'Each point of space is a world in itself.' *Monadology, Leibniz, father of relational space-time.*

INTRODUCTION: RELATIONAL SPACE-TIMES, A THEORY OF EVERYTHING.

Absolute Lineal Space-time & Relational Cyclical Space-time.

In the understanding of space and time, there have been always 2 'explanations', which are in fact complementary: The external space-time in which we exist, and the internal vital space and time cycles of which we are made.

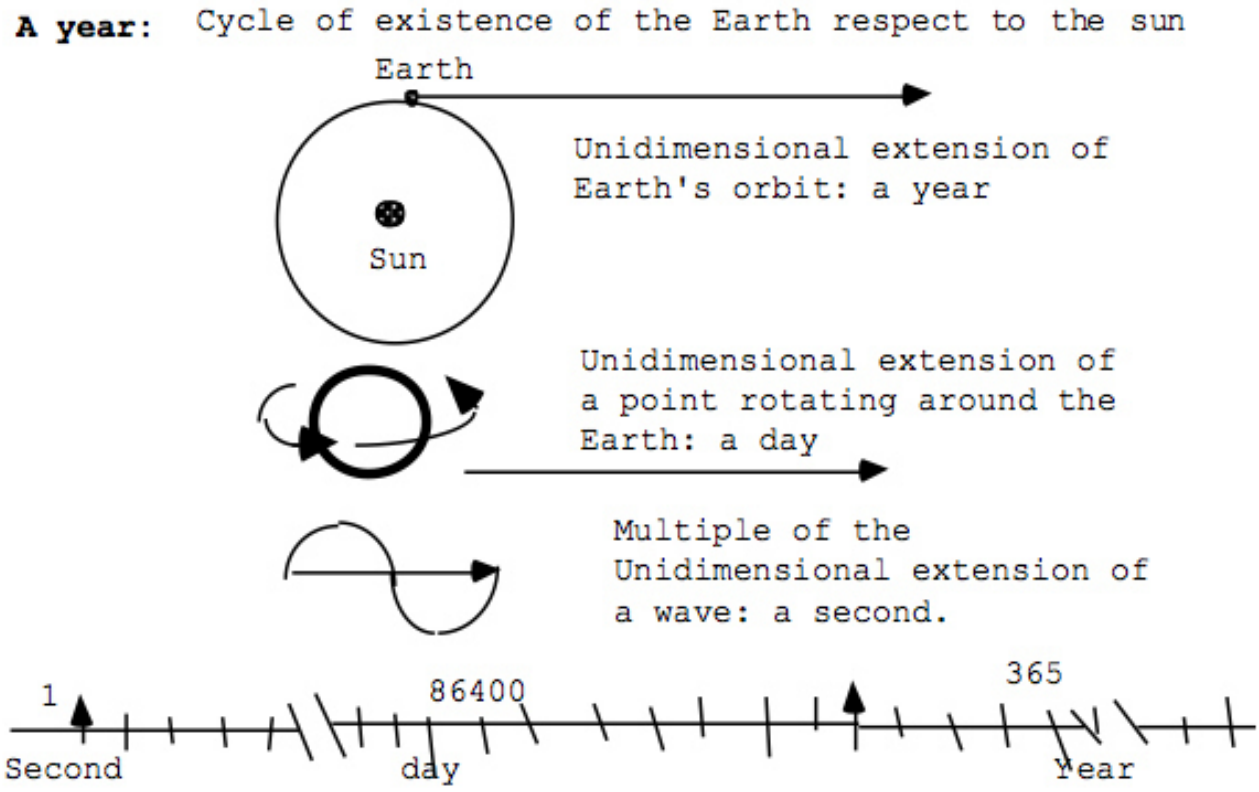
External, Absolute Space and Lineal Time.

What physicists call External, Absolute Space-time that is supposed to fill up the entire Universe, is a simplification of all the spaces and times of the Universe put together into a single space and a single time. As such absolute space-time is an abstract artifact, useful to measure with clocks and rods, time durations and distances. Galileo, Newton and Descartes invented it to facilitate the practice of science, which constructs machines and measures the motions of weapons with accurate distances, projecting the changes in location and motion of beings into an abstract mathematical, Cartesian graph made of:

- 'Absolute, infinite space distances', the X-coordinates, a continuous line of length, L, (extended to 3 lines in volumes). This absolute Space, **S** or **L,** has a definite

lineal, Euclidean form, and so we use to represent lineal space or lineal speed the symbol, **L, or L^3,** which is the magnitude symbol used in Physical sciences.

- Absolute time, the Y-coordinates, also a continuous line of height, obtained by uncoiling and reducing all the cycles of all the clocks of time (an hour, day-rotation, a year-orbit or any of the infinite cyclical clocks of the Universe of different form and frequency) into a single extended timeline, called 'duration'. We shall use for this absolute, lineal Time duration the symbol **T,** also the magnitude used in Physical Sciences to represent it**:**



In the graph, mathematical physicists developed a Universal Cartesian graph to facilitate measure. So they equalized all time clocks with the mechanical time clock, and as times went by, they confused this artifact with reality, forgetting its abstract nature, which reveals nothing of the cyclical closed nature of time cycles, its

