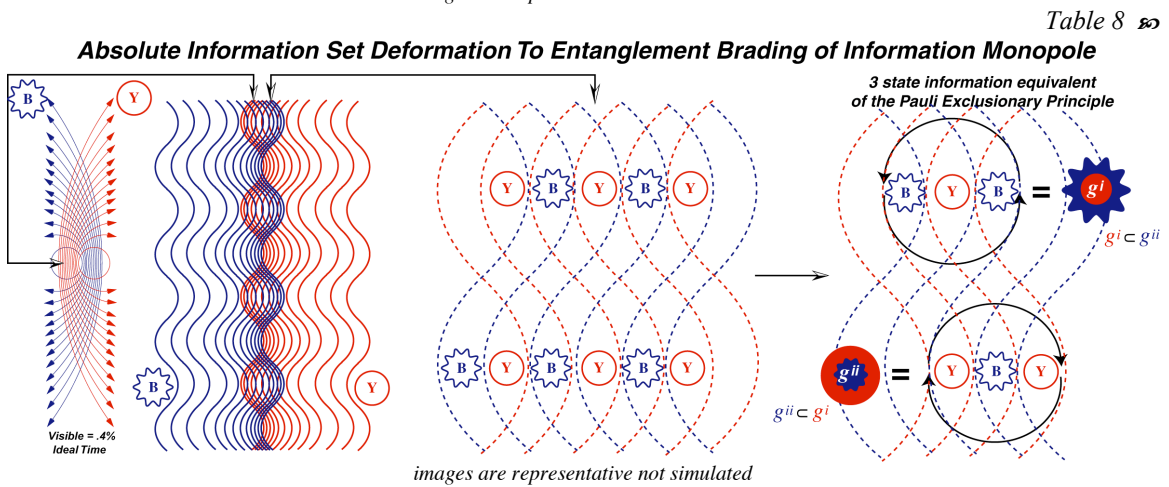
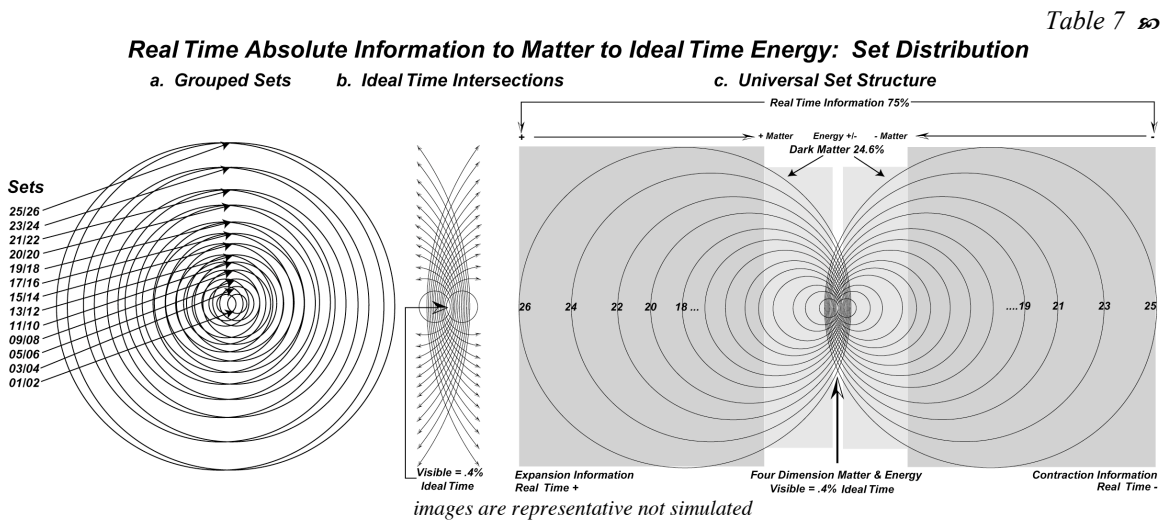
Table 5  $\infty$



This structure is foundational to non-linear information coherent resonance later evident in matter definition. *Table 5* Venn across set morphisms is evident in *Table 6*.



Expressing this in a fundamental topological argument from set information theory can be accomplished by extrapolating the Venn diagram relationships of the information monopole explored in *Table 6* and the *Table 7* matrix to a canonical example of a braided monoidal category, Braid, *Table 8*.

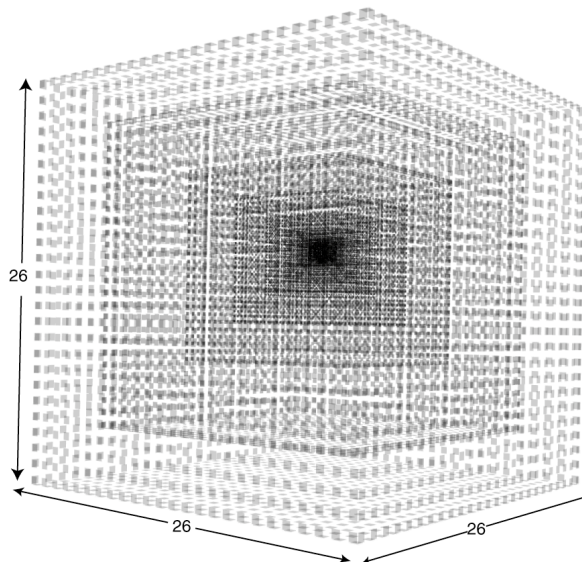


A Young-Baxter operator can be applied to the information monopole facilitating a braiding of intersecting sets generally suggested in *Table 8*.

Young–Baxter applies to higher dimensions if everything is categorized; its higher dimensional analogue is called “Zamolodchikov tetrahedron equation.” [27, 28, 29] When three-space is mapped onto the information monopole, it yields 17,576 corresponding points (vector potentials) that are the  $I^A$  lattice of the structure. CORRESPONDING POINTS are dimensionless notions of locations emergent from  $I^A$  vector potential. These  $I^A$  states are foundational to four-space. 26 dimensions to the 26<sup>th</sup> power each or  $26^{26}$ , realizes  $6.15611958 \times 10^{36}$  corresponding points for each dimension in the information monopole; or when three space is mapped into 26 dimensions to the 3<sup>rd</sup> power, or  $26^3$ , realizes 17,576 vector-less corresponding points for each 26-nested Bloch-like spheres of an information monopole. Corresponding points are  $I^A$  phase space notions in which all possible information states of the system are represented on each twenty-six nested, twenty-six dimensional  $I^A$  state Bloch-like spheres. A bijective or injective/reflexive relationship is implied on a one to one between vectorless points (*see Appendix C1 & C2*). This helps conceptualize entangled sets and degrees of freedom. Corresponding points establish homogeneity of structure. Without the vector potential of corresponding points vectors would not be emergent.

Table 9  $\infty$

**26 X 26 X 26 Information Monopole Schematic**



*Image is representative not simulated.*

5. THE ENTROPIC DIMENSIONAL UNIVERSE & WMAP EMERGENCE 

There must be specific boundary conditions necessary for four-space. The quantum mechanical behavior of fundamental forces arising from four-space, address the potential of boundary conditions. EDU started as a retrograde analysis of four-space and fundamental forces that led to a pro-grade analysis. Intuitionistic logic started it off with the axiom of absoluteness and the axiom of entropy, [pg. 8]; Boolean logic then took over breaking down to twenty-six degrees of freedom [see Table 1, pg. 11] from Definitum/Empty with twenty-six states resulting from set interaction process [see Table 4, pg. 14]; and then intuitionistic logic took the lead again describing the function of each logical information state associated with each Boolean dimension that eventuates in Planck-space, which is the topic of this section; after which, applied  $I^A$  across classical and relativistic mechanics finishes the cycle [eq. 19-57, pgs. 33-51]; all followed by intuitionistic implications. Such is the logic cycle contained herein. In this section the intuitionistic rationale for the functions of each dimension are explained in detail.

Clarifying dimensionality was approached logically. First, why is the universe three, four or five or ten or even twenty-six dimensions? What is the underlying logic? What is the function of each dimension? Generally, three dimensions are dependent upon spatiality and mass; four are dependent of spatial/mass and time dilation; five factors in an additional spatial dimensions allowing for curvature of electromagnetism; and ten plus are attempts to bring gravity into the dimensional mix. This approach makes dimensions dependent upon observables instead of giving them an independent foundation. So if it can't be observed, arguably, there are no dimensions or they are compactified and too small to be seen. All measurements made for experiments to date generally engage three or four dimensions (note: there are also higher dimensional untested experiments proposed) [Randall]. Since  $I^A$  entropy argument carries with it a Real Time to ideal time function this eliminates the need for a time dimension. Then the electromagnetism curvature spatial dimension evident in Kaluza-Klein, while evident throughout twenty-six dimensions, would logically be emergent from a three-space construct; leaving three spatial dimensions which are geometrically invariant, not divisible, and with a boundedness that, as will be seen, carries profound implications. EDU intuitionistic logic

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is from the outside in. Assuming entropy equivalence to time, how many information states would it cost to build a three-dimensional universe? Or as Landauer might ask, “How much information must be thrown away, or entangled, for dimensions to be evident?” That is a logical emergence of function from dimension.

In the WMAP, Wilkinson Microwave Anisotropic Probe, [19, 20] a dark universe,  $\sim 99.6\%$ , with no apparent observables has presented itself. Proposed in *Table 11* is a hierarchal logic that explains dimensions as set functions and then their emergent constituent parts, as subsets of those functions. Percentages remain the same regardless of power so the intuitionistic decision was made to map three-dimensions onto each of the twenty-six without necessarily invoking the factorial.  $26^3$  yields a cube of 17,576 corresponding points with 100% degrees of freedom [Table 9, pg 20].

Each dimension carries 17,576 corresponding points. However, each entanglement effects degrees of freedom, DOF, to where:  $25^3$  yields 15,625 with 11.1% entanglement and 88.9% DOF, while  $24^3$  yields 13,824 with 21.5% entanglement and 78.7 DOF. Degrees of freedom for each dimension, coupled with their functions establish a framework percentage of universal structure. Outside of three space mapping this analysis is informational, not spatial, and leads to an interactivity on the order of  $26^{26}!$ . It is not about form, it is about function. Quantity does not matter, it’s about quality. Absolute information is an entropy of information from high order to low order. Dimensions are information states measured over degree of freedom to entanglement.

Spatiality, geometry, mathematics, energy, scalars, matter and vectors are all emergent from, and dependent upon, foundational absolute information,  $I^A$ . Three-space concepts cannot describe the whole structure, as they are potential states arising from  $I^A$  phase space. What is needed to understand three-space is a fundamental construct that is common to all of three-space, matter, energy and all forces; one thing that binds them all together, a common event conditional, yet unique to each boundary.

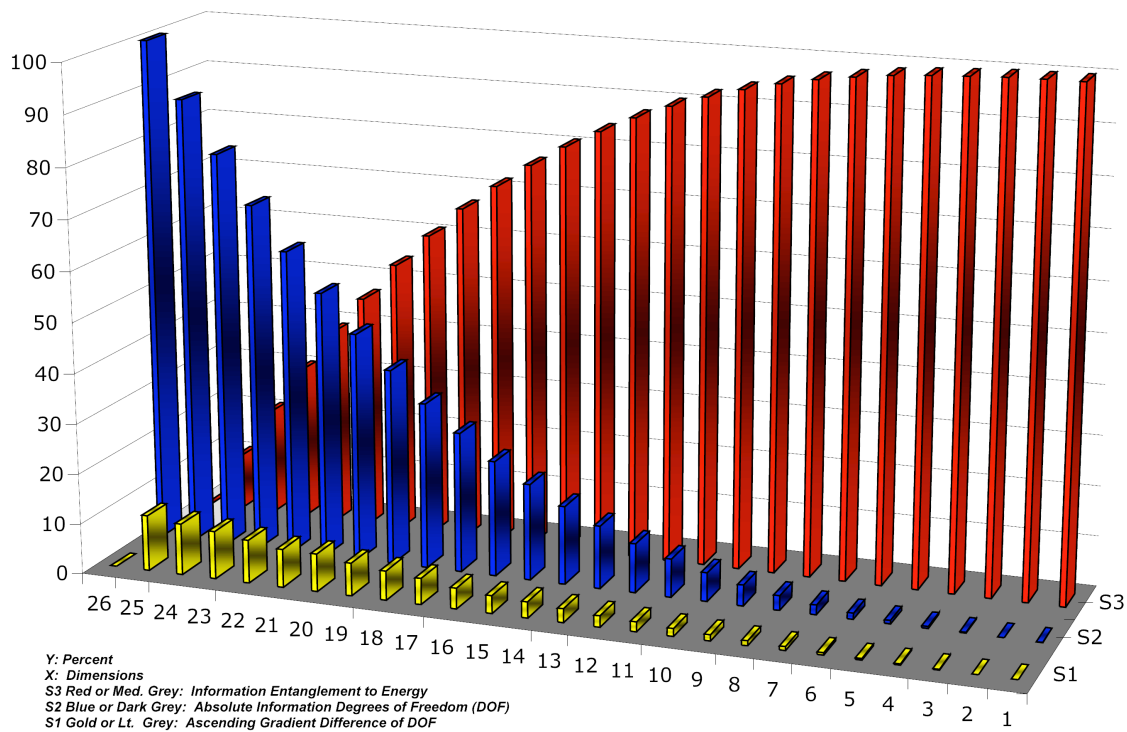
This insight led to the intuitionistic logic of the twenty-six dimensions of absolute information. Definitum/Empty Information entangles from certainty to uncertainty. Each entanglement yields its own information dimensional function expressed across absolute information *Table 11*. The reflexive relationship of absolute information

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expansion and contraction sets are explored in *Table 11*, “Information Monopole: Absolute Information to Energy Ratio.” Evident is a statistical movement from certainty of absolute information into the uncertainty of the bounded Hamiltonian through quantum information. Each specific function has a specific percentage of degrees of freedom.

Intriguingly, the Entropic Dimensional Universe structural analysis of entanglement to degrees of freedom tracks WMAP data on the nature of universal structure [19, 20], even the functions are the same. Twenty-five, twenty-seven or twenty-eight dimensions did not yield the WMAP results. In EDU, WMAP numbers could have only come out of a twenty-six dimensional universe. In fact, EVERY MULTIPLE OF TWENTY-SIX CARRIES THE EXACT SAME PERCENTAGE FOUND IN THE WMAP; supporting homogeneity of structure from the absolute information monopole to the whole universe.

*Absolute Information Entropy  $HIA$  Degrees of Freedom to Entanglement %* Table 10 



**THREE-SPACE MAPPING ON** TABLE 11   
**26 DIMENSIONAL INFORMATION MONOPOLE: ABSOLUTE INFORMATION TO ENERGY RATIO**

Dimensions (cubed) • States • Entanglement %: Total Information Unavailable • DOF: Information Degrees of Freedom • WMAP % (Source 19 & 20)

<i>Dimensions</i> <sup>3</sup>	<i>States</i>	<i>Entangled %</i>	<i>DOF %</i>	<i>WMAP %</i>	<i>Information Set Function</i>	<i>Info to Energy Realization</i>	<i>Explanation</i>
<b>26<sup>3</sup></b>	17576	0	100	73 for 100 total	<i>Expansion Upper Bound</i>	<i>Absolute Real Time E</i> 26 -17, 73% <sup>19/20</sup>	Real Time Expansion/Absolute Information (WMAP Dark Energy 73% for total of 100%)
<b>25<sup>3</sup></b>	15625	11.1	88.9		<i>Contraction Lower Bound</i>	<i>Absolute Real Time E<sup>-</sup></i>	Real Time Contraction <i>Hom<sub>U</sub>B</i>
<b>24<sup>3</sup></b>	13824	21.3	78.7		<i>Standing Waves sE<sup>+</sup></i>	Information SpaceTime lattice	Absolute Information Structure/universal homogeneity
<b>23<sup>3</sup></b>	12167	30.8	69.2		<i>Standing Waves sE<sup>-</sup></i>	Information SpaceTime lattice	Absolute Information Structure/universal homogeneity
<b>22<sup>3</sup></b>	10648	39.4	60.6		<i>Oscillating Corresponding Points</i>	Information Receptor	Dimension facilitating monopole communication
<b>21<sup>3</sup></b>	9261	47	53		<i>g<sup>i</sup> Information Monopole</i>	Information Monopole	Construction determined by subset of information set
<b>20<sup>3</sup></b>	8000	54.4833	45.516		<i>g<sup>ii</sup> Information Monopole</i>	Information Monopole	Construction determined by subset of information set
<b>19<sup>3</sup></b>	6859	60.957	39.02		<i>Oscillating Corresponding Points</i>	Information Receptor	Dimension facilitating monopole communication
<b>18<sup>3</sup></b>	5832	66.818	33.18		<i>+ strong force</i>	Nucleon definition	Nucleons from 3 monopoles
<b>17<sup>3</sup></b>	4913	72	27.9		<i>- strong force</i>	Nucleon definition	Nucleons from 3 monopoles
<b>16<sup>3</sup></b>	4096	76.7	23	23	Expansion Matter Containment	Dark Matter 23% <sup>19/20</sup> nuclear definition	23% Dark Matter Atomic definition
<b>15<sup>3</sup></b>	3375	80.8	19.2		Contraction Matter Resonance	nuclear definition	Atomic definition
<b>14<sup>3</sup></b>	2744	84.3	15.6		<i>Expansion Matter Resonance</i>	nuclear definition	Atomic definition
<b>13<sup>3</sup></b>	2197	87.5	12.5		<i>Contraction Matter Containment</i>	nuclear definition	Atomic definition
<b>12<sup>3</sup></b>	1728	90.2	9.8		<i>+Gravity Probability</i>	matter definition maintenance	Absolute Information to maintain matter integrity
<b>11<sup>3</sup></b>	1331	92.4	7.6		<i>- Gravity Probability</i>	matter definition maintenance	Absolute Information to maintain matter integrity
<b>10<sup>3</sup></b>	1000	94.3	5.7		<i>x, y, z</i>	Causal Formation	3 x 3 x 3 invariance Structural Dimension
<b>9<sup>3</sup></b>	729	95.85	4.15	3.6	<i>y, z, x</i>	Non-luminous matter 3.6% <sup>19/20</sup>	Quantum World WMAP.005 to 3.6 = 4.1% 3 x 3 x 3 invariance.
<b>8<sup>3</sup></b>	512	97.09	2.91		<i>z, x, y</i>	Gradient D10+D09+D08 = 3.7	3 x 3 x 3 invariance Structural Dimension
<b>7<sup>3</sup></b>	343	98.05	1.95		<i>- electromagnetism</i>	Interacting Mass Dynamics	Dimensions Facilitate Quantum Information
<b>6<sup>3</sup></b>	216	98.8	1.2		<i>+ electromagnetism</i>	Interacting Mass Dynamics	Dimensions Facilitate Quantum Information
<b>5<sup>3</sup></b>	125	99.3	0.7		<i>- light expression</i>		Dimensions Facilitate Quantum Information
<b>4<sup>3</sup></b>	64	99.6	0.4	0.4	<i>+ light expression</i>	Stars & luminous gas 0.4% <sup>19/20</sup>	Dimensions Facilitate Quantum Information
<b>3<sup>3</sup></b>	27	99.85	0.15	0.1	<i>- weak force</i>	Neutrinos 0.1 <sup>19/20</sup>	Dimensions Facilitate Quantum Information
<b>2<sup>3</sup></b>	8	99.955	0.045	0.04	<i>+ Weak force</i>	Black Holes 0.04 <sup>19/20</sup>	<i>Ideal Time + Hom<sub>U</sub>Y</i>
<b>1<sup>3</sup></b>	1	99.9943	0.0056	.005	<i>Expansion Lower Bound</i> <i>Contraction Upper Bound</i> <i>Ideal Time</i>	Radiation 0.005% <sup>19/20</sup> <i>Q<sub>I</sub> Limit</i>	<i>Ideal Time -</i> <i>Q<sub>I</sub> Quantum Information Limit</i>

