

Surmounting Unwanted Infinities: Newly Endorsing Competing Entropies: The Basic Heretical Verities

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A single holistic theory for how the universe is organized, and how its diversity of scales and systems coordinate and *perform* together, may yet be obtainable. But not within the current paradigms. We are stopped by some foundational misunderstandings within mathematics that forced the impasse we are currently at - especially the discontinuity between relativity and quantum mechanics - especially the discontinuity between physics/chemistry and biology/sociology/economics. A solution is presented, illuminating and defining mathematical relations previously ignored/unidentified. **The following is an analytical essay.**

1. The Challenge Scenario

Mathematics has become a spectacularly complex system, as you are all aware of it and practice it. But it is a language. And as much as we hope it is thorough, informative, useful and applicable where we want it to be and need it to be, experience has proven, especially with Godel's theorems, [1] that languages are narrow frames of reference about existence and behavior spaces and relationships.

When you are embedded in a language you've known and depended on all your life you assume it was handed to you and fully tested by generations before and around you, adequate to all your needs for understanding and engaging your world. But just as a speaker of Swahili or Japanese or French or Chinese or English, or any others know, not all knowledge or data or comprehensions translate perfectly, or contain equal perceptions. Building on Einstein's and Reichenbach's [1] realization of relativity describing the universe having multiple frames of reference of comparable validity, the 1930's linguist Benjamin Whorf, observed,

"each language is not merely a reproducing instrument for voicing ideas but ... is itself the shaper of ideas, the program and guide for the individual's mental activity, for his analysis of impressions, for his synthesis of his mental stock in trade.

"This fact is very significant for modern science, for it means that no individual is free to describe nature with absolute impartiality but is constrained to certain modes of interpretation even while he thinks himself most free. The person most nearly free in such respects would be. familiar with very many widely different... systems. ...We are thus introduced to a new principle of "relativity", which holds that all observers are not led by the same physical evidence to the same picture of the universe, *unless their linguistic backgrounds are similar, or can in some way be calibrated.*" [2]

Whorf's last remark is of critical importance to the mathematical effort to coordinate and make sense of all dynamics in the universe. In his prefacing words, Whorf alerts us that we may be so habituated to a given accepted language that we don't recognize deficits or holes - which may be preventing knowledge awareness. His closing remark about 'calibration' challenges us

to be alert to coordinating all aspects within and among languages, recognizing that any missed relational definitions are a red flag of deficiency.

Humanity's continuing improvement and enlargement of mathematics has been an accepted grail, from Greek geometry to Roman numerals to Arabic/Hindu numerals with zero - as placeholder *and* number - to Leibnitz/Newtonian Calculus, to Cantor's transfinite, to Boole's alternate algebra, to Clausius and Boltzmann entropy, to Dirac's quantum notations, to Feynman quantum chromodynamics, to Shannon's information theory, to Gell-Mann's quarks, to Mandelbrot's fractal equations, to Zadeh's Fuzzy logic, to Prigogine's 'dissipative systems' - and innumerable mathematical inventors and inventions renowned but not named here. All have been additions, embellishments and advancements on the foundations that came before them.

Even so, we are at a loss. Our house of mathematics has added even more: convoluted statistics variations, Abelian/non-Abelian optional frames of reference, the square root of minus-one, normalization tricks that explore relations where chosen parameters are stripped of their dimensionality, string theory and Mbranes, and, in the realms of biology, sociology and economics - compensatory derivatives equations and ultra-fine measurements near the Planck realm that reference global macroscale events.

And still, we are left with unclear and competing notions of entropy, with a basket full of different definitions for 'information'; with no way to coordinate relativity and quantum mechanics, with mathematics that forces unwanted infinities, has no way to cope with division by zero, and carries many unproven essential hypotheses and conjectures as exemplified within the Millennium Prize Problems set by the Clay Mathematics Institute. [3]

Too, in physics, we are able to *describe* behaviors and action patterns such as gravity and electromagnetism, but we have no notion of their causal source - except that we intuit that there should be a unified one.

2. The Challenge Criteria

If the universe is a self-consistent coordinating dynamic on all scales of existence, then a unified field theory or theory of everything - in the way physicists, cosmologists and mathematicians aspire it to be - requires that the architecture and grammar

of mathematics be general enough and adaptive enough to do even more. A schemata that spans all performance processes needs to be applicable to biology, sociology, and economics as well and all manner of entailments (causal connections, both typical and novel) and complicated coordinations, as Robert Rosen [4] suggested. The scope and architecture of the language of mathematics needs to be more general and more flexible than it currently is.

If Thomas Kuhn [5] is correct, then an increasing set of anomalies will press us to look for alternative associations, relations and possibilities of explanation.

From observations, several differential behaviors are of note. One is Markovnikov v. anti-Markovnikov [6] addition of atoms to molecules; sometimes atoms join molecules where an energy barrier is lower, sometimes the lower energy site is de-selected, against the energy rules.

Another broad puzzle is the problem of complexity formation, which robustly occurs in opposition to Clausian thermodynamic entropy, a pure science rule of behavior conventionally taken to be un-opposable. How is it that the universe regularly produces amazing, intricate order - not just simple clumping or crystalline regularity - against the fundamental rule that entropy and disorder must always increase?