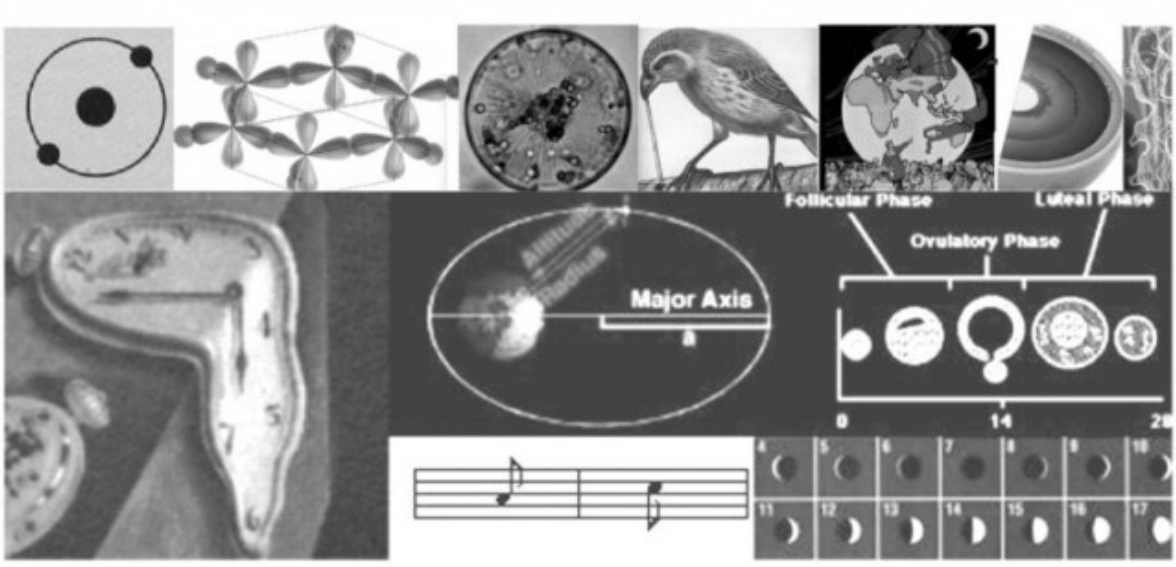
forms and functions.

We shall thus call this absolute space-time, ***ST,*** *capitalizing its 2 lineal parameters.*

Problem is the absolute graph of space-time is not real – nowhere in the Universe we find a 'structure' in the background that is continuous, lineal and infinite.

Space-time seems in fact to be the sum of an enormous number of 'quanta of energy', and 'clocks of information', which in the latest formulations of space-time are either described as closed strings (diminutive clocks with a tic of 10^{-43} sec.) and lineal ones (diminutive lengths of 10^{-33} m.), but which in our scale of size is obviously made of an enormous numbers of entities that occupy a vital space and last a finite number of time cycles. Thus we talk also of:

<u>Internal, Finite, Vital Spaces with Motions and Cyclical times, of which all species are made.</u>



In the graph, all systems of nature are made of time cycles that enclose a vital space with motion, creating a

fractal Universe of infinite cyclical frequencies of repetitive actions, in which systems absorb and emit energy and information, repeating their motions to ensure their survival beyond death. The sum of those repetitive space-time actions (ab. Time cycles) through the entire existence of a being creates its worldcycle, which substitutes in a model of relational space-time, the simpler worldlines of absolute ST physics. We could then consider the Universe a zero sum of worldcycles, made of space-time actions that exchange energy and information between infinite space-time beings.

Time is NOT only a de-formed lineal parameter used to study motions of space (4D metrics). While there is nothing wrong with the use of lineal duration in studies of spatial speeds and motions according to the Physical equation, t=s/v, the true error of Physicists is to reduce stubbornly time to such a concept; to concentrate only in motion studies, without much interest for all other properties of Time, which is by far the less understood concept of physical sciences.

<u>The 3 arrows, dimensions, motions of temporal change.</u>

Time is change, hence motion. But Time is not only lineal motion is also cyclical motion and motion with form with information.

The first property, time as change, is s a logic and bio-logic property, which relates time to 3 dimensions of:

1.1.1 Past (entropic, dead change).

1.1.2 Present (repetitive change).

1.1.3 And future (informative change).

Thus lineal motion is entropic, expansive, dead related past change. And this is the type of change physicists

study, departing from its lineal uncoiling of time.

The second property of time, as cyclical motion, is a close concept to those used in physics, when they study rotary motion, frequency and angular momentum. Even though physicists do not related it to time. It is in fact, the second, 'present', repetitive type of time-change. So we shall consider the different forms of repetitive change in physics - cycles of motion, waves – forms of present time, in as much as they seem not to change by repetition, they seem to keep a present state. So time cycles are studied as rotary motions, angular frequencies, disks, cycles, vortices – all of them varieties of cyclical times; as the word time is 'ONLY' by dogma, a lineal parameter of motion T=s/v (or the corrected version of Einstein, which however stems from the same Galilean concept).

Finally the third property of time, its form, is essential to the fundamental structure of the Universe, which can be defined as a fractal that reproduces in-form-ation. And we shall consider it the 3rd arrow of time, or dimension of future, related to life processes, and creative processes. So matter curves into cyclical vortices of information, called galaxies, and black holes and solid states, and life increases its form with time, from an entropic age of energy to an age of information.

So we define also 3 dimensions of time, which we shall call 'ages', even though we shall see each of them relate to the 3 dimensions of space by a fundamental symmetry, and write the fundamental equation of cyclical, relational time ages as:

1. Past entropic Space-Time > Present, steady state of space-time > Future, informative space-time << Death ≈ Entropic Space-Time.