<sup>19</sup>. P. Ostriker and P. Steinhardt, *New Light on Dark Matter*; Science 20 June 2003; 300: 1909-1913 [DOI: 10.1126/science.1085976]; <sup>20</sup> C. L. Bennett et al. *First Year Wilkinson Microwave Anisotropy Probe (WMAP1)* E-Print: arXiv:astro-ph/0302207 v3 5 Jun 2003

A twenty-six dimensional universe may seem contrary to logician William of Ockham's principle [30], "*Entia non sunt multiplicanda praeter necessitatem. (Entities should not be multiplied beyond necessity.)*" The principle can be an entropy statement of "*entities on an arrow of entropy to their multiplicities with necessity as limitation.*" Accordingly, EDU is consistent with Ockham as multiplicity of twenty-six dimensions are emergent from two entity states, Definitum and Empty Information. A first-order argument with only two assumptions and two entities is high order information and logically *must* exist to baseline complexity.

ALL OF THE UNIVERSE AND ALL ITS FORMS ARE SIMPLY ENTANGLED MULTIPLES OF TWENTY-SIX STATES. That is high order.

In EDU *Table 11*, quantum mechanics is an extremely small process result emergent from interacting absolute information, a percentage argument in keeping with experimental evidence. Ostriker and Steinhardt [19] summarized WMAP (Wilkinson Microwave Anisotropic Probe) data [20] on universal structure that showed luminous components of the universe at  $\sim 0.4\%$  of the total energy leaving 99.6% dark to observation. In this dark state,  $\sim 3.7\%$  are cold gas and dust, neutrinos and black holes, while  $\sim 23\%$  is dark matter. But the vast majority,  $\sim 73\%$ , is some form of self-repulsive gravitationally dark energy. *Table 11* data lights up the darkness with an entropy statement at work in the universe. The entity being ordered cannot be matter, the data does not support that argument. It cannot be quantum mechanical, again the quantum world is emergent from matter. Gravity? Gravity is associated with matter, so it is not a candidate, unless elusive dark matter is factored in. But even if dark matter is counted for that still leaves 73% unaccounted for. So, what is left? What Ockham entity is being ordered? Arguably, the total universal amount of the entire testable quantum mechanical world comes to  $\sim 4.15\%$ ; a number at the heart of EDU's *Table 11, D9* degrees of freedom percentage at 4.15% of universal structure.  $\sim 95.85\%$  of the universe is up for theoretical grabs. It cannot be defined quantum mechanically, relativistically or classically, yet it is approachable in EDU. Out from  $HI^A$ , WMAP percentages emerge. The Ockham entity being ordered is  $I^A$ , indicating a twenty-six dimensional cosmological information structure at work where every dimension is uniquely entangled.

6. THE STRUCTURE OF THE ABSOLUTE INFORMATION MONOPOLE OF TABLES 11 & 12 ~~so~~  
*(Derived from a retrograde to prograde and back analysis down from, and back into, four-space)*

EXPANSION UPPER BOUND REAL TIME  $E^+$  • DOF 100% OF WHICH 73% IS  $I^A$

WMAP TOTAL 100 % OF WHICH 73% IS DARK ENERGY

*D26* a c e g i k m o q s u w y B d f h j l n p r t v x z

As the upper bound of  $\text{Hom}_U B$  strange attractor from Expansion lower bound  $D02$ ,  $D26$  has 100% degrees of freedom. Driven by Definitum, there are no constraints until it interacts with another information monopole. Absolute information entanglement (dark energy) moves from  $D26$  to  $D17$  for a total of 72%; the Degrees of Freedom (DOF) arising out of percentage totals of  $D16$  is 73%, both indicating the WMAP total of 73%

CONTRACTION LOWER BOUND REAL TIME  $E^-$  • DOF 88.9%

*D25* a c e g i k m o q s u w Y b d f h j l n p r t v x z

Symmetrically, where expansion strange attractor moves from  $D02$  towards degrees of freedom of  $D26$ , contraction strange attractor  $\text{Hom}_U Y$  seeks entanglement from  $D25$  to  $D01$ . And is driven by Empty. Its 100% degrees of freedom are entangled upon interaction with the strange attractor, entangling the system to  $D24$  and  $D23$ . Every information monopole internal to Definitum/Empty Information expansion and contraction states have a direct corresponding relationship across corresponding points. A four-space analogue would be every point on an inner sphere has a corresponding point to the outer sphere no matter how large the outer sphere or where the inner sphere is located in the interior of the outer sphere.

EXPANSION STANDING WAVE  $SE^+$  ABSOLUTE INFORMATION LATTICE • DOF 78.7%

*D24* a c e g i k m o q s u w y B d f h j l n p r t v x z

STANDING WAVES  $SE^-$  ABSOLUTE INFORMATION LATTICE • DOF 69.2%

*D23* a c e g i k m o q s u w Y b d f h j l n p r t v x z

$D24$  and  $D23$  are the ground state of a single unbounded absolute information monopole and as such facilitate corresponding points informational lattice bringing homogeneity and isotropy to all casual formations. [App. C1 matrix 1] THE PRINCIPLE OF CAUSAL FORMATION states that all absolute information to matter to energy to quantum information in a system remains constant establishing homogenous boundary

conditions necessary to closed systems. The principle is first order to all Conservation Principles as it is emergent from the Absolute Information Monopole. All conservation principles can be defined by, the Principle of Causal Formation.

SE<sup>+</sup> OSCILLATING CORRESPONDING POINTS • DOF 60.6%

D22 a c e g i k m o q s u w y B d f h j l n p r t v x z

*g<sup>i</sup>* INFORMATION MONOPOLE • DOF 53%

D21 a c e g i k m o q s u w Y b d f h j l n p r t v x z

*g<sup>ii</sup>* INFORMATION MONOPOLE • DOF 45.5%

D20 a c e g i k m o q s u w y B d f h j l n p r t v x z

SE<sup>-</sup> OSCILLATING CORRESPONDING POINTS • DOF 39%

D19 a c e g i k m o q s u w Y b d f h j l n p r t v x z

Absolute Information, matter, energy and quantum information result from Definitum and Empty attempting return to first order. Mechanistically, strange attractors *Hom<sub>U</sub> B* and *Hom<sub>U</sub> Y* drive entanglement across *D24* and *D23* causing entanglement of *D22* through *D19*. [App. C1 matrices 2 & 3] Strange attractors are the driving information mechanism that facilitates braiding of expansion and contraction in two symmetrically opposite monopolar structures. [Table 8, pg. 19]

E<sup>+</sup> STRONG FORCE • DOF 33.18%

D18 a c e g i k m o q s u w y B d f h j l n p r t v x z

E<sup>-</sup> STRONG FORCE • DOF 27.9%

D17 a c e g i k m o q s u w Y b d f h j l n p r t v x z

When both information monopoles interact in bi or tri-polar causal formation monopole definition is challenged and strong force from *Hom<sub>U</sub> B* and *Hom<sub>U</sub> Y* end up maintaining monopole definition on the nucleon level as seen across *D16* through *D13*. This releases resonance,  $\gamma$ , over corresponding points across standing waves. One monopole contains 100% of the information necessary for universal structure; two monopoles contain 50% each; a nucleon of three monopoles is 33.3% +/- .1, a number facilitating quantum mechanical uncertainty. Due to entanglement of the monopoles, three is the maximum number of absolute information monopoles in one nucleon.

EXPANSION MATTER CONTAINMENT • DOF 23%

WMAP DARK MATTER 23%

*D16* a c e g i k m o q s u w y B d f h j l n p r t v x z

CONTRACTION MATTER RESONANCE • DOF 19%

*D15* a c e g i k m o q s u w Y b d f h j l n p r t v x z

EXPANSION MATTER RESONANCE • DOF 15.6%

*D14* a c e g i k m o q s u w y B d f h j l n p r t v x z

CONTRACTION MATTER CONTAINMENT • DOF 12.5%

*D13* a c e g i k m o q s u w Y b d f h j l n p r t v x z

Resonance facilitates matter production over *D16* to *D13* through nucleon production. Matter entropy at this stage is not electromagnetic, but the entropy of matter definition dependence on nucleons is conditional to stress and strain tensors and resonant relationships in complex matter states emergent from *D12* and *D11* into *D10* to *D08*.

+ GRAVITY PROBABILITY • DOF 9.8%

*D12* a c e g i k m o q s u w y B d f h j l n p r t v x z

- GRAVITY PROBABILITY • DOF 7.6%

*D11* a c e g i k m o q s u w Y b d f h j l n p r t v x z

Matter definition maintenance from the monopole/nucleon and out across more complex matter states is handled over *D12* and *D11*. These two dimensions are gatekeepers to absolute information maintaining its independence from three-spatial dimensions of *D10*, *D09* and *D08*. All absolute information coming into the three-space is emergent from the gravity probability. Gravity results from maintenance of invariant matter definition across the nucleon level giving cause to homogeneous gravitational attraction across all forms of matter in a vacuum. Gravity cannot exhibit speed, or gravitational waves, as matter definition is invariant. However, gravity, or matter definition constant maintenance, does effect the stress and strain tensor states of the three-spatial dimensions as evident in mass constancy to weight; mass remains constant while weight is dependent on causal formation matter density that exerts “force” across the stress and strain tensors of three-space due to a gravitational probability wave from matter definition maintenance in dimensions *D12* and *D11*. [App. C2 #7]

The greater the density of compacted matter, the greater the need for absolute information to maintain matter definition on the nucleon level.

X, Y, Z BOUNDED THREE-SPACE • DOF 5.7%

D10 a c e g i k m o q s u w y B d f h j l n p r t v x z

Y, Z, X BOUNDED THREE-SPACE • DOF 4.1%

WMAP MEASURABLE QUANTUM WORLD .0056 +.04 + .1 + .4 + 3.6 = 4.1%

D09 a c e g i k m o q s u w Y b d f h j l n p r t v x z

Z, X, Y BOUNDED THREE-SPACE • DOF 2.91%

D08 a c e g i k m o q s u w y B d f h j l n p r t v x z

BOUND D10, D09 & D8 & WMAP NON- LUMINOUS MATTER • DOF 3.6% +/- .1

There are twenty-three boundary conditions from dimensional degrees of freedom entangling twenty-three dimensions with specific information bounded states that *cannot increase beyond bounds* so they are neither infinite nor finite. Why twenty-three boundary conditions and not twenty-six? Three-space dimensions, *D10*, *D09* and *D08* are upper and lower bounded by 3 x 3 x 3 invariance facilitating a spatial boundedness fundamental to both finite and infinite; three-space acts as one bounded dimension. [Table 12, pg. 32] This boundedness averages out the DOF for the group from 5.7% to 1.96% allowing for the bounded average of 3.7%. FINITE involves countables and only matter based quantum mechanical states are countable. Natural numbers are emergent from Definitivum/absolute information at Planck scales on, or from dimensions *D10* – *D01*. From *D26* – *D11* natural numbers do not apply, but entropy is a measured probability across the absolute information monopole structure. INFINITE is generally defined as a concept of increase beyond bounds. There are twenty-three boundary conditions from dimensional degrees of freedom entangling twenty-three dimensions with specific information bounded states that *cannot increase beyond bounds*, and as they are not countable using natural numbers they are neither infinite nor finite. Why twenty-three boundary conditions and not twenty-six? Three dimension, *D10*, *D09* and *D08* are upper and lower bounded by 3 x 3 x 3 tensor invariance facilitating a spatial boundedness fundamental to both finite and infinite. Gravitational probability maintains definition in three-space and is probable from being the root of post three-space dimensions, *D10*, *D09*



and  $D08$  matter wave state, energetically expressed across dimensions  $D07$  to  $D02$ . Gravitational probability wave facilitates potential of variable oscillations across the stress and strain tensors establishing a matter wave state emergent from  $D10$ ,  $D09$  and  $D08$  and across  $D07$  to  $D02$ . What is being thrown away to facilitate electrostatics is the gravitational probability wave from matter definition maintenance. If gravity itself actually moved as it entangled through three-space  $D10$ ,  $D09$  and  $D08$  then it would trigger change fine structure constant in  $D07$  to  $D02$ .

- ELECTROMAGNETISM • DOF 1.95%

$D07$     *a c e g i k m o q s u w Y b d f h j l n p r t v x z*

+ ELECTROMAGNETISM • DOF 1.2%

$D06$     *a c e g i k m o q s u w y B d f h j l n p r t v x z*

Electrostatics of  $D07$  and  $D06$  occur when absolute information not needed to maintain matter definition is projected through three-spatial dimensions of an entangled tri-polar absolute information nucleon with release of energy due to topological fluctuations. This maintains conservation of causal formation resulting in a quantum mechanical wave state across dimensions  $D07$  through  $D02$ .

- LIGHT EXPRESSION • DOF .7%

$D05$     *a c e g i k m o q s u w Y b d f h j l n p r t v x z*

+ LIGHT EXPRESSION & WMAP STARS/LUMINOUS GAS • DOF .4%

$D04$     *a c e g i k m o q s u w y B d f h j l n p r t v x z*

Light is infinite across three-dimensional space  $D10$ ,  $D09$  and  $D08$  and dimensions arising out of it  $D07$  –  $D01$  but is not infinite across  $D26$  through  $D11$ . That is why gravity emergent from  $D12$  and  $D11$  is not infinite in its application, yet it can bend light through maintenance of matter definition across  $D10$ ,  $D09$ , and  $D08$ . Light is bounded by a three-space point with an upper wave limit cutoff at  $D01$ .

- WEAK FORCE & WMAP NEUTRINOS • DOF 0.15%

$D03$     *a c e g i k m o q s u w Y b d f h j l n p r t v x z*

+ WEAK FORCE/EXPANSION LOWER BOUND & WMAP BLACK HOLES • DOF 0.45%

$D02$     *a c e g i k m o q s u w y B d f h j l n p r t v x z*

Driving wave conditions across  $D02$  to  $D07$  and back is the lower bound of  $Hom_U B$  dimensionally interactive with the upper bound of  $Hom_U Y$  at  $D01$ . Entanglement of  $D07$  to  $D01$  is proportional to  $Hom_U B$  at  $D02$  needed to maintain absolute information balance to the upper bound of  $D26$  leading to potential collapse/detangling at  $D01$ .