Also, how is it that the universe elegantly and pervasively holds atomic nuclear plasmas together with simple handfuls of electrons alone, when humanity has to bring to bear transinitely larger factors of energy to accomplish the same thing, and, for only Planck-length moments of time? What is balanced in the dimensional relations of atoms that we are not duplicating? Is it possible that balancing energy is not the only thing involved in atomic electrons' containment of nuclear plasma? Maybe something in the dimensional structures of the fields and particles is balancing as well. Something we haven't considered yet, because math language isn't highlighting it yet.

Regarding complexity, yes, Mandelbrot discovered that self-iterating equations will generate forms of complexity that match many *patterns* of complexity found in the natural world. But the equations are alternate generators of net-observed patterns, not replicants of the natural generators. Fractal equations can replicate the boundary geometry and imagery of surfaces, mountains, coastlines, liquids, plant forms, fur, and skin textures, they do not do it describing the generative physical internal core relations of 'volumes of water', 'masses of internal stone dynamics', or 'the metabolic relations' *inside* living tissue. Fractal equations are surface relations, not the core mechanisms or actual architectural dynamics of systems. Fractal equations mimic net-dimensional external observable forms patterns, but not the inner generating architecture. We might say that fractals deal with *presentational dimensions*, while leaving *process mechanisms* and other *natural dimensions* unspecified.

Prigogine's 'dissipative systems' too are a step towards describing how in some cases random energy will patternize and induce seeming complex order from non-complex energy radiators, but, the equations do not have obvious applications to the complicated realms we really want to explain.

Yes, we understand that thermodynamic energy is a driver for performance and action. Everywhere we look we see amassed energy doing thing., We even predict an exhausted universe as

energy dissipates and thermodynamic entropy goes to 'maximum'. But what drives living systems into existence against that dictum? An anti-entropy 'force' per Prigogine and Mandelbrot? Or, is it possible there is a different common source for inorganic and organic systems to perform under? If our goal is a *universal* synchronized model, there should be. For in fact, that is exactly what we observe and experience. Non-living and living systems totally and completely engaging together. Maybe we have enough.

Right now the only model we have says there are four forces and a semi-defined process called entropy, a time oriented measure of energy exchange and distribution that motivates process behaviors, which, to the best of our understanding, erodes complexity and drains systems of the empowerment to do things.

So the question is, with all the extraordinary advanced insightful mathematics at our command, and the descriptive companion languages of arrayed humanity, what is missing in our attempts to linguistically match what we observe the universe doing and being? What is missing, such that we can recognize in plain words the things I've mentioned, but fail to bring them together in mathematics, the language we hold most dear?

I will tell you what I think is missing.

3. A Tendered Solution

As incredible and as heretical as this will sound to you, I propose that our current mathematics is a Ptolemeic cobbling of accurate observations, true fundamental relational principles, appropriate definitions, viable operators, and perceptual insights - all put together in the wrong way.

Let me say very clearly, Ptolemy was no fool, though that is how we portray him compared to Copernicus. Neither were Ptolemy's contemporaries, or centuries following peers in mathematics, geometry and world observers. Euclid, Archimedes, Apollonius, Aristotle et al were no idiots. But they didn't stand to challenge the geocentric cosmology. Why would they? It worked. Hypercycles and all. The seasons were measured accurately, the paths of the wandering stars (planets) were accounted for, planting and harvesting were predictably ordered, tools were made, buildings were measured and cities built, cultures invented and economically synchronized, the arts and literature raised the quality of human life. What was to question?

In 1995 two high school students Dan Litchfield and Dave Goldenheim were given an assignment to find a geometric method of dividing a random line segment into n-equal parts. What they discovered was a non-trivial method of partitioning [7] unknown to Euclid et al. Are the ancient Greek geometers any less esteemed for the oversight? No, of course not. They had other methods for partitioning that worked easily and true. Why seek something different when what you have satisfies your needs?

In both these cases, the first part of Whorf's hypothesis holds true. The system a people or culture or scientific community uses may have irksome anomalies or unanswered questions, but the last thing one thinks to do is start over from scratch by throwing away what works, no matter how make-shift or work-around.

In today's phenomenally vast and intricate house of mathematics, that's really the last thing anyone would think of doing.

But we are at an impasse and there really is no other choice. Thankfully, not much change will be needed to reset ourselves on the better path. But it promises to be just as fundamental a change as going from an earth centered to a sun centered cosmology. Interestingly, we only need hold ourselves and our mathematics to a higher consistency in applying existing conceptual and relational notions and definitions.

Where we see commonalities - coordinate them. Where we see relational uniformities - generalize them. Where we define a notion - be consistent in all applications. When we recognize shared domains, manifolds and ranges, even if the scales of diverse phenomena don't immediately seem to match - then modify the basis and scope of the descriptive system to encompass them all. For example: sound, light, radio waves, ocean waves, cosmic pulses, circadian rhythm are all different. No, not really - they are just different sampled phenomena along the single electromagnetic spectrum. In mathematics, we need to do the same sort of thing: generalize the fundamentals and remain consistent in relationship application. For example: a definition currently exists - "a whole positive number exponent is defined as the 'dimension' of its basis parameter", e.g. x^2 is two dimensions of x . But, when we move away from the definitional restriction of 'whole positive number', it starts to get messy and computationally embarrassing - e.g. x^0 , x^{-4} , $x^{2/3}$, or x^{ei} . Especially x^0 .