The reader should notice that those phases of a time cycle

close into a zero sum, as death equates the arrow of life, and its 3 ages. So we can also write it as:

1. Young-past, energetic age > Present, adult age > Future, old, informative age << Death ≈ entropic time.

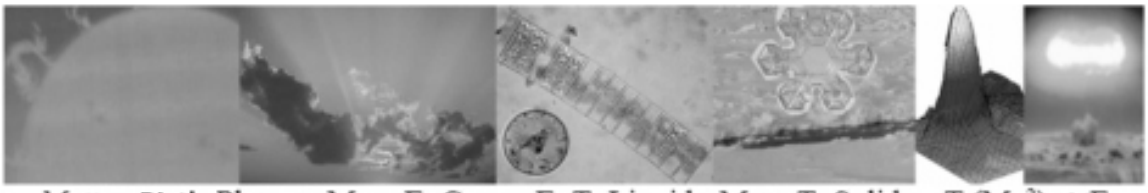
Further on, as all cycles enclose space, breaking it into an inner and outer region (Fundamental theorem of knot theory), we can talk of space-time cycles, even though time is the dominant factor.

And so this simple equation of the ages of a space-time cycle is destined to become to XXI century science what Einstein's 4D metrics was to XX c. – the fundamental equation of relational space-time.

The world cycle of life and death.

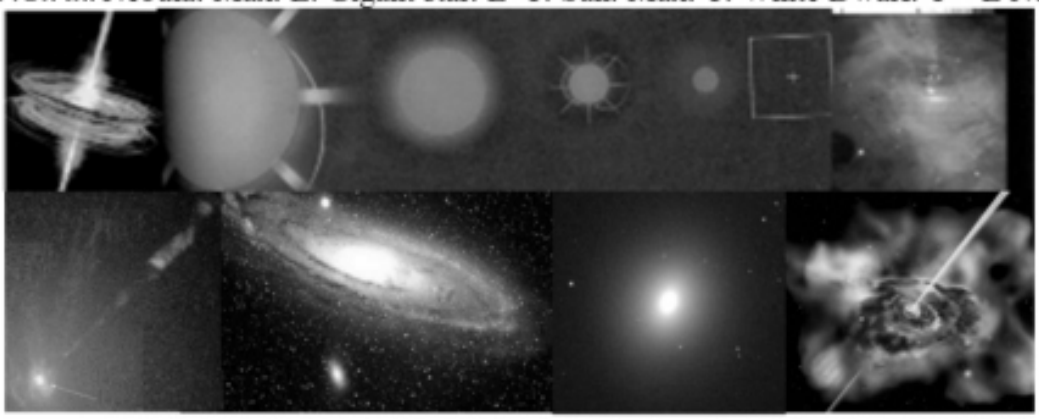
Age of Energy, Classic age of Harmony, Old Age of information, Explosion and Death:
Human: Youth (0-20a.); Maturity (20-40); 3rd age and death (60-80).

Culture: Epic, Lineal Art; Realist, Classic Art; Baroque Art. War.

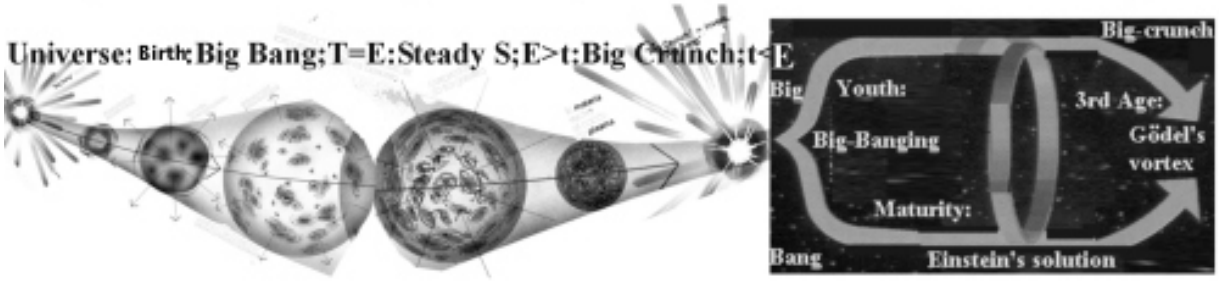


Matter: **Birth:** Plasma Max. E: Gas E=T: Liquid Max. T: Solid T (Mc^2) <<E

Star: **Birth:** Nebula. Max. E: Gigant star. E=T: Sun. Max. T: White Dwarf. T<<E Nova



Galaxy: Jet Max.E: Irregular. E=T Spiral⇔Elliptic. Max.T: Globular T<<E: Quasar



In the graph, some fundamental worldcycles, which expand the concept of a worldline of 4D metrics, to a worldcycle by adding new dimensions, from past to future (which we shall call ages, as we are more interested in its qualitative nature, and treat them all within the metrics of the 5th dimension that encompasses the entire evolution of

the Universe, across its scales of size and its speeds of time). We see in the graph 2 human, sociological cycles, the human life death cycle and its parallel social life-death cycle of civilizations shown in the ages of art before war-death; the states of matter which are the thermodynamic ages and its gaseous, liquid and solid state; the ages of stars and galaxies which end in an ultra solid black hole state, and the similar 3 ages of the Local Universe described by the 3 solutions of Einstein's 4D metrics, *which must be considered sequential time solutions, not as physicists do 3 'parallel Universe', but rather as Dirac thought and the cosmological constant varying in 3 phases* proves, the 3 ages of warping of space into information, which complete the Universe's time cycle.