CONTRACTION UPPER BOUND & WMAP RADIATION • DOF 0.0056%

$D01$  a c e g i k m o q s u w Y b d f h j l n p r t v x z

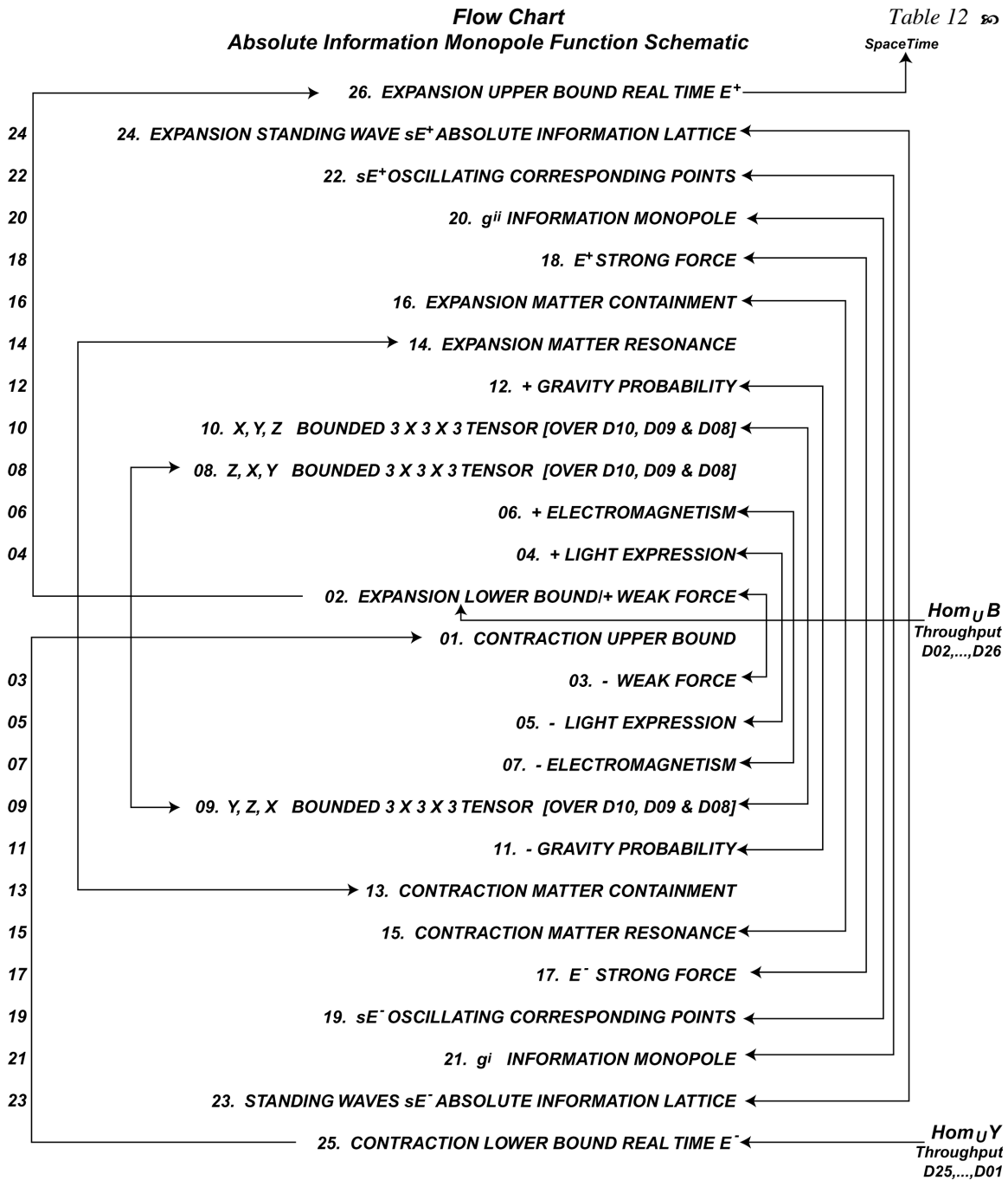
$D01$  is the upper bound of three-space and matter wave state with a cutoff at  $3 \times 10^8$  mps or  $c^2$ . The boundedness of  $D10$ ,  $D09$  and  $D08$  bolstered by gravity  $D12$  and  $D11$  collectively create a firewall protecting the monopole's higher states from three-space incursion maintaining an entropy balance.  $D01$  is ideal times upper limit being a second firewall from the monopole. Suppression of matter waves in a causal formation generally indicates that contraction absolute information is bounded at the center of mass while the expansion information is the outer boundedness of the causal formation. This is true for all oblate spheroid stellar objects including galaxies. It sets bi-singularity conditions necessary for black hole detangling of absolute information through center of causal formation "contraction singularity" which is symmetrically evident in the flatness of rotation due to "expansion singularity" at the galactic edge; between bi-singularities exists the visible universe. Fracturing of Definitum/Empty groupoids results in all twenty-six dimensions existing in timelessness. Time does not exist until entanglement of absolute information. Time arises across on an arrow of entropy from Real Time 100% degree of freedom, to ideal time .0056% degrees of freedom at the cutoff of quantum information. Entropy is the amount of absolute information not available to do work; with work defined as entanglement of absolute information. The percentage of observable ideal time across universal structure is  $\sim .4\%$  of the total [% based on 19, 20].

Suggested time frames clarify the gradient of information monopole entropy:

FUTURE: Potential of RealTime to ideal time entanglement of degrees of freedom across absolute information to matter to energy to quantum. Generalized across  $D26$  to  $D23$ .

PRESENT: Immediately measurable entangled state of matter interaction with absolute information to matter to energy to quantum information. Generalized across  $D22$  to  $D08$  leading into  $D07$  to  $D01$ .

PAST: Remnant quantum informational record of degrees of freedom entanglement from RealTime to ideal time expressed over absolute information to matter to energy to quantum information; perceived history is limited to a four-space construct in ideal time. Generalized across *D07* to *D01*.



7. HEURISTIC FOUNDATIONS OF PLANCK SPACE 

In EDU; matter, energy, force, the Hamiltonian, the Lagrangian are premised by:

*Free absolute information seeks to instruct when entangled absolute information seeks definition.*

For every action there is an equal and opposite reaction, and that includes the principle of least action which forms the basis of the Hamiltonian. One can only observe the effects of energy and not energy itself. The same holds true for its entropic counterpart,  $I^A$ . As previously explored, the degrees of freedom of the twenty-sixth set are reflexively attracted to the deformation/entanglement of twenty-fifth with the reverse holding true, *Table 3*. This sets up intersecting conditions. The division and collapse of Definitum/Empty Information leads to function  $F$ : which contains set properties of absolute information  $I^A$ , matter and energy potential that moves to matter definition  $m_e^I$  set properties of information and energy potential which moves to energy  $e_I$  with a potential for information moving to quantum information  $Q_I$ .

$$F : A \underset{def}{\cap} \emptyset \rightarrow F : I^A \rightarrow m_e^I \rightarrow e_I \rightarrow Q_I \quad 19$$

Universal homogeneity is derived from this fractured state. All that follows comes from entangled  $I^A$  evident in the function of an information monopole. To consider the Hamiltonian,  $H$ , bounded below Planck space and out from Planckian causality, it is critical to address differences between potential and kinetic energies of the Lagrangian  $\mathcal{L}$ . Since  $\mathcal{L}$  and  $H$  are mass dependent, first an explanation of mass is appropriate. Rest mass is unbounded ground state matter definition

$$m_e^I = \text{matter} \overset{\text{absolute Information}}{\underset{\text{conversion to energy}}{\text{,}}} \quad 20$$

with super and sub scripts representing a twenty-six dimensional tensor potential of  $I^A$  to matter to energy. It is a central and unproven hypothesis of QCD that quarks cannot be observed as free particles. As experiments have shown, accelerator searches have not been able to “unglue quarks,” no free quarks have been discovered. [31, 32, 33]  $I^A$  matter definition gives foundational support to the QCD argument concerning color confinement in quarks. The charge of the particles is due to one form of information being contained as a subset of another. This establishes a single quark as an  $I^A$  baseline,

or ground state, for all matter. One quark (or its  $I^A$  equivalent, the information monopole  $q^i$  and  $q^{ii}$ ) is an information monopole ground state that is fundamental non-interacting rest mass for all quantum fields. It takes the interaction of two symmetrically opposite information monopoles entangling to an information bi-pole to facilitate color confinement resulting in electric charge. Monopoles  $q^i$  and  $q^{ii}$  are fundamental  $I^A$  states responsible for higher-level entropy stress and strain tensors. Charge is emergent from inertial interaction between two “at rest” monopoles that results in the increase of  $I^A$  to maintain the integrity of both structures. Mass definition refers to  $I^A$  of eq. 23 that is an entropic asymptotic constant across nucleon quark construction. In eq. 21, matter definition,  $m_e^I$ , equals entanglement of three information monopoles into a nucleon,  $q^{i,ii,i'}$ , over entangled dimensional three-space  $\gamma D10, D09, D08$  in relation to entanglement,  $\gamma$ , of  $I^A$  function  $F : \gamma I^A$  across  $D26$  to  $D11$  and  $D07$  to  $D01$  in all three monopoles  $q^{i,ii,i'}$ .

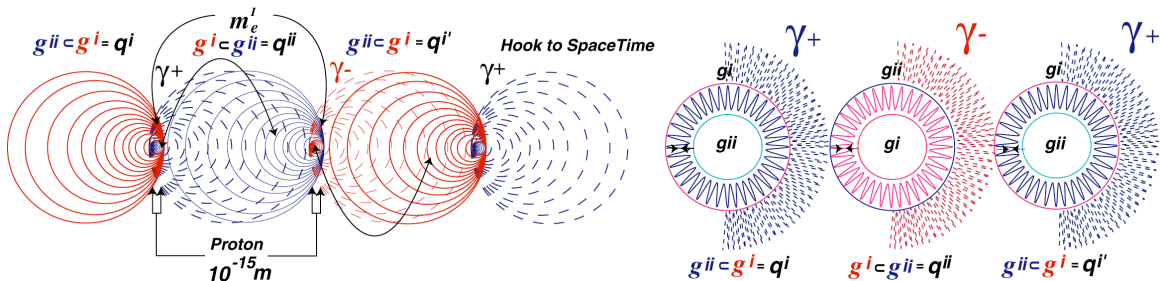
$$m_e^I = q^{i,ii,i'} \frac{\gamma D10, D09, D08}{F : \gamma I^A (D26, D25 \rightarrow D11 \wedge D07, D06 \leftarrow D01)} \quad 21$$

Quark,  $q^{i,ii,i'}$ , homogeneity results from  $I^A$  contraction  $E^-$ , as a subset of expansion,  $E^+$  and equals  $g^i \subset g^{ii}$  and, therefore when expansion  $E^+$  is a subset of contraction  $E^-$  it results in the contraction information monopole  $g^{ii} \subset g^i$

$$E^- \subset E^+ = g^i \subset g^{ii} = q^{ii} \therefore E^+ \subset E^- = g^{ii} \subset g^i = q^i \text{ or } q^{ii} \quad 22$$

Table 13  $\infty$

**DIAGRAMMATIC OF INFORMATION MONOPOLE NUCLEON INTERACTION**



all images are representative, not simulated

An unbounded information monopole is quantum mechanically invisible. As stated, it takes at least two interacting information monopoles to facilitate state

entanglement  $\gamma$  release of energy,  $\gamma^+ + \gamma^- = \lambda$  necessary for quantum information  $Q_j$ . Asymptotic  $I^A$  quark states  $q^i$ ,  $q^{ii}$  and  $q^{i'}$  construct a nucleon out of six base information sets facilitating three monopoles, *Table 13, eq. 23*. The structure is examined across a classical model of wave interaction where  $\gamma$  acts as a resonant “spring” expansion “ $\gamma^+$ ” or contraction “ $\gamma^-$ ” between monopoles setting up mass vibration across a proton.  $\gamma$  results from a unitary evolution operator between subsets and strange attractors of  $\text{Hom}_U(Y,B)$  leading to the Hamiltonian (as explored in eq. 34 through 36).

$$\begin{aligned}\ddot{q}^i &= -\frac{\gamma^+}{\text{Hom}_U B \rightarrow g^{ii} \subset g^i} (q^i - q^{ii}), \\ \ddot{q}^{ii} &= -\frac{\gamma^-}{\text{Hom}_U Y \rightarrow g^i \subset g^{ii}} (q^{ii} - q^i) - \frac{\gamma^+}{\text{Hom}_U B \rightarrow g^{ii} \subset g^i} (q^{ii} - q^{i'}), \\ \ddot{q}^{i'} &= -\frac{\gamma^+}{\text{Hom}_U B \rightarrow g^{ii} \subset g^i} (q^{i'} - q^{ii})\end{aligned}\tag{23}$$

Applying a one dimensional wave argument from dimension  $D01$  on one Information Monopole to  $D01$  in another expresses the above equation across RealTime,  $RT$ , and ideal time,  $t$ . This serves to clarify the notion of location vector potentials found in Corresponding Points. Taken to its logical conclusion, the equation below is illustrated across twenty-six dimension in *Appendices C1 & 2*.  $q^i$  and  $q^{ii}$  are uniquely expressed in the universal homogeneity of atomic structures evidencing  $I^A$ ,  $g^i$  and  $g^{ii}$  as first order recipients of universal constants  $\text{Hom}_U(Y,B)$ . First order constants are necessary for Lagrangian dynamics.  $m_e^i$  is defined by dimensionless/dimensionfull constants based on interacting nucleon  $I^A$  even at relativistic speeds where

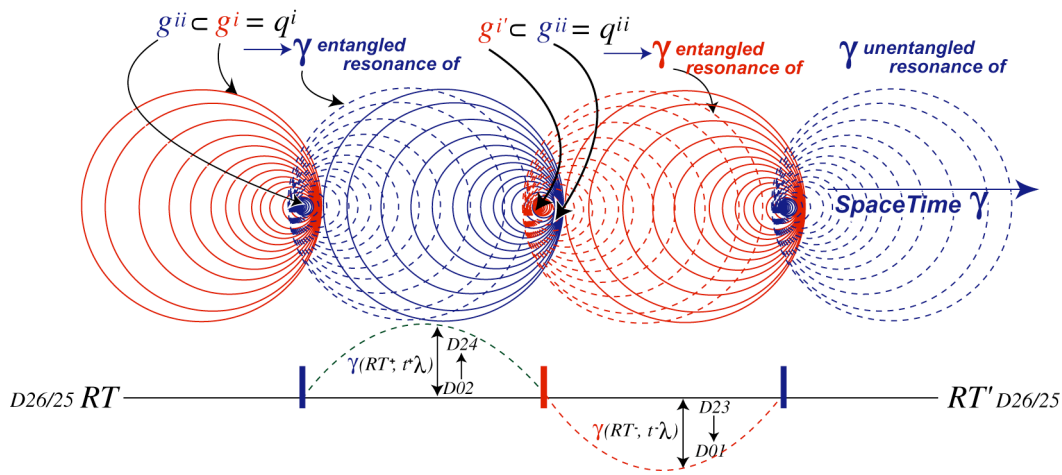
$$m = \frac{m_e^i}{\sqrt{1 - v^2 / c^2}}.\tag{24}$$

“Rest mass”  $m_0$  becomes “matter definition”  $m_e^i$  constant.  $I^A$  still enhances  $D10$ ,  $D09$  and  $D08$  while  $e'$  moves out from three-space causing spatial distortion. This absolute information/relativistic equation is not just electromagnetic, it is gravitational. The amount of  $I^A$  necessary to maintain matter definition in a causal formation is constant regardless of mass density. When mass is compressed at core density entangling  $D07$  to  $D02$ ; or opened by light speed across  $D07$  to  $D02$ , both emerge from maintenance of

matter definition. If a charged particle or a gravitating mass suddenly accelerates, the change in field relativistically propagates at the speed of light across  $D07$  to  $D02$  with an upper bound of  $D01$  entangling  $c$  to those dimensional limitations. *Table 11* is a physical mechanism of the radiative process from  $I^A$  to  $m_e^!$ . Instead of an ad hoc Hamiltonian designed to fit a problem, matter definition invariance is used.

Table 14  $\infty$

**Mass Definition Across An Absolute Information Nucleon Structure**



Here  $RT$  is 26 degrees of freedom while  $t$  represents 1 degree of freedom. Ideal time is a dimensional wave state where  $\rho\gamma^2$  is potential entanglement across degrees of freedom between two information monopoles in a bi-pole structure.  $\gamma(RT, t\lambda)$  as displacement (or entanglement) of the resonance,  $\gamma$ , satisfies the equation

$$\frac{\partial^2 \gamma(RT, t\lambda)}{\partial RT^2} = \frac{1}{\gamma^{q^i q^{ii}}} \frac{\partial^2 \gamma(RT, t\lambda)}{\partial t^2} \tag{25}$$

where  $\gamma^{q^i q^{ii}}$  is the degree of entanglement with a potential of a wave state  $\lambda$  that is realized as an amplitude in ideal time  $t$  between two interacting information monopoles that satisfy the one dimensional physical conditions as both  $q^i$  and  $q^{ii}$  are held fixed at  $D01$  as at these two points resonance is always zero with a requirement that

$$\gamma(q^i, t) = 0 \quad \text{and} \quad \gamma(q^{ii}, t) = 0 \quad (\text{for all } t) \tag{26}$$

Interaction between gamma functions across at least two symmetrically opposite information monopoles is needed for particles to exhibit electrical charge wave state.

$$\gamma^{q^i} + \gamma^{q^{ii}} = e^I \lambda \quad 27$$

Lagrangian conditions necessary for charge are exhibited across the two monopoles. A singular information monopole does not exhibit energy or three-space conditions as it is a non-interacting pure  $I^A$  state. Changes in topological phenomenon causing measurable interference, determines mass reaction, with momentum as the equivalent to the constants of  $I^A$  and matter definition. Particle charge is due to one form of information being a subset of another and expressed across at least two information monopoles resulting in resonant gamma function release. It is the gamma function that is the basis for the de Broglie wave argument. Emergent from gamma is the Hamiltonian based upon the Lagrangian. This facilitates an absolute Lagrangian. Correspond the function of a classical Lagrangian to a twenty-six dimensional  $I^A$  monopole where  $q^i$  and  $q^{ii}$  represent a dipolar information causal formation interaction, then heuristic application of  $I^A$  on the classic Lagrangian transitions to

$$\mathcal{L}^A(q^i, q^{ii}) = T(m_e^I \frac{q^i}{q^{ii}} + \frac{q^{ii}}{q^i}) - V(I^A \rightarrow m_e^I) \quad 28$$

where the absolute Lagrangian function  $\mathcal{L}^A(q^i, q^{ii})$  is the generalized coordinates of the system and equals kinetic energy  $T$  (realized from matter definition maintenance) in relation to with  $V$  (potential energy an  $I^A$  to matter definition entropy statement). The entropy potential carries a time slope from Real Time to ideal time. This slope is the entanglement of information across the system and is fundamental to motion realized in four-space. Therefore, the twenty-six dimensional action potential  $S$  involved in the entanglement of  $I^A$  of the system from Real Time to ideal time is

$$S = \int_t^{RT} \mathcal{L}^A dRT \rightarrow t, \quad 29$$

and according to the principle of least action, entanglement of the  $I^A$  degrees of freedom taken by the system will minimize  $S$ . Conditions necessary for  $S$  to be minimum obey an  $I^A$  equivalent of the Euler-Lagrange equations:

$$\frac{d}{dRT \rightarrow t} \left( \frac{\partial \mathcal{L}^A}{\partial q^i} \right) - \left( \frac{\partial \mathcal{L}^A}{\partial q^{ii}} \right) = 0 \quad 30$$