We grudgingly acknowledge fractal (fractional) dimensions because by common-sense we live in a 3-dimension realm with time being that strange '4th dimension'. We don't experience and find it difficult to mentally relate to, 'partial physical dimensions'. How would one diagram an infinite number of companion 'in-between dimensions' to show them in a graphing of (x,y,z) coordinate space? And even though quantum mechanics is structured as phase-space (3 space vectors pair bound with three momentum (time) vectors), every string theorist and M-branist and hyperdimensional cosmologist and quantum gravity theorist starkly proclaims 10 or 11 or n -teen 'space dimensions' and one and only one time dimension - probably for not having a clue how to keep track of 10 or 11 or n clock-bases at the 'same time' (!). So we ignore the challenges. We make a menagerie of new definitions to avoid disparities. We ignore special conditions instead of understanding and coordinating them.

Even Einstein dropped the ball on this one. Yes, we have his Relativity geometry that added Time to Euclidean and hyperbolic space. But if every whole number exponent is tantamount to a dimension designation, then doesn't $E=mc^2$ tell us that time is *two*-dimensional? And doesn't his description of a gravitational field being tantamount to a continuous acceleration zone also re-express this idea? For what is acceleration, but ' $t \times t$ '? Again, the cross product of *two* orthogonal time dimensions. Simply put, the differential gradient called gravity *is* the resulting field stresses or densities of *two* intersecting/engaging temporal vectors that generate a variable density domain. As I will discuss later, applying the gas laws notion that a reduction in density is tantamount to an increased entropy state, I proffer the notion that all differential polar geometries are the origins of *gradients* and that all gradients are the fundamental expression of entropy 'tendencies' - action inducement zones. The "fundamental" forces are differential (entropy gradiented) fields *first* - being

special scales and shapes - but they are gradients first, *before* they are their own individual type 'forces' and functions.



Fig. 1. Not just Sigma~function, but Gradient (Sigma~function)

Imagine a pachinko machine or a sand hourglass. When every part of the either apparatus is appropriately related, classic statistical gaussian curves are generated. Use bowling balls instead of small ball bearings and suddenly the 'standard curve' becomes a 'standard straight line'. Or, more appropos to the conjecture here of "no gradient, no activity" take the devices into outer space away from a gravity well and no field/force drivers induce activity. In other words, absent a gradient field, or set of relations - such as a teacher handing out a test for students to answer and generate a statistical spread of gaussian rights and wrongs - all the fine statistical math means nothing - mean deviations or all the related computations as well. In conventional mathematic's architecture, we don't consider the *crucial generative components* or get to exploring the critically present and important dimensional and information rich architecture that's really co-present in all motive phenomena situations.

4. Adjacent Entropies - Competing Entropies

A broad characterization of *patterned non-homogeneous dimensional space* is being made here, proposing that 'dimensional architecture' is the first order set of relations which induce/produce all possible subsequent actionforms and forces. The four 'fundamental forces' are variants of that spatial relationship-set. Thermodynamic 'entropy' is a later, a third generation, product of those a priori general mathematical gradient regions/domains, which, to keep linguistically related, but distinguished from thermodynamic entropy, I label as "**troepic domains**". I am placing geometry and distribution relations *ahead* of energy and matter. I am placing the existential presence of gradients *ahead* of the field forces that engender gradients. All fields are entropic domains. Therefore, when local fields and relational gradients interact, what are interacting are troepic/negentroepic potentials. As such, all dynamic systems, (and most notably in tier-adjacent troepic differential distribution domains), interact in such ways that can and regularly do, induce negentroepic complexity. Complexity happens when at least two information/energy/communication potentials exist - each having event probabilities 'greater than zero'. Rather than complexity being the product of complicated higher-math relationships, its primal robust form is simple forced entanglement in companion dimensional spaces.

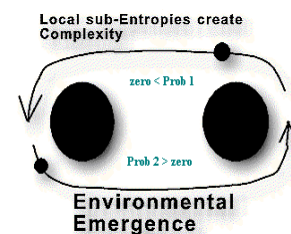


Fig. 2a. Entropic Complexity

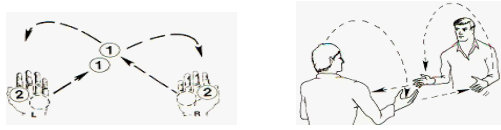


Fig. 2b,c. Entropic Complexity

Imagine two people roaming freely in a baseball field. You can assign an entropy value to their independent distribution in that space. One person is tossing a ball around to himself, using the rule that he cannot drop the ball or let it hit the ground. You can assign an entropy distribution space for the ball around him. He calls the other person to come closer to a reasonable distance (beyond the ball distribution space you just measured), and they have a catch, again not letting the ball wholly get away from either of them. Notice what happens. The entropy distribution of the ball *increases* while the entropy distribution of the two people *decreases* - they became more localized and ordered - more 'complex'. The essential dynamic is now understood as: entropy/communication distribution in one tier of organization can induce complexity formation in the next adjacent tier of organization. This is essential electron sharing which builds complex molecules. This is the mechanism of a formed-complexity called 'game of chess', as long as the players engage in alternating chess-piece moves. This is the mechanism that forms the complexity structure called 'economy' .. mutually engaged redistribution of money to one agent with services or goods communicated/redistributed in return.