The parameters of worldcycles: the wider concepts energy and information

Of similar interest for the understanding of those worldcycles is the concept of energy, in physics, which roughly includes both concepts of relational space-time, the energy and information of a system (since in physics 'all is energy', that is the energy of rotary motions is also included, and the energy of formal location is included as potential energy).

Thus since energy in physics is the integration along a path of space-time (or speed) of the momentum of a being: E $\int p=mv=1/mv^2$ we can represent the worldcycle by changes on the energy and information of a system, considering a general rule of the inverse properties of space(energy) and time (information), eq.1.2:

1.7 Worldcycle and its ages:

∫œ = Max. Energy (young-past age) > Energy = Information (adult age) > Max. Information (Old age) << Energetic big bang (death): Max. E.

This description of the worldcycle of a system, in 3 ages is the fundamental law of all time cycles of existence, and will be paramount to describe any physical, biological or organic system of the Universe.

As life is a travel through two scales of the 5th dimension, between birth and extinction, through those 3 ages of maximal space-motion, Max. Se, (youth), reproductive balance Se=To and old, informative age, Max To, join then back to the ST=i-+1 cellular plane.

Information≈ time cycles vs. Energy≈ Space

It is now easier to understand why we relate energy to space-speed and information to time cycles.

Since a conservative field does not consider that work is done when a rotary point returns to the beginning of the cycle, it follows that time cycles do not vary the energy of the system, a property which will latter allow us to deduce the immortality of the Universe (as no loss of energy, hence of entropy exists in a Universe made of worldcycles).

On the other hand, information, form in action is measured by the frequency and form of those cycles. And so in a perfect lineal motion there is no information. A property which will allow us to understand the non-local infinite speed of invisible gravitation.

In the graph below we observe that process and write the equation of existential algebra that describes it in the simplified notation. The reader could notice even if it does not fully grasp what we just explained, the enormous enlightenment that the understanding of the paradoxes and inverse arrows of scalar space and cyclical time, and the flows of energy and information between planes of existence, should bring to many themes of science.

So dynamically all can be resumed in a concept: the world cycle of life and death which all systems follow as they use their topologies in an orderly fashion:

Now once this is clear, the metrics and partial equations and dynamic analysis of motions through those world-planes, will be able to describe an enormous number of phenomena of which perhaps the most important s the world cycle of life and death:

i-1 (seed) <∑i-1 (fetus)>i (birth)< Max. Ei (Youth) ≈ Se=To (adult iteration)> Max Oi (3 informative age) <∑Ei-2 (death).

If he is able to go through the initial difficulties of understanding the primary concept and paradoxes that structure the Universe, he will learn about a revolution of thought, unlike any other in modern science since a century ago the understanding of the 4th dimension and the paradoxes of quantum physics, many of which find an explanation in the metrics of the 5th dimension.

It is now clear what we mean by an immortal Universe, and the null energy spent in time cycles, which become a zero sum that appears also as such in geometrical, simpler physical systems, where there is no work≈energy change when a cycle closes itself.

In the larger view of relational space-time this is also truth: when the cycle closes, the total energy-information of a system returns to a zero sum.

The Metrics of the 5th dimension.

But if there are infinite time cycles in the Universe, each one with a different closed form enclosing a different space of a different size how can we order them?

This is what the *metrics* of the fifth dimension do.

Since as it happens, *there is an order when we compare the size of beings on one side (The Se in the equation) and the speed of its temporal cycles (The To),* according to a paradoxical law:

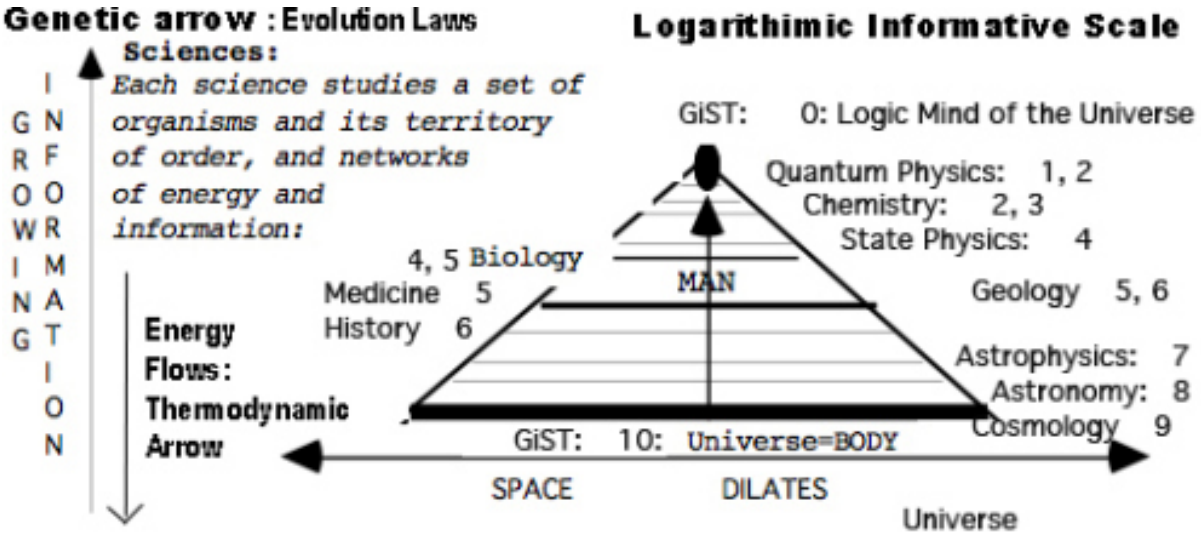
Systems that grow in spatial size paradoxically decrease the speed of its temporal clocks and hence its volume of form (and its speed, processing information).