These entanglement equations are the foundational equivalent to Newton's laws of motion. Backing the Lagrangian up into the first order absolute information state  $I^A$ , motion is only a potential of motion. Motion and time become one across an arrow of entropy from  $I^A$  to matter/energy indeterminacy. First order  $I^A$  is present in indeterminacy as evidenced through Lagrangian cancellation of potential and kinetic energies. The Lagrangian  $\mathcal{L}$  is the difference between the kinetics of an orbiting a particle  $m_e^I$  and its gravitational potential from  $I^A$  needed for maintenance of atomic definition  $I^A m_e$ . This argument is foundational to fundamental four-space  $\mathcal{L}$  establishing boundary conditions for  $I^A$  to matter to energy statement  $m_e^I$  enabling a different equation for Absolute Lagrangian  $\mathcal{L}^A$ .

$$\mathcal{L}^A = m_e^I - I^A m_e \quad 31$$

With the Absolute Lagrangian  $\mathcal{L}^A$ , acceleration and gravity are linked due to  $I^A$  maintenance of atomic definition  $m_e^I$ . Interaction of sets must be invariant, as  $\mathcal{L}$  and  $\mathcal{L}^A$  are invariant with respect to a coordinate system with the Lagrangian  $\mathcal{L}$  function being the generalized coordinates of the system due to the constancy of  $\mathcal{L}^A$ . This is fundamental to establishing  $I^A$  as the gravitational constant working equally on the information monopole level giving constancy to matter definition. Classically,  $\mathcal{L}^A$  implies acceleration  $a$  equals the derivative of matter information to energy  $dm_e^I$  with respect to the derivative of  $I^A$  RealTime  $RT$  to quantum information ideal time  $t$ ,

$$a = \frac{dm_e^I}{dRT \rightarrow t} \quad 32$$

$I^A$  cannot be a formalized derivative, though it is implied through  $RT$  interaction into four-space  $t$  over  $I^A$  corresponding points. This presents a transformational time gradient Function of RealTime  $T$  with  $I^A$  approaching matter  $m_e^I$  approaching four-space induced energy  $e^I$  approaching quantum information  $Q_I$  ideal time  $t$  realized

$$F : (RT) I^A \rightarrow m_e^I \rightarrow e^I \rightarrow Q_I (t) \quad 33$$

where absolute information approaches matter that approaches energy that approaches quantum information  $Q_I$ .  $Q_I$  is an indeterminate probabilistic quantitative information

state born from matter to energy process. The amount of  $I^A$  to maintain  $m_e^I$  is variable due to the local wave state  $\psi$ . At the trough of  $\psi$  oscillations the  $I^A$  not needed to maintain atomic definition is released through four-space entanglement in the form of  $e^I$  which forms the basis of  $Q_I$ . There is no need to engage a time argument as time is an arrow of entropy from highly ordered  $I^A$  Real Time to low ordered indeterminacy of energy  $e^I$  of ideal time, with entropy as the amount of  $I^A$  not available to do work.<sup>2</sup> Therefore, the lower bound is constructed as an Absolute Hamiltonian

$$H^A(I^A \rightarrow m_e^I \rightarrow e^I \rightarrow Q_I) = m_e^I + I^A m_e, \quad 34$$

where Hamiltonian is a function of  $I^A$  (*D26 to D17*) approaching matter  $m_e^I$  (*D16 to D08*) to matter approaching energy  $e^I$  (*D07 to D02*) and energy approaching quantum information  $Q_I$  (*D01*) equaling total information, matter and energy of the system.

$$I^A \rightarrow \frac{\Delta\psi}{m_e^I} \rightarrow H\psi = -\frac{\hbar^2}{2m_e} \Delta\psi + V\psi \quad 35$$

where  $-(\hbar^2 / 2m_e)\Delta\psi$  is equivalent to  $(m_e^I)^{-1}$  with  $V\psi$  equivalent to  $I^A m_e$ . The following equation supports interpretation of wavefunction as being a function of absolute information on an arrow of entropy to energy establishing a RealTime to ideal time application in the Schrödinger. The  $I^A$  bounded Hamiltonian applied to the Schrödinger can be generally expressed as time-dependent

$$H(RT \rightarrow t) |\psi(t)\rangle = i\hbar \frac{\partial}{\partial(RT \rightarrow t)} |\psi(t)\rangle : (RT \rightarrow t) = F : I_e \rightarrow m_e^I \rightarrow e^I. \quad 36$$

Hamiltonian  $H$  results in the definition of energy arising from  $I^A$  entropic time expression RealTime to ideal time ( $RT \rightarrow t$ ) lower bounded in four-space ideal time  $|\psi(t)\rangle$  to where  $t$  is ideal time,  $\partial / \partial(RT \rightarrow t)$  is the partial derivative of RealTime to ideal time over entangled dimensions *D07* through *D01*;  $|\psi(t)\rangle$  being wave function across ideal time.

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<sup>2</sup> Note: Standard Information Theory governs  $Q_I$ , and  $Q_I$  governs boundedness of four-space in quantum mechanics.  $I^A$  supports quantum limitations of  $Q_I$  as it is a four-space derivative of  $I^A$ . Limitations are imposed on three-space information to matter to energy to  $Q_I$ . Bekenstein bound [31] still applies to black hole event horizons. But there are no such limitations on  $I^A$ .

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Schrödinger equation origins are evident when one considers that the wave function is due to local stress and strain tensors effects upon matter definition; that the “absolute information in” to maintain definition during oscillating local fields is proportional to the “matter wave function out” in the form of an electron. Since the wavefunction contains all the measurable information about the particle; and since entanglement of degrees of freedom has a measurable percentage across the absolute information entropy then  $\Psi * \Psi$  summed over phase space of absolute information allows for entangled corresponding points to baseline probability distribution in three-space over  $D10$ ,  $D09$  and  $D08$  leading to the electron wave function over  $D07$  to  $D01$ , which implies a free particle is a sine wave with a precisely determined momentum and a totally uncertain position. Expressed time-independently as

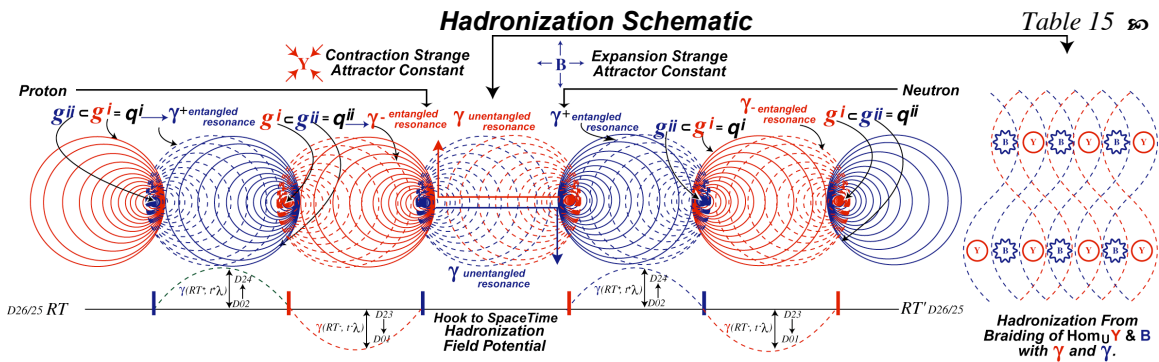
$$H^A |HI^A(D24, \dots, D11) \rightarrow m_e^t \rightarrow D07, \dots, D01 | \psi_n(x) \rangle = E_n | \psi_n(x) \rangle. \quad 37$$

Outside of the quantum mechanics,  $I^A$  cannot reproduce all predictions of quantum mechanics, to do so would violate the dimensional logic of EDU. However, potential of those predictions exits in  $I^A$ . Inequalities involve three-space measurements on entangled pairs of particles that have been separated in three-space. Under those conditions that are no hidden variables as four-space acts as a closed system to its uniquely entangled dimensional  $3 \times 3 \times 3$  tensor structure over  $D10$ ,  $D09$  and  $D08$ . Yet,  $I^A$  supports Newton’s gravity being an instant force. That is because  $I^A$  is foundational.

ENTROPIC CORRESPONDENCE PRINCIPLE: Absolute information,  $I^A$ , high order reduces to bridge dimensional expression wave/particle duality of Quantum Mechanics, which further reduces to Cartesian coordinate system of classical physics through varying localized SpaceTime interactions over corresponding points.

Gamma becomes suppressed when compressed mass conditions enable a pressure gradient that forces the quarks into a close proximity. With the suppression of gamma, the information necessary to maintain matter definition becomes systemic to the causal formation in the release of  $I^A$  gravity probability wave. The field effect of a nucleon projecting gamma function into SpaceTime, is fundamental to SpaceTime “zero point energy,” “quintessence,” or “quantum foam” and quark/anti-quark pairs. This evidences why unbounded quarks cannot be observed in a lab [27, 28, 29]. For quarks to be present

in four-space gamma function must be emergent from  $D10$ ,  $D09$  and  $D08$  facilitating entanglement from  $D07$  to  $D01$ . The energy used to free quarks, while forcing quarks further apart causes the free gamma function to resonate across SpaceTime interacting with other free gamma functions creating quark/anti-quark pairs through absolute information monopole the process. Gamma resonance entangles with absolute information driving hadronization. Once gamma entangles with  $I^A$  phase space, strange attractors,  $\text{Hom}_U Y$  and  $B$  or  $\text{X}$ ,  $\text{Y}$ , of the universal set facilitate quark/anti-quark pairing that appears to suddenly emerge from “empty space.” [Table 15] The real driver is a function of absolute information entropy,  $HI^A$ , classes.



Gamma resonance  $\gamma+$  results from  $g^{ii}$  being a subset of  $g^i$ . Local force field interaction drives superset  $g^i$  attempt to further entangle with subset  $g^{ii}$ . Subset  $g^{ii}$  seeks instruction from strange attractor  $\text{Hom}_U B$  to maintain its degrees of freedom. In seeking definition  $g^{ii}$  deforms superset  $g^i$  by interacting with  $g^i$  own gamma resonance  $\gamma+$  increasing instruction from strange attractor  $\text{Hom}_U B$  to maintain monopole,  $q^{ii}$ , definition. This  $I^A$  increase is balanced with a symmetrically opposite information monopole,  $q^i$ , that is  $\gamma$  entangled with  $q^{ii}$ . This causes an increase in  $\text{Hom}_U Y$  instruction to maintain definition of a subset  $g^i$  from field conditions acting on superset  $g^{ii}$  own  $\gamma$  resonance  $\gamma-$  increasing demand of  $\text{Hom}_U Y$ . This cause both  $Y$  and  $B$  to offset local forces by maintaining matter definition across the whole of the quark pair or nucleon with excess information carried through four-space over a gamma resonant field interacting with, or hooking into, SpaceTime. Quarks, anti-quarks and gluons have never been measured and according to QCD confinement they will never be measured. And that is

true if the yardstick is electromagnetic field driven, and is as true as saying that nothing electromagnetically measurable exists beneath Planck space. But that is not the case when considered through absolute information entropy,  $HI^A$ . This leads to an intriguing point; the fine structure constant is only constant across four space; that electrostatics can be driven back down the arrow of entropy towards absolute information end; and that conservation applies across the entire  $HI^A$  statement.

Lagrangian conditions necessary for charge are exhibited across the two monopoles. A singular information monopole does not exhibit energy or three-space conditions as it is a non-interacting pure absolute information state. Change in topological phenomenon causing measurable interference effects are determinant of the characteristics mass reaction with momentum as the constant equivalent to the constant of absolute information to the constant of matter definition.

Gravitational force and Coulomb's law have the same inverse square law form and each depend upon two interacting sources. This indicates a potential balance of forces behavior between the two equations as each of these arguments involve an exchange particle of zero mass. However, there is an underlying symmetry at work.  $I^A$  is invariant. The mass of an object measured in kg remains the same regardless of where in the universe the given mass is located. Mass is never altered by location, gravity, speed or reaction with other forces. This evidences that absolute information matter definition is constant from the nucleon into the object. If an object mass is 2 kg, then one descriptor of its matter definition is

$$m_e^I = 2kg, \quad 38$$

whereas weight will vary depending upon location of an object throughout the universe. This makes weight equivalent to the force of gravity and dependent on  $\gamma$  that is inversely proportional to the center of mass. Matter definition is invariant under the force of gravity. In fact it is matter definition invariance that facilitates gravitational fields. This critical argument is explored across a one-dimensional argument corresponding to absolute information. Gravity and electrostatic force share inverse square law form and each depend upon two interacting sources. A balance of forces exists as both involve an exchange particle of zero mass; there is an underlying symmetry at work through

exchange. Gravity,  $D12$  &  $D11$ , is proportional to entangled strong force,  $D18$  &  $D17$ , “absolute information to matter” end of entropy. An  $I^A$  relationship exists between alteration of motion and the proportionality of motive force. This alteration occurs through entanglement of  $I^A$  boundary conditions between two forms of matter in a causal formation. Implicit in Newton’s law of universal gravitation, mass as a source of gravitation  $m_G$  is the same as inertial mass  $m_I$ ,

$$m_I \frac{d^2 x^K}{dt^2} = -m_G \frac{\partial \Phi}{\partial x^K}, \quad 39$$

with masses cancelled, the equation reads,

$$\frac{d^2 x^K}{dt^2} = -\frac{\partial \Phi}{\partial x^K}, \quad 40$$

where in a given gravitational field all point like particles fall with the same acceleration. The potential energy of a body placed in a gravitational potential  $\Phi(x)$  produced by an external source and where mass density of the body  $\rho(x)$  is

$$V = \int \rho(x)\Phi(x)d^3x, \quad 41$$

Gravitational self-energy of a continuous mass  $\rho(x)$  and  $\Phi(x)$  is the potential produced by mass distribution itself and 1/2 needed to get rid of double counting of potential pair energies of mass elements results in

$$\frac{1}{2} \int \rho(x)\Phi(x)d^3x, \quad 42$$

The gravitational self-energy can also be expressed in the alternate as

$$-\frac{1}{2} \int G \frac{\rho(x)\rho(x')}{|x-x'|} d^3x d^3x', \quad 43$$

Now consider

$$\int \frac{1}{8\pi G} (\nabla \Phi)^2 d^3x + \int \rho \Phi d^3x, \quad 44$$

Through analogy this equation corresponds to formulas for electrostatics where  $(\nabla \Phi)^2 / 8\pi ZG$  can be viewed as the energy density of the gravitational field with  $\rho \Phi$  viewed as an interaction of energy density of field and matter. With electrostatics all

electrical energy can be thought of as positive field energy. But for gravity this is not possible as field energy is positive. Therefore, a negative must be added to it to obtain a negative total energy evident in *eq. 44*. There is an entropy statement at work here that is explored herein where absolute information is diagrammatically bracketed between Newtonian Gravity left and Coulomb’s law right. Absolute force,  $F^A$ , is proportional to amount of absolute information needed to maintain the constant of matter definition, which is proportional to energy released,  $I^A \propto \Delta m_e^{I^2} \propto \Delta e^{I^2}$  in relation to absolute information across two forms of entangled matter,  $m_e^{I_1} \gamma m_e^{I_2}$ . Both Newton and Coulomb are directly related to maintenance of matter definition.

$$F = -G \frac{m_1 m_2}{r^2} \quad \therefore \quad F^A \propto \frac{I^A \propto \Delta m_e^{I^2} \propto \Delta e^{I^2}}{m_e^{I_1} \gamma m_e^{I_2}} \quad \therefore \quad |F| = k_c \frac{|q_1| |q_2|}{r^2}$$

45

This argument simply states that the two forces exist at different points on the same arrow of  $HI^A$ . Their “negative” and “positive” attributes evident in *eq. 44* arise from an entropy statement based upon dimensional entanglement into and out from matter. Based on dimensional mapping of *Table 11*, the amount of absolute information needed to maintain matter definition (gravity), when matter is subjected to oscillating local fields (force), facilitates release of unneeded information (energy) over dimensions  $D07$  to  $D01$  in the form of Coulomb constant, electromagnetism and other kinetic and potential energy. As the arrow of entropy moves from Real Time to ideal time so does perceived reality relative to the observer. Wave-particle duality depends upon which of the entangled dimensions are being observed. Over three-space,  $D10, D09, D08$ , a particle presents itself, whereas when  $D07$  to  $D01$  are the observed, wave nature is realized. Dimensional entropy is a fundamental constant to the uncertainty principle, without it there would be no uncertainty. The causal formation initiates a notion of location between both forms of matter across information monopole corresponding points. Instead of motive force being kinetic, it can be described across monopoles as being proportional to

function change of absolute information entropy,  $\Delta F : I^A \rightarrow m_e^l \rightarrow e^l$ , or  $\Delta F : HI^A$ , which carries time expression through entropy equivalence. Matter is constructed of absolute information monopole structures facilitating information to energy action/reaction when two forms of matter entangle in a causal formation. This means that all force is emergent only from matter. In the following cosmological argument the universe is not curved or flat but is an absolute information state across twenty-six dimensional degrees of freedom. Newton's scalar gravitational argument is stated followed by its absolute information equivalent across two forms of matter.

$$F = -G \frac{m_1 m_2}{r^2} \quad \therefore \quad \Delta F : I^A \rightarrow m_e^l \rightarrow e^l = -I^A(D12, D11) \frac{m_{e1}^l m_{e2}^l}{\gamma^2}$$