Fractal complexity is a special limit form of this defined process-set. The "at-least two" 'greater than zero' probabilities are present in the Mandelbrot general equation format. The rule is satisfied in the equation's reflexive re-iteration process: input to output is one probability and output to new input is the second... both greater than zero. Disengage or take a critically required re-positioning redistribution probability to zero and the entangled complexity ceases.

Several key phenomena arise, as dynamic systems are now understood as local entropic groups encountering and engaging together - in simplistic pairs, or, in more complicated collections. Three diagrams (Figs 3,4,5) illustrate first, an approximation of the competing entropies, and second, an energy/stability schema of complex organizations in general.

The adjacent competing entropies $\{E_S, E_L\}$ have a *set of behavior synchronies* only just now being deciphered and equationed - which ranges of behaviors and local entropic/negentropic gradients states will eventually be described in a single combined equation. Referenced as E_S, E_L :

1. Disengaged E_S, E_L || behave independently
2. Engaged: E_S, E_L || Two entangled properties

For the engaged case, the increased entropy of S imposes decreased entropy of L ; but both entropies now vary directly instead of inversely. Now consider the equation:

$$E_L : \mathcal{R}/E_S$$

where $\{E_S, E_L\}$ are entropy fields in adjacent behavior spaces that are linkable through shared action or communication parameters and agents within \mathcal{R} . Their entropies vary in 3 related ways -

independently, directly and inversely. The $(:)$ symbol is a states equality operator that tells us that as sub-parameters within \mathcal{R} match or mismatch, float, couple and decouple, the adjacent entropies will take one of those three relational states. Notably, the coupled states arrangement establishes a Gaussian bubble of stable conditionally bound behaviors - a new complex entity. This is set forth as a general systems rule for all levels of complexity and organization.

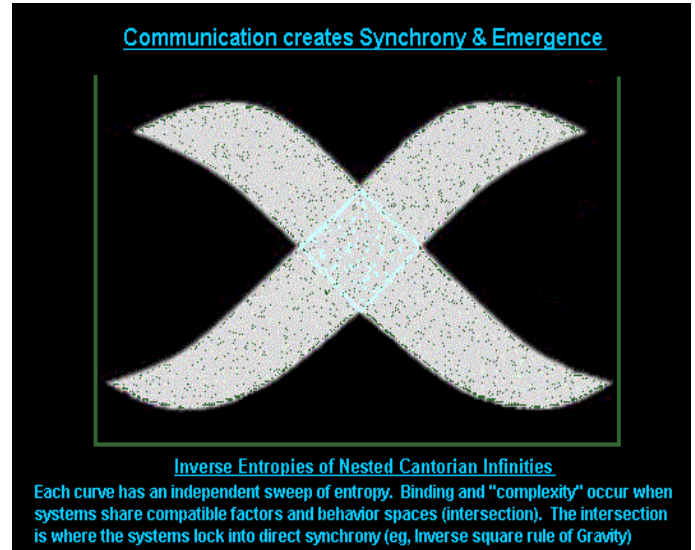


Fig. 3. Engaged adjacent entropies

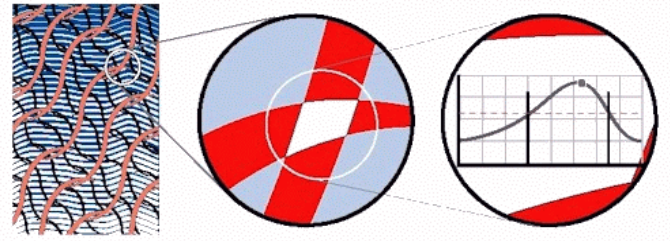


Fig. 4. Image on the right depicts a general schemata of performance health - integrity - applicable to all complex systems, detailed in the next figure.

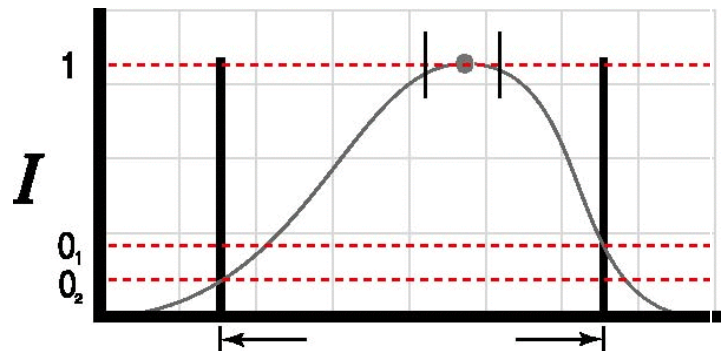


Fig. 5. This graph is an idealization of the health, the functional integrity I , of any given dynamic system. The limits correspond to energy/information a system carries, processes and requires - recognizing minimum requirements and noting that systemic health co-requires not maximizing processing or carrying potential.