In the graph above we can see those metrics; the larger systems (the galaxy) run slower time cycles than the smaller ones, the human i-scale, which runs slower than the cells in the right, which run much faster its atomic clocks. This law explains in decametric scales (the graph is taken from Eames' film 'potencies of 10'), the structure of the Universe, and so it is the key to unify all sciences.

Clocks of time run at different species according to size, being faster, hence processing more information in smaller planes, explains an infinite number of facts, from the Chip evolution (Moore's law, if you half the size which we do every 2 years, the chip runs twice more time-cycles or Hertzs of potency), to genetics (smaller systems store more information in the frequency and form of its cycles, and that is why genetics codes slower humans and not the other way around).

Thus we talk of a 5th dimension of relative planes of space-time, which if we consider the human scale, the referential plane of existence of the Universe, Si, group in

nesting larger and smaller wholes and parts: Si±4:



In the graph, the 5th dimension and its fundamental logarithmic scales.

We can see how each science studies a different range of species according to their co-invariance in the 5th dimension (max. Size = Min. Cyclical Time Speed). Thus we can build a Theory of Everything based in the Metrics of the 5th dimension.

So we order them with a new dimension, the Si 5th dimension of relative S-ize, and i-nformation. The Si logarithmic 10^{10} scale that goes from the simplest Si=1 force scale through social groups of $\pm10^{10}$ elements that become units of a bigger whole (so 10^{4x10} gravitational strings across 4 dimensions of space-time create an electromagnetic wave of force, 10^{10} ties of atoms create a DNA cells, $10^{\pm10}$ cells or stars an organism or a galaxy, and around those logarithmic numbers all kind of varieties of species with lesser or larger 'fractal points-particles' create new worlds.

1.10 U+1: Si+1 ≈ $10^{\pm10}$ Si

The formalism of scalar space-times describes the Universe as a Fractal System of Spatial Energy and

Temporal Information, extended through a 5th dimension of scales in which all those systems obey the same=isomorphic sets of mathematical and logic laws – the formalism of the 5th dimension. In each of those scales species change in 2 parameters, its 'spatial size' and its 'speed of informative clocks'. And both parameters are inverted.

Thus we can refine the 'equation of relational space-time' ∑Se x To=Ra, where Ra is any relative constant relationship or ratio between both parameters that make up the Universe.

And write it as an inverse function of the properties of its 2 formal motions:

1. 2. Max. Se (maximal Spatial energy content) = Min. To = Minimal Temporal Speed of Information.

From where we deduce the Metrics of the Fifth dimension:

1.2.1 Se x To = ST±4

This equation, whose first member is, similar to the equation of relational space-time, now establishes a constant quantity, ST, the co-invariant value of the product of the inner speed of time clocks and size in space of a certain family of species, across multiple relative 'scales' of absolute space-time, ST±4, whose combined value is the same, but *have different sizes in space and speed of times. A fact, of enormous importance to understand the scalar, organic structure of the Universe, and the relationships between the microcosms and macrocosms, which can relate to each other, through their co-invariance of size and informative speed of time-cycles, but are essentially different, to the point we can talk of 'different discontinuous planes of space-time', and 2 opposite gradients of increasing size and diminishing information, as we change the ±n logarithmic parameter*

of those scales.

And so we come to the realization that the external space-time of the Universe is not a single continuous space-time

Thus the 5th dimension is the dimension of spatial size and speed of temporal clocks. Both parameters are inverted: when systems grow in size the speed of its time cycles slows down and vice versa. Smaller clocks tick faster as it happens in chips, particles or life metabolisms. Or in terms of those invariant, isomorphic scales:

That is, the smaller we are in space (and hence in energy content, since space stores it in the vacuum) the faster we move, perceive and rotate our clocks of time that store and process information in the frequency and form of its cycles. So from black holes that rotate at light speed in its event horizon, to quantum charges, to chips that calculate faster as they increase the frequency (hertzs) of its time cycles to all kind of clock-like, cyclical vortices, from Planets (Kepler's laws) to air and water vortex whose equation (VoxRo=K), from metabolic rates much faster in small rats than elephants, the metrics of the 5th dimension, defines the laws that rule the Universe.

Since it is precisely the co-invariance of both parameters what allows 'species' to travel through those scales and exchange energy and information through them. So species can be born as fast-evolving seminal seeds in the i-1 cellular or atomic scale (baby black holes of maximal attractive power, seminal organisms) and devour energy and information from the environment or the mother's womb so fast that they soon become a mature, larger organism emerging in the relative human i-scale as babies, or feeding on a planet or star in a Nova explosion that gives birth to an adult black hole.