Gravitational force,  $F$ , dimensionally evolves out from three-space into a change in function of absolute information entropy  $\Delta F = F : I^A \rightarrow m_e^l \rightarrow e^l$  or  $\Delta F = F : HI^A$  as realized in the information equation to the right of the Newtonian.  $G$  transforms to  $I^A(D12, D11)$  dimensional gravitational probability wave of absolute information over dimension  $D12, D11$  and represents the gravitational constant emergent from absolute information maintenance of matter definition established over  $D21$  through  $D13$ . Due to a gravitational potential energy, Newtonian masses  $m_1 m_2$  are gravitationally attracted to one other proportionate to the distance between them,  $r^2$ . The corresponding absolute information statement concerns matter definition difference between two point masses  $m_{e1}^l m_{e2}^l$ , that are each three-space dimensionally emergent from  $D10$  to  $D08$ . Respective definition of both masses is challenged by resonant dimensional entanglement,  $\gamma$ , between  $I^A$  monopoles of both point masses,  $\gamma^{gi, gii}$ . The greater the degrees of entanglement between matter, the greater the challenge to its mass definition; and the greater the amount of  $I^A$  necessary to maintain definition. By examining the product of the above masses the gravitational argument is simply an extension of  $I^A$  monopoles attraction across a nucleon seen in *eq. 23, pg. 25*. Matter definition is a constant across information monopoles in a nucleon, it is also a constant between interacting matter states realized as gravity. By its  $I^A$  definition, gravity is a weak force



as it is informational and not energetic. That said, if gravitational  $I^A$  could be converted to an energetic equivalent then it would eclipse all other forces combined, approaching the cosmological constant discrepancy from zero point expectations on the order of  $\sim 10^{120}$ . [36, 36] The weakness argument is due to interpreting gravitational force through an electromagnetic baseline. Due to its  $I^A$  state, gravity is a weak force as it is informational and not energetic. Weakness results from projecting gravitational force onto an electromagnetic baseline. Therefore, maintenance of matter definition is equivalent to gravity. This enables equivalence statement between gravity, matter definition and acceleration. Velocity,  $v$ , and acceleration,  $a$ , cannot exist for one particle completely independent of other particles. As with force,  $v$  and  $a$  are a direct extensions of interacting matter. However, a potential for both exists asymptotically over absolute information

$$F = ma \quad \therefore \quad \Delta F : I^A \rightarrow m_e^I \rightarrow e^I = m_e^I \frac{\Delta m_e^I}{\Delta RT \rightarrow t} \quad 47$$

The diagram shows the equation  $F = ma \therefore \Delta F : I^A \rightarrow m_e^I \rightarrow e^I = m_e^I \frac{\Delta m_e^I}{\Delta RT \rightarrow t}$ . Arrows indicate the following relationships: a top arrow from  $\Delta F$  to  $m_e^I$ , a top arrow from  $m_e^I$  to  $e^I$ , a bottom arrow from  $m_e^I$  to  $\Delta m_e^I$ , and a bottom arrow from  $\Delta RT$  to  $t$ . A large bracket on the right side of the equation spans from  $\Delta F$  down to  $t$ .

$F$  is equal to the change of function of absolute information entropy,  $\Delta F : I^A \rightarrow m_e^I \rightarrow e^I$ ;  $m$  becomes, matter definition,  $m_e^I$ ; and acceleration,  $a$ , becomes rate of local field change on matter definition in respect to change of Real Time to ideal time,  $(\Delta m_e^I / \Delta RT \rightarrow t)$ . This argument impacts conservation of momentum in that momentum is always conserved because maintenance of matter definition is a constant and momentum is the direct result of matter definition maintenance.

$$p = mv \quad \therefore \quad p^A = m_e^I \frac{\Delta \gamma m_e^I}{\Delta RT \rightarrow t} \quad 48$$

The diagram shows the equation  $p = mv \therefore p^A = m_e^I \frac{\Delta \gamma m_e^I}{\Delta RT \rightarrow t}$ . Arrows indicate the following relationships: a top arrow from  $\Delta \gamma m_e^I$  to  $p^A$ , a bottom arrow from  $m_e^I$  to  $\Delta \gamma m_e^I$ , and a bottom arrow from  $\Delta RT$  to  $t$ . A large bracket on the right side of the equation spans from  $\Delta \gamma m_e^I$  down to  $t$ .

Here,  $p$  becomes absolute momentum  $p^A$ ;  $m$  becomes matter definition; and  $v$  the change of entanglement on matter definition in respect to change of Real Time to ideal time. Therefore, the total amount of matter definition in all things in the universe will never change as the basis of that definition is the information monopole.

$$m_e^l = q^{i,ii,i'} \frac{\gamma D10, D09, D08}{F : \gamma I^A D26, D25 \rightarrow D11 \wedge D07, D06 \leftarrow D01} \quad 49$$

First order matter definition,  $m_e^l$ , equals the displacement of three information monopoles,  $q^{i,ii,i'}$ , in three-space across,  $\gamma D10, D09, D08$ , in relation to the function of the entanglement,  $\gamma$ , of  $I^A$  function,  $F : \gamma I^A$ , across  $D26$  to  $D11$  and  $D07$  to  $D01$ . Since the absolute momentum equation factors change of Real Time to ideal time,  $\Delta RT \rightarrow t$ , in relation to momentum, then the  $I^A$  momentum equation also supports the four-momentum, four vector of special relativity. The length of dimensions  $D10, D09, D08$  plus ideal time,  $D01$ , in the information monopole are invariant under Lorentz transformation. So how does light speed fit into the  $I^A$  equation? Well, first lets examine velocity. Absolute velocity equals the change of entanglement across matter definition in relation to the change of Real Time to ideal time impacting information monopolar definition,

$$v^A = \frac{\Delta \gamma m_e^l}{\Delta RT \rightarrow t} \quad 50$$

and since entanglement is dimensionally limited across matter definition, eq. 50, then the absolute limit of entanglement is  $D01$ , which, as shown on *Table 11*, only has 0.0056 degrees of freedom. This establishes a limit to entanglement. Electromagnetic radiation and light,  $c$ , are emergent over matter entanglement at,  $D10, D09, D08$ , and expressed across  $D07$  through  $D01$ . Velocity has been shown to be a property of entanglement over  $D10, D09, D08$ . Since  $D01$  is the absolute limit of entanglement for the information monopole, then light speed limitations are imposed by the absolute information monopole  $D01$  dimensional limit of 0.0056 degrees of freedom. Note: the time argument in absolute velocity could also be stated as a function of  $\Delta F = F : HI^A$  that is upper bounded at the limit of quantum information,  $Q_I$ .

$$v^A = \frac{\Delta \gamma m_e^l}{\Delta F : I^A \rightarrow m_e^l \rightarrow e^l \rightarrow Q_I} \therefore \Delta F : I^A \rightarrow m_e^l \rightarrow e^l \rightarrow Q_I = \Delta RT \rightarrow t \quad 51$$

For acceleration to occur, matter definition must be challenged. Matter definition can only be challenged through a causal formation between two particles.

$$F : \frac{m_e^{l_1} \rightarrow m_e^{l_2}}{I^A \rightarrow m_e^l \rightarrow e^{l_i}} = \{\partial m_e^{l_1} \cap \partial m_e^{l_2}\} \therefore \Delta F : \frac{\{\partial m_e^{l_1} \cap \partial m_e^{l_2}\}}{I^A \rightarrow m_e^l \rightarrow e^{l_{i \rightarrow f}}} = \{d\} \text{ or } d^A \quad 52$$

The function  $F$  : of matter definition set 1,  $m_e^{l_1}$ , mapping onto matter definition set 2,  $\rightarrow m_e^{l_2}$  in relation to differences across the absolute arrow of entropy,  $I^A \rightarrow m_e^l \rightarrow e^{l_i}$  across information monopole corresponding points, equals a causal formation  $\{\}$  between the boundaries,  $\partial$ , of two intersecting mass sets,  $\{\partial m_e^{l_1} \cap \partial m_e^{l_2}\}$ . Therefore, change in function  $\Delta F$  between boundaries  $\partial$ , of two intersecting masses in causal formation,  $\{\partial m_e^{l_1} \cap \partial m_e^{l_2}\}$ , in relation to the absolute arrow of entropy,  $I^A \rightarrow m_e^l \rightarrow e^{l_{i \rightarrow f}}$ , equals causal formation displacement  $d$ , realized as a vector potential between the sets  $\{\bar{s}\}$ , for both masses adjusting the absolute information state between them. This facilitates an  $I^A$  correspondence to a vector quantity.

$$\begin{aligned} \bar{v}_{av} = \frac{\bar{s}}{t} \therefore d^A = \Delta F : \frac{\{\partial m_e^{l_1} \cap \partial m_e^{l_2}\}}{I^A \rightarrow m_e^l \rightarrow e^{l_{i \rightarrow f}}} \wedge \\ t \therefore = RT \rightarrow t = \frac{\gamma m_e^l}{\Delta I^A \rightarrow m_e^l \rightarrow e^l} \therefore v^A = \frac{d^A}{RT \rightarrow t} \end{aligned} \quad 53$$

Space, Time, energy and force are no longer separate; there is a union between them in  $I^A$ . In light of this argument the Hubble constant  $H$ , generally seen as a function of time, can informationally be expressed as a conservation of momentum argument where  $m$  matter at rest evolves to  $m_e^l$  matter definition constant. In the diagrammatic below, arrows point from inelastic collision between two masses moving at initial velocity to correspondence of the  $I^A$  momentum equivalent.

$$\begin{aligned} & m_1 v_{1i} + m_2 v_{2i} = m_1 v_{1f} + m_2 v_{2f} \\ & \left\{ m_e^{l_1} \frac{\Delta \gamma m_e^l}{\Delta RT \rightarrow t_{1,i}} + m_e^{l_2} \frac{\Delta \gamma m_e^l}{\Delta RT \rightarrow t_{2,i}} \right\} = \left\{ m_e^{l_1} \frac{\Delta \gamma m_e^l}{\Delta RT \rightarrow t_{1,f}} + m_e^{l_2} \frac{\Delta \gamma m_e^l}{\Delta RT \rightarrow t_{2,f}} \right\} \end{aligned} \quad 54$$

Mass 1,  $m_1$ , transforms to mass definition 1,  $m_e^{l_1}$ , while velocity 1,  $v_1$ , is realized as change of entanglement of mass definition,  $\Delta \gamma m_e^l$ , in relation to the change of Real Time approaching ideal time across the initial state,  $\Delta RT \rightarrow t_{1,i}$ . The same holds true for  $m_e^{l_2}$

in the initial state, and both  $m'_{e1}$  and  $m'_{e2}$  in the final state,  $f$ , on the right side of the equation with all interacting masses in a one on one causal formation  $\{\}$ . Since conservation of momentum is equivalent to matter definition maintenance, then the amount of absolute information needed to maintain definition is the constant that is fundamental to momentum and upholds Causal Formation. Now when the particle moves at constant velocity across zero gravity field free deep space, the initial collision event effect on entanglement raised the particle's baseline requirement for absolute information to maintain definition.  $KE$  enables a new baseline that becomes an  $I^A$  constant to maintain particle/matter definition until acted upon by another force. Absolute momentum can be written as

$$p^A = m'_e \frac{\Delta \gamma m'_e}{\Delta RT \rightarrow t} \text{ where } F : p^A \simeq F : I^A \rightarrow m'_e \rightarrow e^I \quad 55$$

#### 8. THE INFORMATION MONOPOLE & THE PRINCIPLE OF CAUSAL FORMATION

The Principle of Causal formation is defined: “All absolute information to matter to energy to quantum information in a system remains constant establishing homogenous boundary conditions for closed systems. It is first order to all conservation principles as it is emergent from the Absolute Information Monopole.” This EDU principle is first order to all conservation principles as they are emergent from the Absolute Information Monopole. The Principle of Causal Formation describes all conservation principles as they are a singular specific expression of  $HI^A$  needed to maintain the constants of the system. The absolute information monopole degrees of freedom to entanglement ratio, is a first order conservations principle. [Table 11] The table simply states that each absolute information monopole has 100% of the absolute information to energy ratio necessary to describe universal structure in its own boundaries from  $D26$  to  $D1$ . Therefore, when two information monopoles are bounded together in a system, *both* monopoles *and* their binding energy equals 100% of absolute information necessary to describe universal structure; with each monopole carrying a 50% share in the total absolute information of the bounded system. For three monopoles bounded in a nucleon, the ratio still equals 100% with each monopole having  $\sim 33.3\%$  share in the bounded total

absolute information of the nucleon, and on it goes. The variable percentage of  $\sim 33.3\%$  across nucleons sets the stage for quantum uncertainty.

Further, the emergence of the WMAP data on the structure of the Universe from the Absolute Information Monopole data in *Table 11* is not trivial. It indicates that absolute information to energy ratio is conserved from atoms, to molecules, planets, and moons, to solar systems, galaxies and the entire universal structure. 100% of absolute information necessary for universal structure is universal; from Definitum, to unbounded monopoles which are invisible in four-space, to matter to black holes that detangle (instead of annihilate) the information monopole resetting the ideal time clock to RealTime 100% degrees of freedom, [*Table 11*]. This freedom from the bounded absolute information state facilitates a bifurcated absolute information monopole dimensional singularity realized in a contracting lower bound at black hole center to an expansive outer bound at galactic edge.

Within the boundaries of this bifurcated singularity exists the complete entropy of the closed galactic system. Applying the Principle of Causal Formation uniformly, a closed system is realized to be a proportionally balanced system of absolute information to matter to energy to quantum information. The percentage ratios in *Table 11* establish informational boundary conditions for each closed system. By identifying the proportions, the balance of the absolute information to matter to energy to quantum information of the system can be determined. The following example deals with gravitational force and conservation of momentum through the absolute information monopole constant. An unbounded deep space particle enters the orbital planes of a solar system adding little to the  $I^A$  percentage ratio of the entire system. But what it does add is balanced with the closed system it has entered. If particle velocity into the system is fast enough its matter definition of its mass would be greater than the matter definition of the system and it would pass through the system. But if matter definition of the particle is less than that of the system definition for particles of its size then it has insufficient escape velocity and moves into  $1/r^2$  proximity of the  $I^A$ /matter definition state of a large planet with an orbital moon. It becomes part of the total entropy,  $HI^A$ , of the system. The de Broglie wavelength,  $\lambda$ , relativistic 35 *a.* or nonrelativistic 35 *b.*

$$\text{a) } \lambda = \frac{h}{p} \text{ or b) } \lambda = \frac{h}{mv} \quad 56$$

The  $I^A$  argument is foundational to both de Broglie equations,

$$\lambda = \frac{h}{m_e^I \text{particle} \rightarrow m_e^I \text{planet}} \therefore \frac{dm_e^I \text{particle}}{dRT \rightarrow t} = - \frac{dm_e^I \text{planet}}{dRT \rightarrow t} \therefore \frac{d(m_e^I \text{particle} + m_e^I \text{planet})}{dRT \rightarrow t} = 0 \quad 57$$

where  $m_e^I \text{particle} \rightarrow m_e^I \text{planet}$  is the information to matter definition to energy entropy of the comet as it approaches the information to matter definition to energy entropy of the planet. Therefore, the information to matter definition to energy entropy of the comet in relation to the difference of RealTime  $RT$  to ideal time  $t$  is negated by the information to matter definition to energy entropy of the planet resulting in zero because the function of Absolute Information approaching matter approaching energy is the constant expressed in causal formations saying two variable time frames can independently exit and then merge. All information monopoles of the particle are redefined by the absolute information monopole definition of the closed planetary system. The absolute information needed to maintain that system does not distinguish between the particle, a comet, the moons or the planet. To maintain conservation of the causal formation, particle velocity offsets increased matter definition of the system as the particle takes on the absolute information definition of the planetary system becoming one with it on planetary impact. The terms gravity or momentum did not need to be used. Instead absolute information maintaining matter definition of citing the principle of causal formation of a closed system is expressed across gravitational force, momentum and acceleration. In the upcoming paper, “On Altering Space Time: Entropic Boundary Conditions” the twenty-six dimensional universe will be explored in depth. Experimental methods will be proposed to test absolute information entropic function across binding energies of information monopoles, nuclear information, and cosmological boundary conditions; a journey from first order entanglement to Hubble constant and galactic rotations driven by black hole detanglement. In the meantime, testable implications to set up the parameters necessary to comprehend the second paper are in order, allowing for falsifiability arguments.

9. THE ENTROPIC DIMENSIONAL UNIVERSE IMPLICATIONS 

Bell's Theorem generally states that no physical theory of local hidden variables can ever reproduce all predictions of quantum mechanics. When viewed through EDU there is an over arching salient logic behind Bell's theorem. In an entropy statement there are no hidden variables to quantum mechanics, everything that can be seen in the quantum world is seen. Consider conditional entropy; in Definitum/Empty first order logic, all conditions arising out from it are entangled. That means that every absolute information monopole in the entire universe is entangled "with the entire universe" and therefore, potentially with each other. Informationally, each monopole is at the center of *its* universe.