5. Adding Apollonius Pythagorus: Diagramming the Family of Fundamental Forces

To continue describing the new mathematics architecture, we have to challenge a deep misnomer - the idea of 'dimensionless numbers'. This is a mathematical schizophrenia rooted in the bias of physical experience. We are creatures rooted in material existence first and foremost, with a thousand generations long mental habit of understanding a 'dimension' as being some sort of requisite 'measure' be it distance or duration or set-content (enumerated parameters list). Well we understand what zero is - it's nothing. So logically if we come across some number - such as the fine structure constant - and there is no material connection with length, width or height, as a mathematical 'point' has no physicality associated with it, by default it is immaterial, 'pure' and unmeasurable ... dimensionless.

But to maintain this view mathematically is to force a continuum discontinuity. Rather, it is critical to let go of that definition artifact. In a universe that is wholly integrated - pun fully intended - every calculus integration and differentiation is in fact a visitation and exploration of information in accessible adjacent *dimensional* spaces in a math *continuum*.

In exactly the same way that we appreciate all energy in the universe is an example and expression of some location along the electromagnetic (gravitational/temporal) spectrum, we must recognize that everything in mathematics is dimensional - even negative and fractional dimensions, even transfinite dimensions and most importantly even *zeroth dimension*.

The new best-math architecture we are building - exponentially tiered Cantorian infinities - requires everything be consistently part of the pandemic plural-dimensional accessible matrix. The key is for zero to be a *dimension* place-holder in addition to being a calculation integer - exactly as we use it within standard math notation already. This completes the continua at every tier and adjacent exponential tier conjuncture. Including dimension-zero as a placeholder finally accomplishes for geometrics, complexity and organization what computation notation-zero did for numerical continuum.

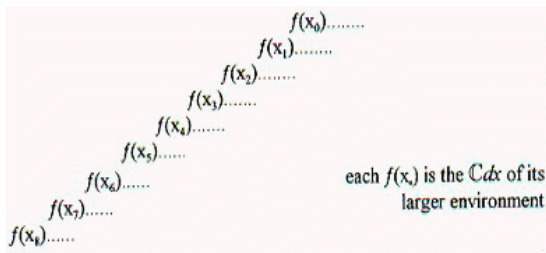


Fig. 6. Nested exponential Cantorian Infinities

We are trying to break Ptolemaic habits here, trying to change, expand and improve our mental maps. $\{Ax^n; Ax^0\}$ The equation form Ax^n defines n as a dimension. Ax^0 , "point", is explicit identification of "zeroth dimension". Both are 'dimensional expressions; both have data 'content'. For example,

$$177x^4 + px^3 - 8.4x - 5 = 0$$

is a 5-dimensional equation, not 4D (even though the highest exponent is "4"). It should be written (or at least thought-noted)

$$177x^4 + px^3 + 0x^2 - 8.4x^1 - 5x^0 = 0$$

Currently equations are grammatically written and thought of as "N" dimensions (highest valued exponent), yet function as "N+ 1" dimensions - to umbrella zeroth place held dimension locus. It is now exponentially diagrammed:

The transition to the new paradigm won't be easy. Its base form can be represented by this simple diagram, but in practice it will take the invention of new notations and operators to work, compute and navigate there. One of the problems is that current notation doesn't give us reference points to quickly identify which basis numberline we are in. We are used to staying in one basis domain, but information and data looks different if you change your 'frame of reference'. Curiously, 'information content' can also remain unchanged against identical transform operation. Currently for example, we assume that when numbers, values, dimensions are coded or reduced to zero, that all information is lost. That may not be the case. Think about writing something on a sheet of paper, that you 'normally' view in its flat two-dimensional presentation. Now look at the same page 'edge on' (which is tantamount to differentiating an equation). Suddenly the information is 'gone', when you've taken the information content 'down a dimension'. Physically, you know how to 'reconstruct and retrieve' the original written image. Mathematically, the potential is there to retrieve what was dimensionally re-coded into compressed format. Too, the same information may 'look different', depending on the dimensional frame of reference it is mathematically observed from or in.

Standard calculus integration and differentiation changes the dimensionality of expressions. That is trivial. We understand that we do calculus operations in order to navigate among correlated dimensional spaces. But do the same operations on certain trigonometric forms such as a simple sine function and something interesting occurs. You generate isomorphic 'information content' simply transformed by 90° .

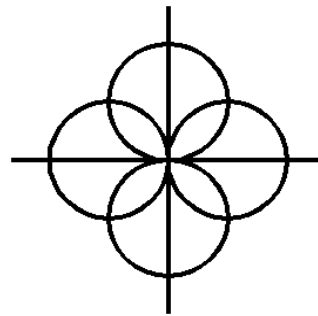


Fig. 7. Calculus integration duplicates information, not just transforms it.

In some intrinsic relationships not previously appreciated or evaluated, information is simultaneously variable *and* invariable; with the option for us that non-identical math expressions may otherwise have information qualia/content that is different in presentation but not essence; with the option that presentation information has different examinable qualities/quantities when accessed in different dimensional frames of reference. In continua domains there are quantum mechanical ways to enstruct and deconstruct, to encode, decode and re-code - mathematical and contextual information. A fully dimensional singularity can

'contain' all the information of a 15 billion year old universe, if you unpack the content in just the right way.