The metrics also explain the organization of systems

across several scales of size. As most of them are sustained and coded by the higher information of its i-1 cellular/atomic scale (genetic, chemical information), stored in the vibrational clock-like circadian or atomic cycles of its diminutive faster clocks; and are themselves 'cellular units' of the slower life-cycles of its societies or in the case of matter, the slower geological or galactic cycles.

In the graph we see 3 of such scales, the human relative i-scale, and on the left the larger scale perceived by men, galaxies with a slow clock-cycle of billions of years, and the DNA, spiral clocks of genetic information with a iterative, reproductive cycle of nano-seconds. It follows from the multiplicity of clock-like cycles stores in the structure of beings, that the fifth dimension describes a Universe made of relational clocks of time and fractal multiple, vital energetic spaces.

Since beings ARE made of 'clock-cycles of time' that last a finite duration, their world cycle or life-death cycle (no longer a world line as in 4D models, since the 'new dimension of scalar information' bends those lines up and down in the life cycle that starts and ends in the i-1 seminal atomic scale where systems are born and return dissolved after a big-bang death). Thus it proves right Leibniz and Einstein who studied a Universe of multiple clocks of time, and gets away with the Newtonian Absolute concept of a single mechanical clock, an artifact of measure, used to equalize all the clocks of the Universe, which physicists latter confused with the entire clock cycles of the cosmos.

There are so many new avenues of knowledge opened by the 5th dimension that at the beginning if you explore this blog all will become a bit overwhelming and confusing. So be patient.

Systems are 'organic'. They are NOT only made of a single

plane of existence, a 'solid' head/particle and a 'solid' body/wave.

As it happens systems do have a structure of 'smaller systems' and they form part of bigger systems.

We are made of vital spaces, broken by time cycles.

The Bio-Logic content of Time cycles.

In that regard there is an important reductionism, beyond the deformation of the form of time cycles, caused by the preponderance of absolute lineal space-time and physical analysis of time durations as a mere parameter of space, which has increased enormously in the XX century, since the publication of Relativity and the Minkowski 4D metrics, the elimination as a fundamental characteristic of the Universe of causal, logic processes, biological, evolutionary, survival reasons and sensorial, informative whys, to the nature and purpose of time cycles.

Since the spatial character of time is secondary to all those properties. Physical reductionism thus have impoverished enormously the understanding of fundamental phenomena related to time, such as:

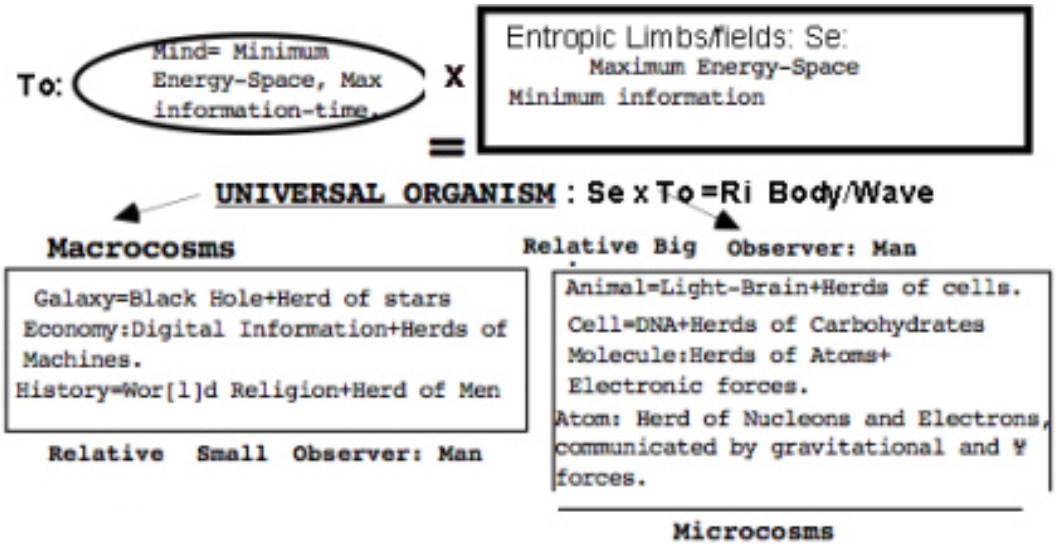
- The discontinuous, discrete, sequential, NATURE of time, as opposed to the continuity and linearity, and equality of space quanta.

- The existence of 3 phases/horizons/ages/states/dimension to all cycles, the past-beginning, steady-state/present/maturity and 3rd/informative/conclusion age of the cycle.

They form together a world cycle, which is the 'advanced' version of the worldlines of 4D Relativity metrics, *as* we ad now a new dimension give the fact that time is no longer a

line but a cycle. We call this dimension created by the cyclical nature of times, which have different speeds and durations for different systems and must be order together, the 5th dimension, whose metrics will be the essential element to describe the Universe of multiple time cycles, and the different sizes of the fractal spaces they enclose within those cycles (Jordan theorem: a cycle breaks space into an inner and outer shape).

We are made of vital spaces that last a duration in time. Thus it is in the understanding of all phenomena related to time, information, cyclical patterns, past-present and future causality where relational space-time analysis vastly increases the knowledge of human sciences. This means the 4th paradigm of Science will bring back organic insights on the structure of the Universe. As both a bio=logic and mathematical model of relational time and fractal space beings:



The true meaning of vital space and cyclical time, is the construction of vital, bio-logical and physical systems

In the graph all Universal Systems are complementary forms made of a vital space with capacity to move, 'S', which makes up most of its energetic fields/limbs and reproductive body/waves and a sum of time cycles, 'To' that regulate its ACTIONS through its clock frequencies, stored in particles/heads.