Hidden variable theories put limits on correlation of the measurements of these particles. In the information monopole there are no limits placed on measurements of particles. Each monopole has an absolute information relation to all other monopoles over corresponding points. There is no limit to the amount of absolute information that interfaces with an absolute information monopole. Each absolute information monopole being the center of *its* universe is linked over corresponding points to all universal absolute information. Therefore, each *unbounded* monopole has virtually limitless degrees of freedom on the order of  $26^{26}!$ . Logic dictates that it has to be. Limits emerge from entanglement leading to three-space, quantum mechanics and ideal time. This supports the no-communication theorem, which depends on finite limitations imposed on quantum theory. But there is no speed to  $I^A$ , as speed is restricted to four-space, three vector dimensions with the ideal time dimension expressed upon rate of dimensional entanglement in four-space. This leaves absolute information degrees of freedom ready to entangle to quantum information,  $Q_I$ , but not "entanglement capable" of communicating with  $Q_I$ .  $HI^A$  satisfies both the quantum Schrödinger wave equation and its infinities and relativistic criteria for no-communication without invoking a positive times. Herein, it is sufficient to simply say that there are no past events in an information monopole, only entangled states on an arrow of entropy from Real Time to ideal time. The implications are profound. But, light speed doesn't have to change; quantum mechanical uncertainty will still be uncertain; and measuring universal structure through

a light cone of past events still makes sense, in the quantum mechanical world, which is the *immediate* world. But the whole of absolute information cannot entangle to exhibit light speed, or be confined to local past behaviors, or three-spatial constructs of universal structure. When the information monopole is challenged to do so, it detangles through black hole physics reverting to  $\text{Hom}_U(Y,B)$  as the two highly ordered extremes book ending complexity. Consider the following heuristic example. The center of the universe is a single unobstructed hydrogen molecule made of monopoles rising up from a Kansas wheat field on a cold October night. Other monopoles surround it as it ascends; monopoles in wheat, the earth, the air, the moon, the stars and the entire *unobstructed* universe all have corresponding point to hydrogen rising. It is the center point in *its universal sphere*. Every point on the universal information Bloch-like outer sphere has a corresponding point to the central Bloch-like sphere of the information monopoles in hydrogen rising. That is the power function of the entropic dimensional universe. It carries robust implications from evolutionary operators homset  $\text{Hom}_U(Y,B)$ ; implications explored across absolute information set theory, absolute information matrices of *Table 4* and *App. C1, C2* and absolute information to energy ratio, *Table 11*. Structural implications must lead to falsifiability, which in turn leads to a more resonant test of the Entropic Dimensional Universe.

- 1) Existence results from Definitum/Empty information strange attractors  $\text{Hom}_U(Y,B)$  attempting to reconcile groupoid failure of its first order state.
- 2) The universe is an absolute information structure facilitating homogenous conditions of matter definition whose maintenance forms the basis of all forces across an arrow of absolute information entropy,  $HI^A$ .
- 3) Absolute information is a monopole structure that contains all conditions necessary to describe the whole of the informational universe from an unbounded quark, to galaxies, and the expanding/contracting universe.
- 4) Degrees of freedom of an unbounded absolute information monopole are “invisible” or unentangled to four-space energy and quantum information; hence the name monopole.



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- 5) Time is a measure of absolute information entropy,  $HI^A$ , across degrees of freedom yielding twenty-six dimensions through information entanglement. The amount of absolute information not available to do work realized across two inverse entropy states from Real Time absolute information to ideal time energy/quantum information. All time frame potentials exist in every information monopole.
  - 6) Matter is a causal formation defined by interaction between at least two entangled information monopoles facilitating stress and strain tensors of four-space resulting in electrostatics. Rest mass is ground state invariant matter definition.
  - 7) Gravity results from maintenance of invariant matter definition across the nucleon level giving cause to homogeneous gravitational attraction across all forms of matter in a vacuum.
  - 8) Gravity cannot exhibit speed, or gravitational waves, as matter definition is invariant. However, gravity, or matter definition constant maintenance, does effect the stress and strain tensor states of the three-spatial dimensions as evident in mass constancy to weight; where mass remains constant while weight is dependent on causal formation matter density that exerts “force” across the stress and strain tensors of three-space due to a gravitational probability wave from matter definition maintenance in dimensions  $D12$  and  $D11$ .
  - 9) The gravitational probability wave is a probable as it is the root,  $D12$  and  $D11$ , of the post three-spatial dimensions,  $D10$ ,  $D09$  and  $D08$  matter waves energetically expressed across dimensions  $D07$  to  $D02$ . Gravitational probability wave facilitates potential of variable oscillations across the stress and strain tensors establishing a matter wave state emergent from  $D10$ ,  $D09$  and  $D08$  and across  $D07$  to  $D02$ . What is being thrown away to facilitate electrostatics is the gravitational probability
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wave from matter definition maintenance. If the gravitational probability wave itself actually moved as it entangled through three-space  $D10$ ,  $D09$  and  $D08$  then there would be no fine structure constant across  $D07$  to  $D02$ .

- 10) Electrostatics occur when absolute information not needed to maintain matter definition is projected through three-spatial dimensions of an entangled tri-polar absolute information nucleon with release of energy due to topological fluctuations. This maintains conservation of causal formation resulting in a quantum mechanical wave state across dimensions  $D07$  through  $D02$ .
- 11) Acceleration results from external topological influence of a bounded causal formation changing the gravitational state on an incoming unbounded absolute information monopole matter definition structure; as matter definition increases it binds the particle to the causal formation releasing excess information from the particle as energy/acceleration.
- 12) When two particles collide, matter definition maintenance facilitates release of energy in the form of inertia establishing a new ground state absolute information to matter definition maintenance that remains constant until the particle interacts with another particle or matter system causal formation. Inertia and gravity are process equivalent through matter definition maintenance.
- 13) Mass density is proportional to suppression of the matter wave potential resulting in conservation of energy realized as absolute information matter definition for the whole of the causal formation; the higher the density, the greater the suppression and the stronger the gravitational “force” to maintain conservation of  $HI^A$ . Matter definition wave state is suppressed through entanglement with matter density in a causal formation  $\{\}$  facilitating gravitational force,

$$\frac{m_e^I \psi}{\{\gamma \rho m_e^I\}} = G_F$$

“Force” is actually a process result from matter definition maintenance emergent from  $D12$  and  $D11$ , which maintains the information monopoles definition evident *prior* to three-space, in three-space  $D10$ ,  $D09$  and  $D08$ .

- 14) Suppression of matter wave state in a causal formation generally indicates that contraction absolute information is bounded at the center of mass while the expansion information is the outer boundedness of the causal formation. This is true for all oblate spheroid stellar objects including galaxies. It sets bi-singularity conditions necessary for black hole detangling of absolute information through center of causal formation “contraction singularity” which is symmetrically evident in the flatness of rotation due to “expansion singularity” at the galactic edge; between bi-singularities exists the visible universe.

Implications 13 and 14 are supported, in part, by a number of experiments and studies on compression effect on electrons, [77, 78] high pressure effects on matter, [79] core density studies [80, 81] and neutrino resonance changes from interacting with core density [82, 83]. Proposed experiments from these studies make the two implications testable in near term.

- 15) Matter definition is invariant on all scales at any point in the universe.
- 16) Absolute Information entropy,  $HI^A$ , is invariant across all universal scales.
- 17) Electromagnetism emerges from symmetrical entanglement of expansion and contraction states across interacting absolute information monopoles facilitating wave state. Therefore, electromagnetism is suppressed if one state is driven to high order enabling the other state to be ideal time low order dominant.

Two inversely proportional entropy states are at work across the absolute information monopole; from expansion to contraction, and contraction to expansion. This facilitates inversely proportional symmetry of high degrees of freedom to low degrees of freedom leading to an immediate falsifiability proposition of 18:

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18) Across interacting absolute information monopoles, conditions necessary for electromagnetism can be neutralized, or detangled, leaving nuclear matter definition expressed across a purely gravitational to absolute informational state running from  $D26$  through  $D08$  and  $D01$  leaving  $D07$  to  $D02$  suppressed. This is already evident through black hole physics.

19) COSMOLOGICAL PROBLEM 1: MISSING ANTIMATTER [47, pg. 20]

The entropy of the information monopole suggests there is no missing antimatter. Antimatter is simply one of many low ordered/high entropy conditional states of matter. Antimatter's entropic counterpart is the highly ordered/low entropy single wave state of bosonic or fermionic matter. Matter is driven from its normal state, to a single wave state, or to a radioactive state, or to its anti-matter state; it is all just variations on the same theme, entanglement across matter definition. Hadronization speaks to this conditional entropy. [Table 15, pg. 41] Matter entangles and detangles back and forth on line between two entropic extremes with varying electromagnetic results but all matter states fall within matter definition. The information monopole matrices and Venn diagrams herein are naïve, perfect examples of degrees of freedom to entanglement simply meant to facilitate exposing the structure of absolute information. The dynamism between three interacting monopoles, each capable of interactions on the order of  $26^{26}!$  factorial, indicate the absolute information entanglement potential of QCD across absolute information monopole nucleon asymptotics. The same absolute information monopole elements that make up matter also construct antimatter and single wave fermionic and bosonic matter with the difference between all forms of matter being entanglement to degrees of freedom. As to antimatter emergence, the entropy nature of matter indicates that it arises from extremely low order/high entropy conditions that can physically cavitate matter as if turning the absolute information monopole inside out on an order of magnitude found in black hole physics or particle colliders.

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With absolute information, matter does not annihilate anti-matter, it simply brings it to higher order. Therefore, whole antimatter galaxies are improbable.

20) COSMOLOGICAL PROBLEM 2: GALAXY FORMATION [47, pg. 49]

Universal structure emerged from groupoids failure of Definitum/Empty causing fracturing of first order conditions resulting in uncountable infinities of closed sets which, when considered only through three dimensions, presents itself as a large scale immediately constructed structure. Each of those uncountable infinities of closed sets exists in varying states of causal formation. And as seen in the hadronization argument [pg. 40-41] each structure carries the same identical absolute information to matter to quantum information potential.

Homogeneity of matter definition is realized because every causal formation structure is an “absolute information monopole” entropy system. The Information Big Bang resulting from groupoids failure wasn’t at “one point” that expanded outward as there was no three-space to facilitate a central point. The Information Big Bang took place across all uncountable twenty-six dimensional points, of uncountable twenty-six dimensional points, of uncountable twenty-six dimensional points, and so on, across an uncountable factorial.

This is structurally evident if one considers the possibility that the arbiter of the microwave background radiation is not universal space time but, counter-intuitively, an entangled imprint emergent from interacting absolute information monopole SpaceTime.

21) COSMOLOGICAL PROBLEM 3: THE HORIZON [47, pg. 19]

Universal structure is top down and bottom up. Every absolute information structure carries a Real Time to ideal time entropy within it. Ideal time exists from  $D07$  to  $D01$  leaving dimensions  $D26$  through  $D08$  available for Real Time entropy expression into ideal time,  $D07$  to  $D01$ .

Absolute information Real Time to ideal time entanglement facilitates Lorentz transformations as well as gravitational time dilation and it all happens between  $D07$  and  $D01$ . From an absolute information entropy  $HI^A$  perspective; each information monopole is the center of Real Time to ideal time universal structure. This makes every information monopole the principle observer, and because its own state defines universal structure as homogeneity and isotropy are emergent.

At near rest mass definition, information monopoles are entangled at the temperature of the background radiation. Since universal structure is  $HI^A$ , then every  $I^A$  monopole internal to that information structure equally shares corresponding points with that informational structure regardless of four-space location. No matter where the  $I^A$  monopole is, it is at the center of “its” universe. And being at “its” center, background radiation is the same for all monopoles. Since every absolute  $HI^A$  structure expresses Real Time to ideal time, it could be said that the monopole is timeless; as time is nothing more than entanglement of absolute information to matter to energy to quantum information.

22) COSMOLOGICAL PROBLEM 4: FLATNESS [47, pg. 161-166, 190]

A result from confining the universe to observed ideal time four-space realities. Structural deformities are invoked to explain discrepancy between the observed and the expected as seen in the cosmological constant problem. The  $HI^A$  structure of the universe cannot be summed in four-dimensions or fundamental forces, it takes a minimum of twenty-six dimensions mapped by three space to even begin to comprehend absolute information. Absoluteness guides the universe; all the universe, all twenty-six absolute information dimensions from monopoles to cosmological structure. Therefore, inflation, light speed, kinetic energy and all of the other energetic drivers of expansion occur across a matter wave state entanglement across  $D07$  to  $D02$  of the overall  $HI^A$ , for all systems across the whole of universal structure, that is Real Time to ideal

time. However, the absolute informational driver for universal expansion is *D26* expansion upper bound and *D01* contraction upper bound across all structures. Matter density is not a singular driver as entanglement occurs across all dimensions.

While matter facilitates energy, WMAP data puts the visible universe at only 4%. Cosmological  $\Omega$  is matter density based while universal structure is absolute information based. The issue of  $\Omega$  being so close to unity is due to  $\Omega$  arising out from the matter definition constant maintenance, or gravity, which as argued, can never slow down or speed up the universe as it is foundational to three-space.

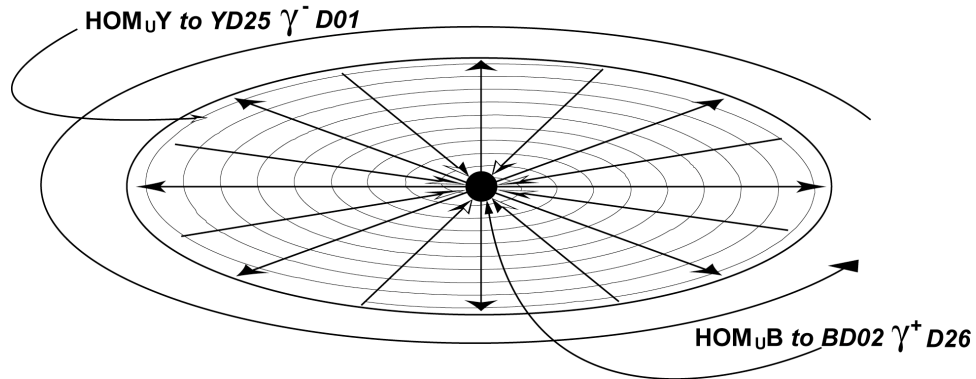
23) THE HUBBLE CONSTANT [47]

So what is driving expansion? In EDU vacuum energy or dark energy is simply highest ordered degrees of freedom for *D26* expansion and highest order entanglement for *D01* contraction; [51] the rest of the universe exists from interaction between these two states across  $HI^A$  structure, again be it a monopole, a galaxy or the universe; and this interaction is fed by the strange attractor of first order  $\text{Hom}_U Y$  and  $B$ .

Factor this argument into every monopole being at the center of its universe and the Hubble constant,  $H$ , takes on even greater significance. The universal  $HI^A$  difference between bi-singularities of outer expansion of strange attractor  $\text{Hom}_U B$  attracted to member  $B$  of dimensional set *D02* which detangles,  $\gamma^+$ , to *D04, D06...D26*) and inner contraction strange attractor  $\text{Hom}_U Y$  attracted to  $Y$  of dimensional set *D25*, which entangles,  $\gamma$ , to *D23, D21...D01*) across galactic causal formations [Table 21] equals a kinetic result of 76.9 km per second per mega parsec +/- 15%.

$$\frac{\text{Hom}_U B \rightarrow BD02(D04 \rightarrow D06...D26)}{\text{Hom}_U Y \rightarrow YD25(D23 \rightarrow D21...D01)} = H = 76.9 \pm_{3.4}^{3.9} \pm_{8.0}^{10.0} \text{ km } 8^{-1} \text{ Mps}^{-1} \quad 59$$

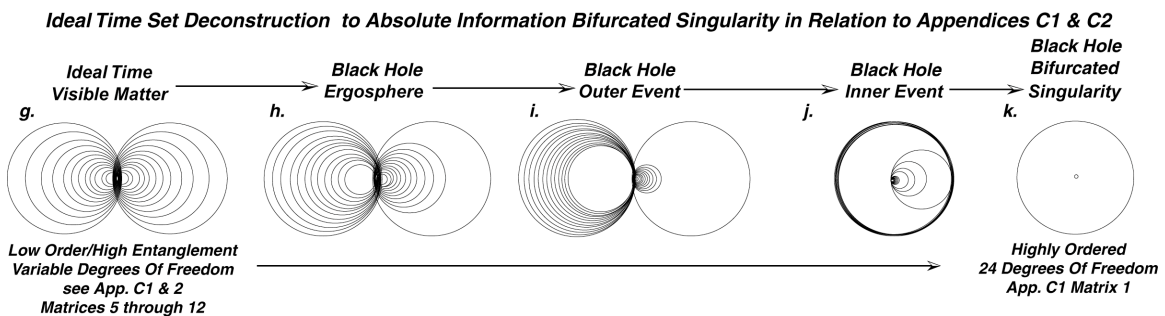
**Absolute Information Entropy,  $HI^A$ , Bi-Singularity Across Galactic Structure** Table 16 ∞



24) BLACK HOLE PHYSICS [49, 50]

A bi-singularity exists in every black hole; at contraction at center of mass, and at the outer expansion edge of a causal formation. Absolute information is not lost during this process, it is simply detangled, with its entropy moving from low order energetic quantum information state to highly order low entropy absolute information singularity. Light absorption at the event horizon is a detangling condition across the absolute information dimensional monopole. Light across  $D07$  through  $D02$  detangles to higher order, then three-space  $D10$ ,  $D09$  and  $D08$  detangles and so on until all that remains at bi-singularity is high degrees of freedom. This establishes the arrow of entropy of a causal formation to be high order to low order to high order.

Table 17 ∞



The Entropic Dimensional Universe is foundational to, and fully supports, the standard model, quantum theory, relativity and classical physics. This paper has explored those relationships on an informational level. EDU could serve to enhance the depth of



current theory through its “outside in perspective.” The cause for measured values of particle masses and coupling constants, or the nature of the Higgs boson, or why there are three generations of particles, now has a most important foundational tool to unlock its mysteries that will be explored in upcoming papers. But in an entropic universe no single theory can fully explore high to low ordered science. Each area of entropy is best described by a specific theory that facilitates depth necessary to comprehend the universe bounded by extremes that function from absolute information to matter definition to energy to quantum information.