Simplistically, when navigating dimensional space, keeping track is only moderately difficult in adjacent exponential tiers. When you want to correlate exponential tiers that are extended and further away, a new math-GPSs will be needed.

Now at least we have a foundation of an expanded and relationally correlatable mathematical architecture that can address relationships and ideas that we were unable to even speak about before.

The prime essential is this: that the architecture of mathematics have no domains that are inaccessible to one another. Limits, walls, barriers of one sort or another may be locally definable, but in the overall, we must appreciate mathematics as a house of information. All-inclusiveness mandates accessibility - whether by transforms, substitutions, interpretations or alternate frames of reference, for describing expressions or equation groups/ relations.

With limited space remaining here I will highlight topics discussed elsewhere. [8]

Pythagorean trigonometry, key to our current math architecture, is so habituated that a critical geometrical relationship was missed. As cosmologists talk about symmetry breaking as the mechanism for dimensionally unpacking the universe it is assumed that circular, radial $r = k$ and conventional trig relations are part of that process. On review however, it is noted that a zeroth dimension point, a one dimensional line, both contain the dimensional element point where the symmetry breaking might have initiated from. An $r = k$ defined circle however does not. It is generated from a focal locus that is not a member of the representative structure 'circle'.

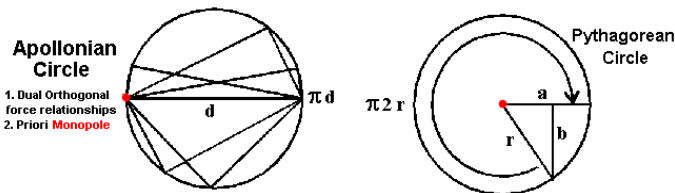


Fig. 8. Breaking symmetry must retain originating loci within the unpacked forms - e.g. the originating point is a member of the generated circle-form circumference, per Apollonius. The originating point is the end locus of 1D line; a circle is the collection of all right angle triangles leg intersections. A full correlated geometry of physics relations results.

Figure 10 diagrams natural symmetry breaking - natural dimensional expansion. Additional findings explored and developed by the author elsewhere, [8] including: symmetry breaking as the creative locus of 'relational negative'; expanded probability theory that includes place-held probability counts; a conceptual challenge to Godel's Incompleteness Theorems (Figure 9); Stochastic Logic - that unifies Aristotle, Boole, Fuzzy Logic and quantum mechanical logic; an alternate rendition of waveforms that suggests certain information transmissions are possible that are impervious to noise; a possible geometry conservation principle that underscores fundamental particle pairs in spite of non-equal mass equivalence; a hypotheses that excessive determinism

is counter-productive to the dynamic endurance of systems in open environments and function spaces.

6. A Schematic Diagram of the Entire Universe

Finally, and hopefully of most profound use, is the extended modeling of the dynamics and relations that have been described here (Figure 10). Essentially, at the beginning of the universe, the originating forces each performed along the guidelines of Entropic Gradient Relations. Gravity - as the product of interacting time dimensions - acted out the essential role of spatially consolidating energy and particles. As a primal product of the geometry of the universe, gravity is not associated with a particle, it is pure field-construct. This is why gravity is measured everywhere, even freely and capriciously roaming beyond black-holes. If gravity were a particle entity (as conventionally modeled) then it would never escape its companions - but it does, so it cannot be. Then the sister forces, using the same entropic principle, formed the essential particles. Recombining and engaging at different scales, all diversity built from there, but all of it, no matter the forms or complexity or convolutions or organization and relational entailments, are tether to freedoms of function space and entropic gradients interacting together (Figures 11 and 12).