Both together form 'beings' of relational space, time, where the To, 'informative', head/particle and its clock-cycles, dominates the whole system.

This dual, organic principle, structures all physical, biological and social systems of the Universe in a given *plane of space-time*.

It is called the complementarity wave-particle in quantum physics.

It is called the duality body/mind in philosophy.

It is a fact of biology where all organisms do have a DNA nuclei or head.

It is a fact of evolution, where biological systems which have more brain that stores and process faster temporal cycles which accumulate its information in its form and frequency, dominate larger, slower species (mammals vs. dinosaurs, man vs. mammals)

It is a fact of technology where chips control machines. And it happens in its binary languages, (also discovered by Leibniz) made of Os and |s.

It happens in societies, where the informative caste in control of the verbal, legal and digital, financial languages of society controls the 'reproductive body of workers' and the energetic geographic plane of space or nation of the civilization.

We thus talk of 2 symbiotic elements in all systems of the Universe made of temporal cycles with form, To, and spatial bodies and limbs larger in space but slower in its time cycles.

Yet this symbiotic dual structure proper of all systems of nature is only possible thanks to the metrics of the 5th dimension, Se x To= Ra that harmonizes both systems.

We thus say in 'technical language that the morphology of all systems of the Universe is an isomorphism of To:heads/particles and Se: limbs/fields.

Energy is lineal because the line is the shortest distance between 2 points; and so it is also the fastest energetic movement. Information has cyclical forms, because cycles store maximal information in minimal space.

For example, a human body and a machine body, a weapon, should not have anything in common; but if we observe the morphology of both, it is clear those morphologies correspond to the generic morphology of all energies: they are big, lineal systems that move in space.

So our limbs are lines extended in space like a ‘missile’. On the other hand, our eyes and brains are smaller and cyclical, like the cameras and chips that act as information organs in machines, ordering ‘bodies of metal’ with digital information. Let us consider the properties of those 2 elements, energy (bodies, fields) and information (particles, heads) and some of its species, in life and metal:

Moving Energy	*Reproductive Information*
Lineal, spatial, big, moving small, rotating, still.	Cyclical, temporal,
Formless, continuous, simple discontinuous, complex.	Form-ative,

Field, body, male, weapon, female, coin, chip.	Particle, head,
Iron, oxygen, carbon	Gold, silver, nitrogen
Protein, lion, shark, death	DNA, human, dolphin, life.

We could summarize the formal and functional differences between energy and information (organs) in a morphological equation:

Maximal Space = Energy = Minimal Form=body
Vs. Maximal form = Information = Minimal Spatial extension=head

For example, the chip becomes smaller as it evolves into a better brain. Every 2 years it doubles its capacity to think, as it dwindles in size. Such process follows a generic law of evolution I call the 'Black hole Law', which computer scientists know as the 'Chip paradox' or 'Moore Law': maximal informative capacity= minimal spatial extension.

The reason is obvious: to think, to calculate you have to communicate in-form-ation, forms between elements of any informative system. The smaller the brain, the faster the communication that takes place within that brain and the faster you can calculate and process information in a logic manner.

As a result of those morphologies we classify as energy or information organs not only carbon-life organisms, made of energy (bodies, food) and information (brains, eyes, senses, worlds), but also other beings and atomic species, even 'deconstructed organs'.

And so indeed we are made of vital, spatial energy, Se and clocks of time, which carried the form, the information of the universe in the frequency and form of its cycles. So we

could write a generic equation for all beings:

1. 1 $\sum Se \times To = Ra$ (Constant being, made of repetitive actions, Ra, of space-time).

Thus a being of 'Relational space-time', $\sum Se \times To = Ra$, is the sum of a series of repetitive cycles of space-time that we shall call actions, through he exchanges energy and information with its external world, which we can define, following the tradition of classic physics, with its wealth of knowledge about the external Universe, absolute space-time, ST.

The Function of Existence

How can we translate in time, logically≈qualitatively and space mathematically≈quantitatively the 2 fundamental properties of time cycles expressed here: its cyclical 3-dimensional ages, past, present and future, which together create the duration of the system; and its biological nature, as expression of the cyclical actions of survival of its species?

To that aim we shall define the fundamental function of the Universe, the 'fractal generator of relational space-time', which we shall call the 'Function of existence', Œ that we write in its simplest form, latter elaborated in higher detail with an acronym:

1.4 $Œ: E \times i = ST$

This simplified conceptual-mathematical expression means that the 'spatial energy', or inner vital space of a

being, and its internal time cycles, which carry the information of the being in in its form and frequency, or I; that is the internal energy and information of a system, is in balance with the external absolute space-time of its world. Since we constantly exchange energy and information through our actions with that external world, with whom we try to be in balance.

Here the concepts of 'energy' and 'information' are loosely used as in common language, in the sense of our expression 'I don't have enough energy and information≈time to do this'. And intuitively refer to the 2 components of all systems of nature, the cyclical particles/heads of information and energetic body/waves of a system, which absorb its quanta of space-motion and its bits of information about the time cycles of external species from the Universe.