## 10. CONCLUSION

The Entropic Dimensional Universe is naive. It has to be, it is highest order. This is evident in Einstein’s thoughts on theoretical logic, “... the greater the simplicity of its premises, the more different kinds of things it relates, and the more extended its area of applicability.” [52] Universal structure was investigated and found to be emergent from first-order universal information continuum of Definitum/Empty that contains two highly ordered conditional potentials that eventuate in all universal states. Information set theory was utilized to explore decompilation/groupoid failure of first-order Definitum/Empty information into an absolute information monopole whose degrees of freedom form the basis of a twenty-six dimensional universe. The absolute information monopole was found to be a symmetrically bifurcated state that is conditional to all quarks and forms the basis of matter definition. Homogeneity of universal structure is evident across the information monopole whose isotropy is expressed over twenty-six dimensions on an arrow of entropy from absolute information, to matter definition, to energy, to quantum information,  $F : I^A \rightarrow m_e^l \rightarrow e_l \rightarrow Q_l$ . When external topological phenomenon entangle, evidenced from three-space as kinetic and potential energy, it works to effect matter definition invariance causing strange attractors of absolute information to increase proportionately to maintain matter definition, and with it, informational phase space. Due to conservation principles on local field oscillations, unneeded absolute information from matter definition maintenance is released through entangled three-space in the form of energy, facilitating quantum information. Process conditions necessary for matter definition maintenance are responsible for all forces

including gravity and gravitational potential. The twenty-six dimensional information monopole was shown to be the same as universal structure, and its dimensional and functional percentages are also the same percentages emergent in the WMAP (Wilkinson Microwave Anisotropic Probe) data on universal structure. The universe is a twenty-six dimensional absolute information continuum that maintains its structural percentage, distribution and functional mapping across limitless multiples of twenty-six member, absolute information monopole sets. In the Entropic Dimensional Universe, twenty-six and only twenty-six dimensions, can result in EDU/WMAP structural percentages.



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## APPENDIX A: EDU TERMS AND STATEMENTS ㉞

**ABSOLUTE INFORMATION  $I^A$  :**

Two symmetrically opposite initial conditional states with thirteen dimensions for each state facilitating entangling interacting information states that construct matter, energy and quantum information. ㉞

**ABSOLUTE INFORMATION HOMOGENEITY:**

Every information monopole internal to Definitum/Empty Information expansion and contraction states have a direct corresponding relationship to mutual corresponding points. A four-space analogue would be every point on an inner sphere has a corresponding point to the outer sphere no matter how large the outer sphere or where the inner sphere is located in the interior of the outer sphere. ㉞

**ABSOLUTE INFORMATION PHASE SPACE**

is the space in which all possible information states of a system are represented in each of the twenty-six dimensions with each possible state of the system corresponding to one unique notion of location across corresponding points between the dimensions. (*see Corresponding points and Information Monopole*) ㉞

**CAUSAL FORMATION:**

See the Principle of Causal Formation. ㉞

**CONDITIONAL/NON-DETERMINISM:**

First order *Definitum/Empty* Information set is conditional to but not deterministic of universal structure. High entropy of first order *Definitum/Empty* Information fractures to probabilistic absolute information into uncertain quantum information. It is from the chaos of absolute information that universal structure evolves. Therefore, initial first order state is conditional/non-deterministic. ㉞

**CONSERVATION OF INFORMATION:**

RealTime absolute information is never lost it is process converted to a matter form, which can be converted to an energetic form, which can be converted to ideal time quantum information. ㉞

**COPENHAGEN RE-INTERPRETATION (CR)**

where absolute information mechanistically predicts criteria of the Copenhagen Interpretation of quantum physics through entangling degrees of freedom of twenty-six dimensions that define universal structure.

“(C1) HEISENBERG'S UNCERTAINTY PRINCIPLE, the idea that pairs of "conjugate" variables (like position and momentum or energy and time) cannot simultaneously be measured to "perfect" accuracy, nor can they have well-defined values at the same time that. (C2) BORN'S PROBABILITY LAW, the rule that the absolute square of the wave function gives the probability,  $P = \Psi\Psi^*$ , of finding the system in the state described by the wave function; (C3) BOHR'S COMPLEMENTARITY PRINCIPLE, the idea that the uncertainty principle is an intrinsic property of nature (not a just a measurement problem) and that the observer, his measuring apparatus, and the measured system form a "whole" which cannot be divided. (C4) HEISENBERG'S KNOWLEDGE INTERPRETATION, the notion that the wave function is neither a physical wave traveling through space nor a direct description of a physical system, but rather is a mathematically encoded description of the knowledge of an observer who is making a measurement on the system.” With fine tuning adjustments to remove anthropic/observer argument C4 becomes: (Cr4) UNIVERSAL INTERPRETATION: The notion that the wave function is neither a physical wave traveling through space nor a direct description of a physical system, but rather a mathematically entangled “absolute information entropy” structure bringing absolute homogeneity to all measurements in all systems, defining the universe to be independent of any one observer, thereby making all observers dependent equals upon it. And from “(C5) HEISENBERG'S POSITIVISM, the principle that it isn't proper to discuss any aspect of the reality which lies behind the formalism unless the quantities or entities discussed can be measured experimentally.” C5 becomes: (Cr5b) UNIVERSAL REALISM: The principle that it isn't proper to ignore any aspect of reality, which lies behind and beyond anthropic formalism or mathematical indeterminism by confining reality to the measurement limitations of observer created experimental outcomes. *Source C 1 - C 5: J. G. Cramer, [53] (used with permission)* ㉞

**CORRESPONDING POINTS:**

are dimensionless notions of locations emergent from absolute information vector potential. These absolute information states are foundational to four-space. 26 dimensions to the 26<sup>th</sup> power each or 26<sup>26</sup>, realizes  $6.15611958 \times 10^{36}$  corresponding points for each dimension in the information monopole; or when three space is mapped into 26 dimensions to the 3<sup>rd</sup> power, or 26<sup>3</sup>, realizes 17,576 vector-less corresponding points for each 26-nested Bloch-like sphere of an information monopole. Corresponding points are absolute information phase space notions in which all possible information states of the system are represented on each twenty-six nested, twenty-six dimensional absolute information state Bloch-like spheres. A bijective or injective/reflexive relationship is implied on a one to one between vectorless points (see *Appendix C and C2*). This helps conceptualize entangled sets and degrees of freedom. Corresponding points establish homogeneity of structure for all monopoles over a notion of location intersections between all monopoles. Without the vector potential of corresponding points vectors would not be emergent. ∞

**CORRESPONDING POINTS & GALILEO'S PARADOX:**

Corresponding points are a one to one correspondence for informational vector-less points in the vein of Galileo's paradox, where "some numbers are perfect squares (i.e., the square of some integer, in the following just called a *square*), while others are not; therefore, all the numbers, including both squares and non-squares, must be more numerous than just the squares. And yet, for every square there is exactly one number that is its square root, and for every number there is exactly one square; hence, there cannot be more of one than of the other. Galileo concluded that the ideas of less, equal, and greater applied only to finite sets, and did not make sense when applied to infinite sets." [36] In absolute information finite and infinity only exist as four-space vectors. In like manner, it does not make sense to apply the idea of less, equal or greater - to absolute information because it is a constant to all dimensions. Galileo's paradox exists because there are two logical ways to produce a set of real and natural numbers; what "produces numbers" to begin with is absolute information that is built upon two information states that are entropically possessed with two different invariant foundations of Definitum/Empty information. It is this entropic process that is realized over the notion of location of Corresponding Points. ∞

**CORRESPONDENCE PRINCIPLE:**

Absolute information entangles to bridge dimensional expression wave/particle duality of Quantum Mechanics, which further reduces to Cartesian coordinate system of classical physics through varying localized SpaceTime effects over corresponding points. ∞

**DEFINITUM SEE: DEFINITUM/EMPTY INFORMATION OR DAS UNIVERSAL DEFINITIVUM****DEFINITUM/EMPTY INFORMATION OR DAS UNIVERSAL DEFINITIVUM**

German; universe absoluteness, *abbr*: Definitum. It is the singular foundation of all constants and absoluteness of universal structure. are initial condition, highest ordered states that are fundamental drivers of an arrow of entropy from which all universal structure, every region of space, to lowest order quantum mechanical uncertainty, are emergent. *das universal Definitivum*, abbreviated Definitum, is absoluteness of information while Empty is total lack of information. Both Definitum and Empty make up a universal Grothendieck-like set with empty also being a subset of Definitum. Through intersections, Empty Information approaches Definitum to "erase" its high order while Definitum approaches Empty Information set to "inform" it. This leads to initial defined condition logic failure resulting in first order of absolute information bijection. ∞

**DEGREES OF FREEDOM:**

the amount of 26 dimensional functions capable of entangling absolute information to four dimensions. ∞

**DENSITY:**

Four-dimensional particles encode their whereabouts in relation to corresponding points of the expanding and contracting absolute information universe as a bridge dimension expression out from the Hamiltonian and four-space indicative of a coordinate system form of information embracing uncertainty. ∞

**DIMENSIONS:**

Twenty-six absolute information degrees of freedom of universal structure facilitating entanglement necessary for formation of matter, energy, ideal time and quantum information; an absolute information phase space that ranges from Planckian Causality into Planck Space and into Post-Planckian states.  $\infty$

**ENTROPIC DIMENSIONAL UNIVERSE (EDU):**

A foundational absolute information theory to Relativity (GR/SR), Quantum Mechanics and Classical physics where dimensional degrees of freedom of absolute information deform through entanglement to establish an arrow of entropy from absolute information to matter to energy to quantum information.  $\infty$

**FINITE:**

A bijection between a set and some other set involving “real numbers.” A set is only finite if the cardinality of its elements is a natural number. Finite involves countables and only a matter based quantum information state is countable. The logic: natural numbers are emergent from Definitivum/absolute information at Planck scales on, or from dimensions  $D10 - D1$ . Therefore, from  $D26 - D11$  natural numbers do not exist; accordingly they can only describe Definitivum/absolute information heuristically.  $\infty$

**FORM:**

The informational shape and structure of an object.  $\infty$

**FOUR FORCES:**

At a floating point boundary condition over  $D10, D09$  and  $D08$  where absolute information entangles with four-space there exists bridge dimensional expressions of the fundamental forces into and out from four-space;  $\text{Hom}_{\cup} Y, B$  strange attractor strong force in; gravity, weak force and electromagnetism out.  $\infty$

**FUNCTION:**

A rule of correspondence between two sets such that there is a unique dimensionless notion of location in the second set assigned to each element in the first set, upon asymptotic interaction between the sets correspondence becomes a vector in ideal time.  $\infty$

**GRAVITY:**

arises from matter definition maintenance from the nucleon forward realized though asymptotics. The greater mass density across three-space  $D10, D09, D08$  the more compressed the causal formation. Compression suppresses electrostatics/matter waves across  $D07$  to  $D02$ . Unneeded information for matter definition is no longer released over  $D07$  to  $D02$  and is conserved across  $D12$  and  $D11$ .  $\infty$

**IDEAL TIME:**

A locally determined quantum mechanical system that measures transition rates of absolute information degrees of freedom to entangled four dimensions. The percentage of observable ideal time across universal structure is  $\sim .4\%$  of the total (*% based on 19, 20*).  $\infty$

**INDETERMINACY OF ABSOLUTE INFORMATION ENTROPY,  $H^A$ :**

The boundary condition between RealTime absolute information and ideal time energy mediated through matter is realized in wave/particle duality probability distribution with uncertainty.  $\infty$

**INERTIA & ACCELERATION:**

Inertia is a kinetic result from the process of maintaining matter definition from the nucleon state forward.

**INFINITE:**

is generally defined as a concept of increase beyond bounds. There are twenty-three boundary conditions from dimensional degrees of freedom entangling twenty-three dimensions with specific information bounded states that cannot increase beyond bounds so they are neither infinite nor finite. Why twenty-three boundary conditions and not twenty-six? Three dimension,  $D10, 9$  and  $8$  are upper and lower bounded by  $3 \times 3 \times 3$  tensor invariance facilitating a spatial boundedness fundamental to both finite and infinite.  $\infty$

**INFORMATION ENTROPY CLASSES OF ABSOLUTE INFORMATION:**

Four class states inherent to specific set boundary conditions of entanglement; 1) absolute information approaching 2) matter approaching 3) energy approaching 4) quantum information.  $\infty$

**INFORMATION EQUIVALENCY:**

Function is to form as absolute information is to energy.  $\infty$

**INFORMATION MONOPOLE:**

Contains all the absolute information necessary for universal structure; a RealTime construct of twenty-six dimensional degrees of freedom until entangled with another information monopole facilitating four-space and ideal time. The information monopole is called a monopole because it takes at least two interacting information monopoles to facilitate four-space infinite complexity of quantum information.  $\infty$

**MATTER:**

Matter is a twenty-six dimensional bifurcated absolute information state constructed of at least two, but generally a nucleon of three, information monopoles on an arrow of entropy from an ordered single wave absolute information or dark matter state to a quantum mechanically complex wave state.  $\infty$

**PLANCKIAN CAUSALITY:**

The underlying foundational relationship between cause and effect, that leads to Planck space and the quantum realm; a cause for quantum mechanics; named after Max Planck.  $\infty$

**PLANCK SPACE:**

The smallest proposed measure of structure in four-space. Lower to upper bound Absolute Information dimensions  $D10 - D1$ . The following all in SI: Planck length,  $1.61624 \times 10^{-35}$  m; Planck Mass,  $2.17645 \times 10^{-8}$  kg; Planck time,  $5.39121 \times 10^{-44}$  s; Planck charge,  $1.8755459 \times 10^{-18}$  C; Planck Temperature,  $1.41679 \times 10^{32}$  K; Planck Momentum,  $6.52485$  kg m/s; Planck energy,  $1.9561 \times 10^9$  L.; Planck force,  $1.21027 \times 10^{44}$  N. E-link source: [54, 55]  $\infty$

**PLANCK WALL:**

the lower bound of Planck Space and the computational point of mathematical indeterminacy. Planck wall is the ceiling for the upper bound of Absolute Information dimensions  $D26 - D11$ .  $\infty$

**THE PRINCIPLE OF CAUSAL FORMATION:**

all absolute information to matter to energy to quantum information in a system remains constant establishing homogenous boundary conditions necessary to closed systems. The principle is first order to all Conservation Principles as it is emergent from the Absolute Information Monopole. All conservation principles can be defined by, the Principle of Causal Formation.  $\infty$

**PRINCIPLES OF FORCE IN ABSOLUTE INFORMATION:**

There is no strong force without interacting information monopoles; no weak force without entanglement imbalance across two interacting information monopoles; no gravitational force without absolute information maintaining asymptotic mass definition across two interacting monopoles; or electromagnetic force without three interacting monopoles across a nucleon releasing excess absolute information into four-space. There is no force without matter mediation and no matter mediation without interacting absolute information monopoles.  $\infty$

**REAL TIME:**

is Absolute Information at the highest degree of freedom over 26th and 1st dimensions.  $\infty$

**REVERSIBILITY OF INFORMATION:**

The arrow of entropy of higher dimensional information entangled into matter into energy into quantum information resulting in a fully reversible process is evident through black hole physics where absolute information that constructs matter is detangled to highest order and is not annihilated.  $\infty$

**REST MASS:**


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is unbounded ground state matter definition.  $m_e^I = \text{matter} \xrightarrow{\text{Absolute Information conversion to energy}} \cdot \infty$

**SPACE:**


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an absolute information to quantum information entropy that can be qualitatively measured over an information monopole  $D26 - D01$ , or quantitatively measured across  $D10$  through  $D01$ .  $\infty$

**SPACE TIME:**


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The illusion of “energy dominance” over absolute information in four-space realized through quantum information expressed by the fundamental forces across ideal time; a process that is defined by absolute information entanglement across twenty-six dimensions.  $\infty$

**TIME:**


---

A measure of absolute information entropy across degrees of freedom. The amount of information not available to do work realized by two inverse entropy states called Real Time and ideal time that exist along the arrow of entropy between absolute information to four-space energy quantum information.  $\infty$

**TIME FRAMES:**


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**FUTURE:** Potential of RealTime to ideal time entanglement of degrees of freedom across absolute information to matter to energy to quantum.

**PRESENT:** Immediately measurable entangled state of matter interaction with absolute information to matter to energy to quantum information.

**PAST:** Remnant quantum informational record of degrees of freedom entanglement from RealTime to ideal time expressed over absolute information to matter to energy to quantum information; perceived history is limited to a four-space construct in imaginary time.  $\infty$

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APPENDIX B: SPECIAL NOTATION & EQUATIONS 

das universal Definitivum or Definitum:  $A_{def}$  Empty Information:  $\emptyset$

Absolute Information:  $I^A$  Matter Definition:  $m_e^I = \text{matter}^{\text{absolute Information conversion to energy}}$

$HI^A$  entropy: absolute information to matter definition to energy to quantum information and its entropy.