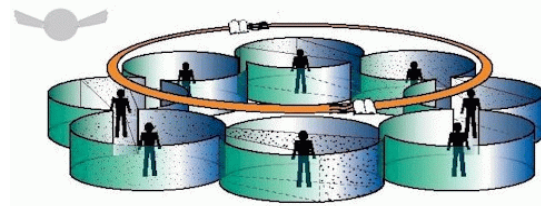


Fig. 9. Accessible information transcends Godel limitations

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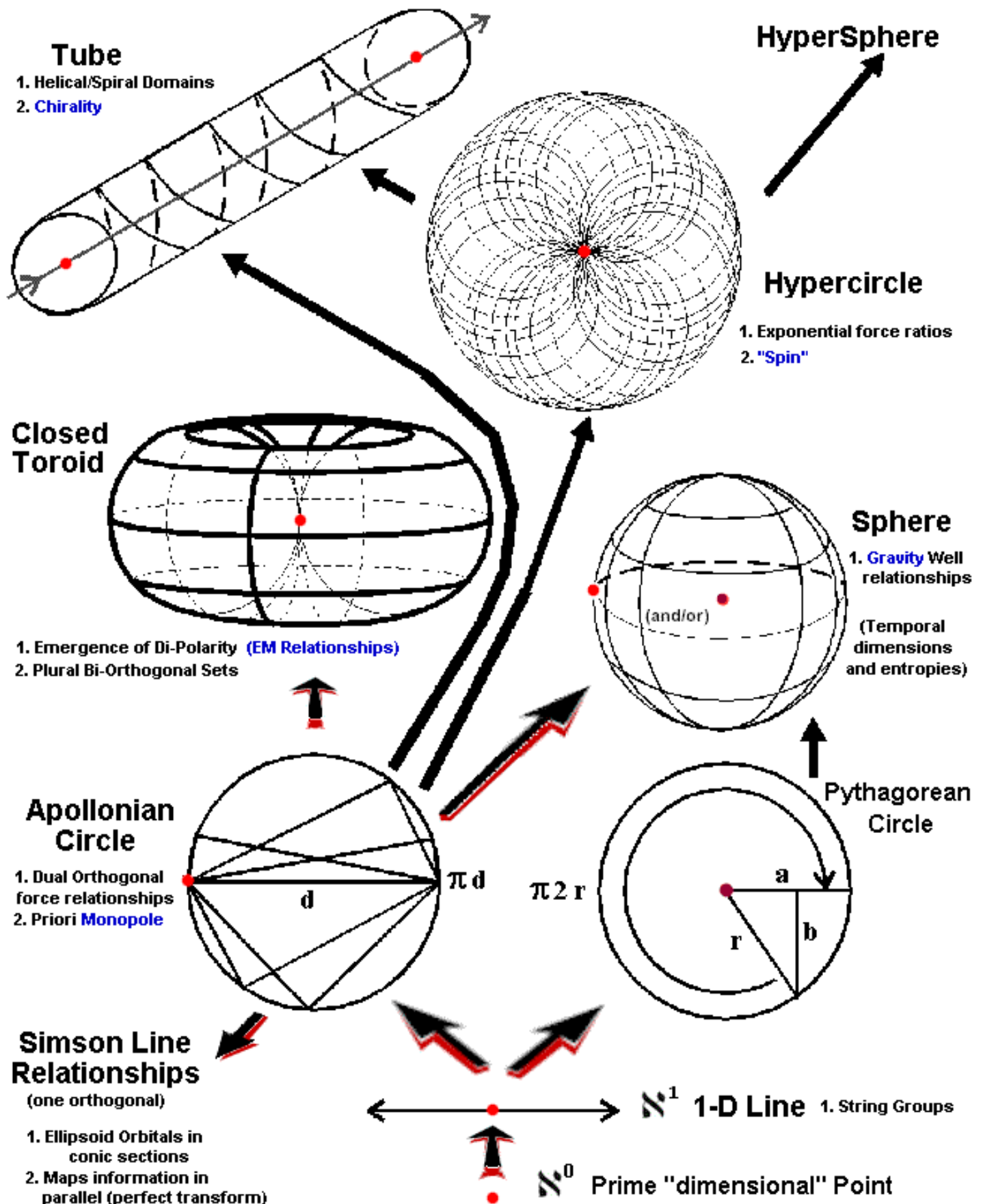