Energy to quantum information:  $e_l$  Quantum Information  $Q_l$

Information Monopoles  $q^i, q^{ii}$  and sets/subsets  $g^i$  and  $g^{ii}$

$$A_{def} \cap \emptyset \leftrightarrow \emptyset \cap A_{def} \quad 07$$

07. The intersection Definitum information with the Empty Information of the empty set results in the intersection of the empty set intersecting with Definitum.

$$F : A_{def} \rightarrow \emptyset \leftrightarrow F : \emptyset \rightarrow A_{def} \quad 08$$

08. Function maps Definitum onto the empty set iff function maps empty set onto Definitum, and function only applies to these two members of the  $U$  (a Grothendieck-like Universe).

$$F : A_{def} \cup \emptyset \neq \emptyset \therefore F : \emptyset \cup A_{def} \neq A_{def} \quad 16$$

16. The union  $25 \cup 26$  is impossible due to failure in initial definition of categories. Complete collapse of the information categories fractures the groupoids  $f$  (26) and  $f$  (25) due to the information logic error limit of first order state where Definitum is no longer absolute and Empty Information is no longer empty.

$$F : A_{def} \cap \emptyset \rightarrow F : I^A \rightarrow m_e^I \rightarrow e_l \rightarrow Q_l \quad 23$$

23. Function process of Definitum/Empty Information leads to a second function that contains set properties of absolute information, matter and energy potential that moves to matter definition containing set properties of information and energy potential which moves to energy with a potential for information moving to quantum information.

$$E^- \subset E^+ = g^i \subset g^{ii} \therefore E^+ \subset E^- = g^{ii} \subset g^i \quad 24$$

24. Quark homogeneity results from absolute information monopole set interaction between the expansion information monopole where contraction, is a subset of expansion therefore there is a contraction information monopole where expansion is a subset of contraction.

$$\begin{aligned} q^i &= -\frac{k}{g^i \subset g^{ii}}(q^i - q^{ii}), \\ q^{ii} &= -\frac{k}{g^{ii} \subset g^i}(q^{ii} - q^i) - \frac{k}{g^i \subset g^{ii}}(q^{ii} - q^i), \\ q^{i'} &= -\frac{k}{g^i \subset g^{ii}}(q^{i'} - q^{ii}) \end{aligned} \quad 25$$

25. Quark homogeneity results from absolute information monopole set interaction between expansion  $g^i$  and contraction  $g^{ii}$ . Interactions between two absolute information monopoles facilitate quantum information. While asymptotic quark states  $q^i, q^{ii}$  and  $q^{i'}$  construct a nucleon out of six base information sets facilitating three monopoles.



APPENDIX C: DOF TO ENTANGLEMENT ACROSS INFORMATION MONOPOLE MATRIX # 1- 6

22 Degrees of Freedom, D24 to D23 entangled imprint on all < D23

Table with 26 rows and 26 columns. The top 10 rows (D24-D15) contain the letters 'a c e g i k m o q s u w y' and the bottom 16 rows (D14-D01) contain 'b d f h j l n p r t v x z'. A shaded region covers rows 14-19 and columns 13-18.

20 Degrees of Freedom, D24 to D22 entangled imprint on all < D22

Table with 26 rows and 26 columns. The top 10 rows (D24-D15) contain the letters 'a c e g i k m o q s u w y' and the bottom 16 rows (D14-D01) contain 'b d f h j l n p r t v x z'. A shaded region covers rows 12-19 and columns 13-18.

18 Degrees of Freedom, D20 to D19 entangled imprint on all < D19

Table with 26 rows and 26 columns. The top 10 rows (D24-D15) contain the letters 'a c e g i k m o q s u w y' and the bottom 16 rows (D14-D01) contain 'b d f h j l n p r t v x z'. A shaded region covers rows 16-19 and columns 13-18.

16 Degrees of Freedom, D18 to D17 entangled imprint on all < D17

Table with 26 rows and 26 columns. The top 10 rows (D24-D15) contain the letters 'a c e g i k m o q s u w y' and the bottom 16 rows (D14-D01) contain 'b d f h j l n p r t v x z'. A shaded region covers rows 18-19 and columns 13-18.

14 Degrees of Freedom, D16 to D15 entangled imprint on all < D15

Table with 26 rows and 26 columns. The top 10 rows (D24-D15) contain the letters 'a c e g i k m o q s u w y' and the bottom 16 rows (D14-D01) contain 'b d f h j l n p r t v x z'. A shaded region covers rows 16-17 and columns 13-18.

12 Degrees of Freedom, D14 to D13 entangled imprint on all < D13

Table with 26 rows and 26 columns. The top 10 rows (D24-D15) contain the letters 'a c e g i k m o q s u w y' and the bottom 16 rows (D14-D01) contain 'b d f h j l n p r t v x z'. A shaded region covers rows 14-15 and columns 13-18.



APPENDIX D: ∞

**Entropic Dimensional Diagramatic Post Definitivum**  
**Set Entanglement/Braiding of Absolute Information Degrees of Freedom**  
 Degrees of Freedom Containment    Deformation Resonance

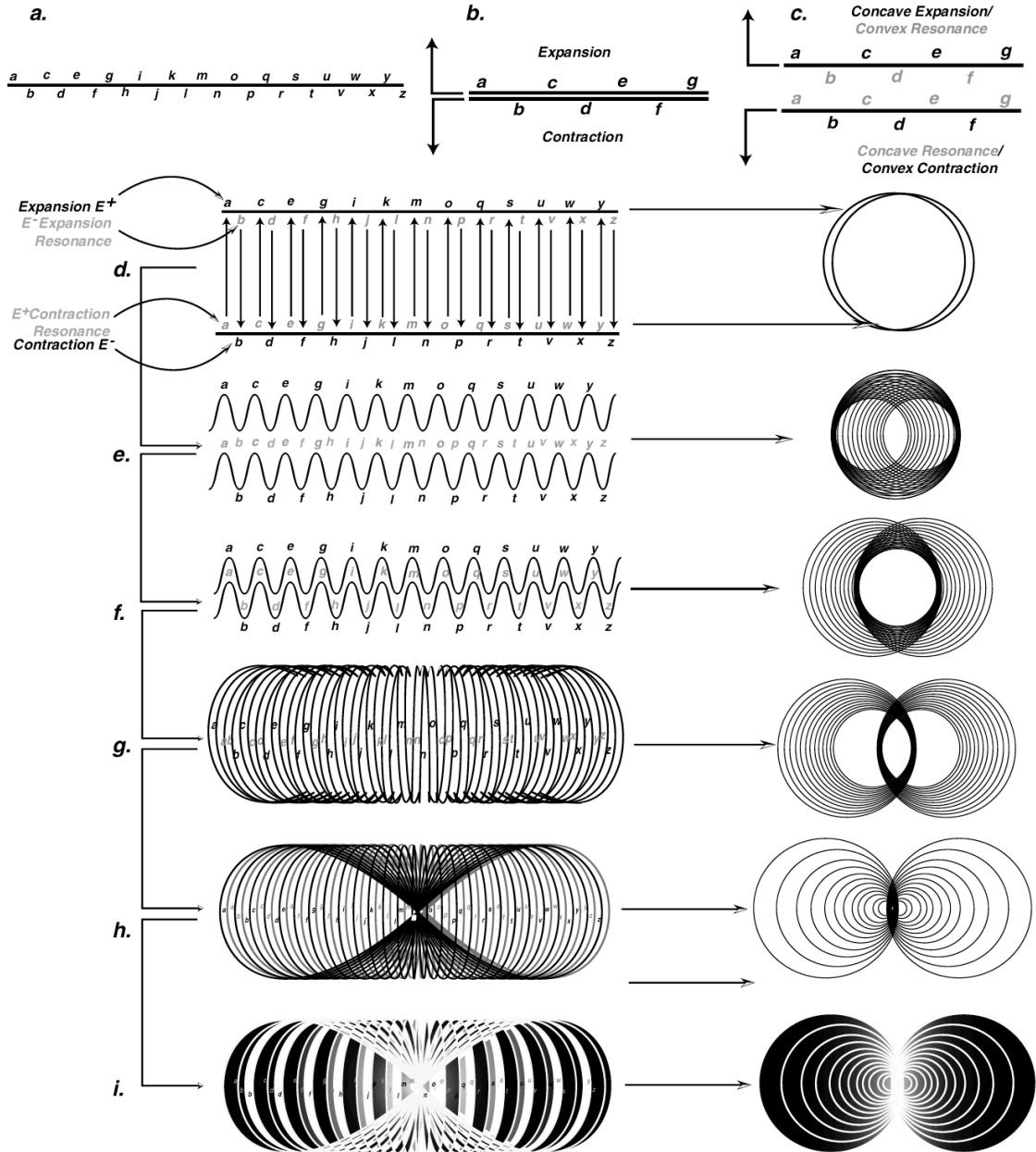


Image is representative not simulated.  
 a: Definitum/Empty Information;  
 b: First Order reflexive;  
 c: First Order recursive attraction;  
 d: Bijective across two categories;  
 e – g: Reflexive relationship leading to;  
 h: entanglement first order logic failure leading to  
 i: Absolute Information Big Bang

## REFERENCES: ∞

01. K. Gödel, 1931. *On Formally Undecidable Propositions of Principia Mathematica and Related Systems I*. In M. Davis (ed.). 1965. *The Undecidable*. Raven Press, New York. <Web version: <http://www.ddc.net/ygg/etext/godel/godel3.htm>>
02. G. 't Hooft, *Determinism Beneath Quantum Mechanics*, Presented at "Quo vadis Quantum Mechanics?", Temple University, Philadelphia, September 25, 2002. arXiv:quant-ph/0212095 v1 16, 2002.
03. G. 't Hooft *The Mathematical Basis for Deterministic Quantum Mechanics*, arXiv:quant-ph/0604008 v1 3, 2006.
04. F. Markopoulou *The internal description of a causal set: What the universe looks like from the inside:* Commun.Math.Phys. **211**, 2000. 559-583
05. A. Einstein, B. Podolsky, N. Rosen, *Can quantum-mechanical description of physical reality be considered complete?* Physical Review **41**, 777, 1935.
06. G. J. Chaitin, "The limits of mathematics," chao-dyn/9407003, IBM Research Report RC-19646, 1994, 270 pp.
07. G. J. Chaitin, *METAMATH! The Quest for Omega*, arXiv:math.HO/0404335 v7 13, 2004
08. C. E. Shannon, *A Mathematical Theory of Communication*, The Bell System Technical Journal, Vol. **27**, pp. 379–423, 623–656, July, October, 1948
09. M. B. Plenio and V. Vitelli, *The Physics of Forgetting: Landauer's Erasure Principle and Information Theory*, Contemporary Physics, 2001, volume **42**, number 1, pages 25 - 60
10. Charles H. Bennett, *Notes on Landauer's principle, Reversible Computation and Maxwell's Demon*, arXiv:physics/0210005 v2 9 Jan 2003
11. C. H. Bennett, R. Landauer, Scientific American 253(1):48-56 July, 1985
12. C.H. Bennet, et al., *A Quantum Information Science and Technology Roadmap Part 2: Quantum Cryptography Version 1.0 Report of the Quantum Cryptography Technology Experts Panel*, Advanced Research and Development Activity (ARDA) July 19, 2004, available at <http://qist.lanl.gov>
13. Ash, R, *Information Theory*, Dover, 1965
14. Rolf Landauer, IBM J. Res. Develop. VOL. 5 NO. 3 1961
15. Kolmogorov A.N. Probl. Inform. Transfer, **1**, 1965, 3.
16. G. J. Chaitin, *A New Version of Algorithmic Information Theory*, Complexity 1:4, 1995/1996.
17. G. J. Chaitin, *Algorithmic Information Theory*, Cambridge University Press, 1987
18. D. Hilbert, 1899, *Grundlagen der Geometrie*, Teubner, Stuttgart. J. Hinktikka, ed., *The Philosophy of Mathematics*, Oxford University Press, Oxford, 1969
19. J. P. Ostriker and P. Steinhardt, *New Light on Dark Matter*; Science 20 June 2003; **300**: 1909-1913 [DOI: 10.1126/science.1085976
20. Bennett, C.L. et. al, *First Year Wilkinson Microwave Anisotropy Probe (WMAP) Observations: Preliminary Maps and Basic Results*, Astrophys.J.Suppl. **148**, 2003.

- 
21. S. Lloyd, *Computational Capacity of the Universe*, Phys. Rev. Lett. **88**(23), 237901
  22. S. Lloyd, *Quantum limits to the measurement of spacetime geometry*, E-Print: [quant-ph/0505064](http://arxiv.org/abs/quant-ph/0505064), May 10, 2005
  23. Feigenbaum, M. J. "*Quantitative Universality for a Class of Non-Linear Transformations.*" *J. Stat. Phys.* **19**, 25-52, 1978.
  24. L. Randall, R. Sundrum, *An Alternative to Compactification*, Phys.Rev.Lett. **83** (1999) 4690-4693 E-Print: hep-th/9906064
  25. A. Karch, L. Randall, *Relaxing to Three Dimensions*, HUTP-05-A0029, UW-PT-05-14, May 26, 2006, E-Print: hep-th/0506053
  26. S. F. Brandt, B. K. Dellen, and R. Wessel, *Synchronization from Disordered Driving Forces in Arrays of Coupled Oscillators*, Phys. Rev. Lett. **96**, 034104, 2006.
  27. A. B. Zamolodchikov, *Tetrahedron equations and the relativistic S matrix of straight strings in 2+1 dimensions*, Commun. Math. Phys. **79** (1981) 489-505;
  28. J. Baez, A. Crans, *Higher-Dimensional Algebra VI: Lie 2-Algebras*, Theory and Applications of Categories, Vol. **12**, No. 15, 2004, pp 492-538, 4.2.1 – 4.2.5;
  29. V. Bazhanov, S. Sergeev, *Zamolodchikov's Tetrahedron Equation and Hidden Structure of Quantum Groups*, J.Phys. **A39** (2006) 3295-3310 <http://arxiv.org/abs/hep-th/0509181>
  30. R. Ariew, *Ockham's Razor: A Historical and Philosophical Analysis of Ockham's Principle of Parsimony*. Champaign-Urbana, University of Illinois, 1976.
  31. J.D. Bekenstein, *Information in the holographic universe*, Scientific American, August, 2003 48-55
  32. P.F. Smith, Ann. Rev. Nucl. and Part. Sci. **39**, 73 (1989).
  33. L. Lyons, Phys. Reports **129**, 225 (1985)
  34. M. Marinelli and G. Morpurgo, Phys. Reports **85**, 161 (1982).
  35. S.M. Carroll, W.H. Press, *The Cosmological Constant*, Annu. Rec. Astron. Astrophys, 1992. **30**:499-542
  36. N. Straumann, *The History of the Cosmological Constant Problem*, Invited talk at the XVIIIth IAP Colloquium: Observational and theoretical results on the accelerating universe, July 1-5 2002, Paris, France, <http://arxiv.org/abs/gr-qc/0208027>
  37. J. S. Bell, *Speakable and unspeakable in quantum mechanics*, Cambridge University Press, Cambridge, 1987.
  38. L. Hackermüller, K. Hornberger, B. Brezger, A. Zeilinger and M. Arndt, "*Decoherence of Matter Waves By Thermal Emission of Radiation.*" *Nature* **427**: 711-714. 2004.
  39. LeSar R, Herschbach DR. 1981. J. Phys. Chem. **85**:2798
  40. J. Garza, R. Vargas, N. Aquino and K.D. Sen, *DFT reactivity indices in confined many-electron atoms*, J. Chem. Sci., Vol. **117**, No. 5, September 2005, pp. 379–386. © Indian Academy of Sciences.
-



41. R. J. Hemley, *Effects Of High Pressure on Molecules*, Annu. Rev. Phys. Chem. 2000. **51**:763–800
42. Y. Allkofer, *Lecture: MSW Effect and Probing The Absolute Density of Earth Core*, University of Zurich, April 15, 22005, CERN
43. W. Winter, *Probing The Absoloute Denisty of The Earth's Core Using A Vertical Neutrino Beam*, E-Print: arXiv:hep-ph/0502097 v2 30 Aug 2005
44. Petcov, S. T., *New Enhancement Mechanism of the Transitions in the Earth of the Solar and Atmospheric Neutrinos Crossing the Earth Core*, Journal-ref: Nucl.Phys.Proc.Suppl. 77 (1999) 93-97 E-print: <http://arxiv.org/pdf/hep-ph/9809587>
45. Petcov, S.T. *Diffraction-Like (or Parametric-Resonance-Like?) Enhancement of the Earth (Day-Night) Effect for Solar Neutrinos Crossing the Earth Core*, Phys.Lett. **B434** (1998) 321-332, E:Print: arXiv:hep-ph/9805262 v3 18 Apr 2005
46. M. Lindner et al., *Tomography of the Earth's Core Using Supernova Neutrinos*, Astropart. Phys. **19**, 755 (2003). E-Print: <http://arxiv.org/pdf/hep-ph/0207238>
47. A. Linde, *Particle Physics and Inflationary Cosmology*, Contemp.Concepts Phys. 5 (2005) 1-362
48. M. Bonamente, M. K. Joy, S. J. LaRoque, J. E. Carlstrom, E. D. Reese and K. S. Dawson, *Determination of the Cosmic Distance Scale from Sunyaev-Zel'dovich Effect and Chandra X-ray Measurements of High Redshift Galaxy Clusters*, (submitted to ApJ) April 3, 2006 E-Print: <http://arxiv.org/pdf/astro-ph/0512349>,
49. Hawking S. W. *Black Holes and Thermodynamics*, Physical Review D **13**, 191-197, 1976
50. J. D. Bekenstein, *The Limits Of Information*, Stud.Hist.Philos.Mod.Phys. 32 (2001) 511-524, E-print: <http://arxiv.org/pdf/gr-qc/0009019>
51. G.E. Volovik, *Vacuum Energy: Myths and Reality*, Submitted to the special issue of Int. J. Mod. Phys. devoted to dark energy and dark matter, IJMP style, E-Print: gr-qc/0604062, 10 Jul 2006
52. A. Einstein, *Autobiographical Notes*, in: *Albert Einstein Philosopheo-Scientist*, ed. P. A. Schipp, 3<sup>rd</sup> ed., Tudor, N.Y.,1970.
53. J. G. Cramer, Rev. Mod. Phys. **58**, 647-687, 1986 (*quoted with permission*)
54. Planck Space: [http://en.wikipedia.org/wiki/Planck\\_units](http://en.wikipedia.org/wiki/Planck_units) for general description of Planck Units.
55. J. D. Barrow, *The Constants of Nature: From Alpha to Omega - The Numbers that Encode the Deepest Secrets of the Universe*. Pantheon Books. ISBN 0375422218, 2002.