Fig 10. Completed Geometric Schemata

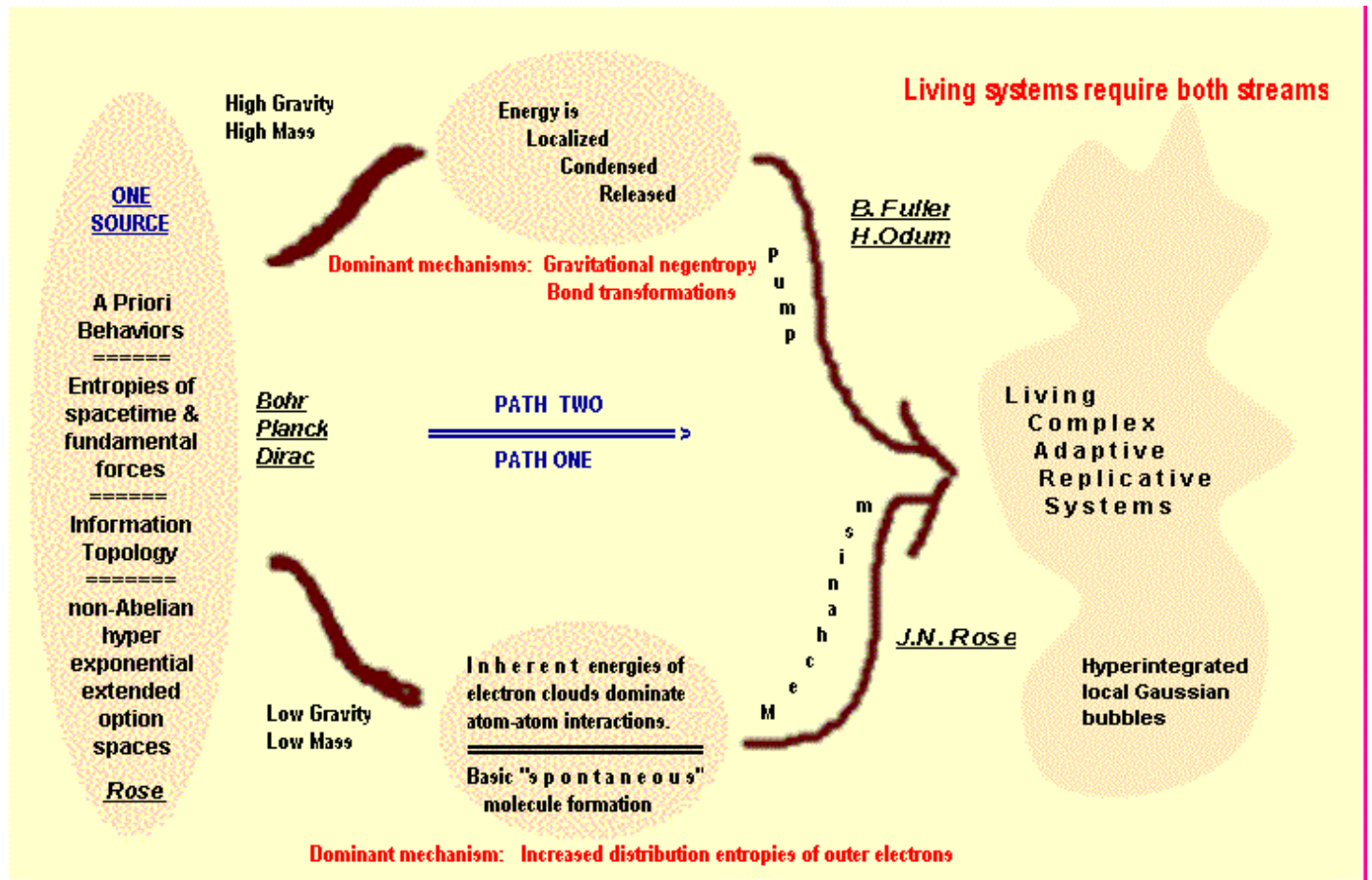


Fig. 11. Gravity Entropies & EM Entropies build complexity

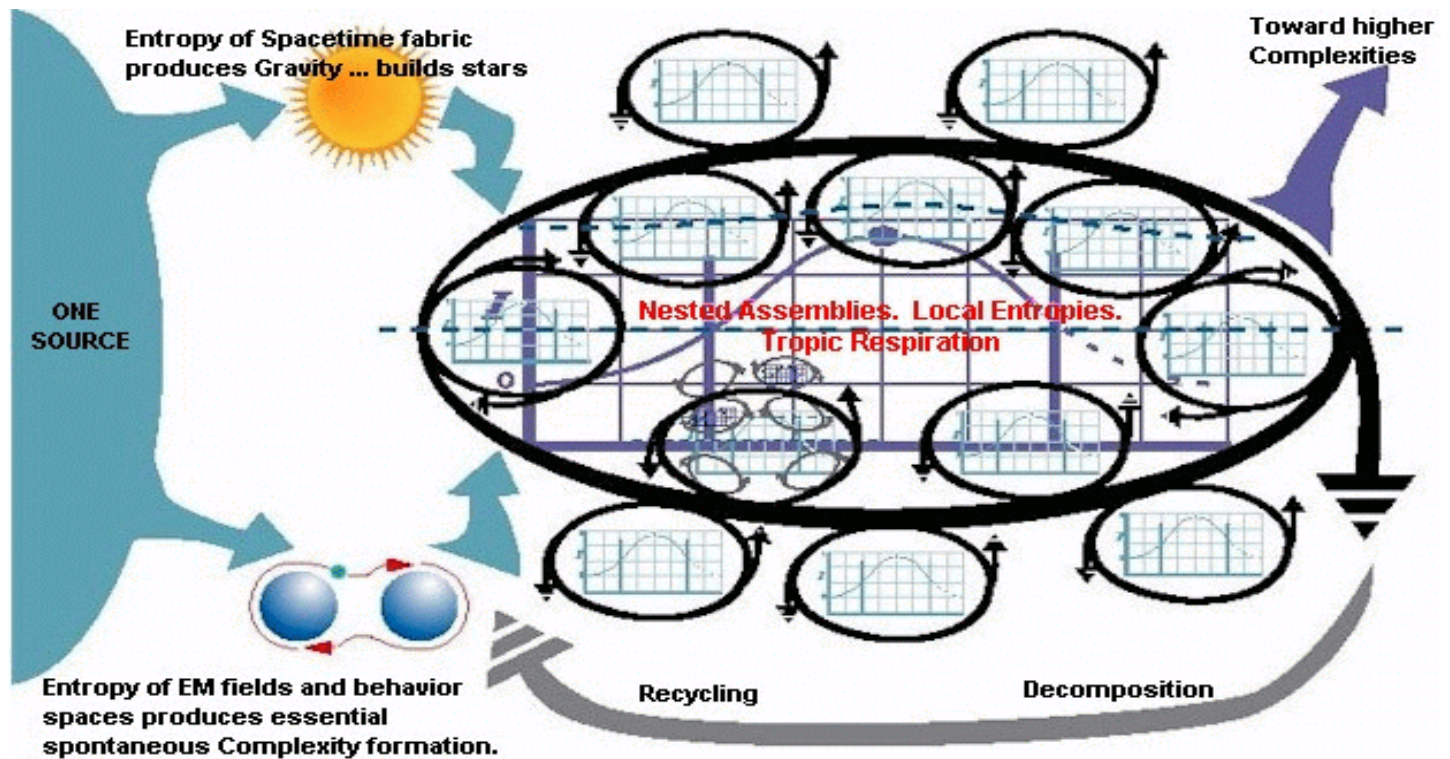


Fig. 12. The Universe: the Entropic Performances Model