All together now: The function of Existences: Œ, its Worldcyle integration and derived 'forces and action': the mathematic functions of 'Relational' Space-time.

Let us resume all what we have learned of this new, enlightening way to understand the whys of the Universe.

The 3 elements of T.O.E 5D scales, fractal space and cyclical time are united through the existential algebra of the Generator Equation of fractal space-time and its integration through all its duration time for a being by its worldcycle. So we shall now consider

Indeed, all fractals despite its complexity can be reduced to a simple generator equation that through iterative reproductions in space, feedback cycles and enlargements and reductions in scales can generate an enormous amount of varieties. Thus if the Universe is a fractal of

species of cyclical time and scalar space, there must exist a Generator Equation of the Universe and all its existences in space and time. And we shall call such equation the Function of Existences.

How can we find it? Easy. As we have only 2 formal motions in the Universe, space, which we can perceive as lineal motion or fixed distances and time, which we can perceive as cyclical motions or dimensional forms. And both can transform into each other ad eternal, we can write the equivalent to the fundamental principle of science – the principle of conservation of energy – extended to cyclical time-information:

1.2.1 'All what exists is a fractal system of Energetic Space and informative time that trans-forms into each other ad eternal: Œ: Es x It = ST±n'

This simple generator equation, Œ, which we write abbreviated as E x I = ST, is the function of Existence, not surprisingly as all what 'exists' is self-similar to Energetic space and Informative Time, written as ExI=ST. We can play with those terms. To exiST that is, to be made of a spherical/cyclical particle/Head To, connected to a body of Energy and Information, ExI, which interacts with an external absolute space-time, ST, To<∑exi=ST…

To Exist, exchanging energy and information, between two poles, the field of energy and the head of information, E< = >I, in feedback cycles that transform one into the other. To ExiST, as a system of internal vital space and cyclical informative Time, ExI, in an external absolute space-time, ST… to exist, in a field of spatial energy, Se, absorbed through a /particle head of temporal information, To, combined in a reproductive body-wave: Se<STr>To…

To exist through a young, energetic age, Se, absorbing information, till reproducing both in an adult balanced

steady state, STra, and then evolving further our energy till exhaust all information in an old age, To, to die exploding in a big bang of energy, Ste>STra>sTo<<Se, to exist with different constant, balanced proportions of energy and form, of space and cyclical time, S x To = S/T=V, to have existential speed, to have a momentum of existence, constantly exchanging energy and information with the external Universe, Mv=St…

As the reader can see, the simplest generation equation, the feed-back cyclical equation of Spatial energy and temporal information, S<= > T, has infinite varieties, and can generate all kind of topologies in space, events in time, across multiple scales of reality to create all the dual field>Particle momentums and amplitude/frequency waves of the Universe.

The derivative actions and worldcycle integrations of Existential momentum.

In that regard, to quantize and systematize the function of existence beyond its philosophical meaning, we shall use the fundamental operators of Existential algebra and the 5th dimension, which are beyond simpler ±social groups, and x/ operandi, the integrative and derivative functions, which for that reason have been the fundamental operandi of modern science. In the section of mathematics, we will indeed, consider the now obvious reasons for the advanced student, on why mathematical systems, despite its complexity are reduced as the best linguistic mirror of the Universe (but by no means the only one, as 'the languages of god are infinite') to a few, dual, inverse operations, which respond to the inverse, dual properties of lineal space and cyclical time. However, the 5th dimension's fundamental operandi are derivatives and integrations. And so we consider 3 fundamental functions of existence:

1.4 Œ: The existential momentum or function of existence proper, Se x Ti=Ra in fractal space-time or S/T=V in absolute space-time. We choose the expression momentum because of its physical meaning. M(t) x V(s) = P, is indeed the main existential function conserved by physical systems, whereas a Mass or charge is a cyclical clock-like vortex of accelerated forces (Equivalence Principle of Einstein), and V a reproductive wave speed or particle motion in space, Hence M(t) x V(s) = P (œ), from where:

1.6 ∂Œ / ∂(a,e,i), Œ= ∑œ, ∫ Œ ds = u:

There are derivative actions, or *existential forces,* which are small 'parts' of the total existential momentum, which in physical systems writes, ∂p=F.

But for more complex systems, are better described by its qualitative meanings. 3 of those actions are related to smaller planes of existence, hence they are truly calculated with ∂ functions, as they imply a minute 'step' and use of the energy and information of the function of existence. However the 2 final vowels, o and u, reproduction and universals creation, are parallel ≈o actions or integrative of multiple similar individuals into social universals, ∫o=u. And so we shall use different operations. The creation of a Universal is in that regard, an integration in space of individual quanta.

But if the creations of Universals is an integration in space, when we integrate in time all the actions of a being, from birth to extinction, ∫∂(a, e, i, o, u) we obtain a worldcycle of existence, the fundamental complete function of a being. And indeed, in the same manner, the integration of the momentum in physics gives us the energy of the system, in the more general relational space-time model with application in all sciences, the integration of all the actions of a being along its lifetime give us a composite

function of energy and information that varies in 2 phases of the cycle:

1.7 ∫Œ dt: The life cycle that transforms the energy of the system into information, form, through 3 ages, energetic youth, reproductive maturity and informative old age: Max E>e≈i> Max. o (We use constantly both Ti, and To, for 3rd informative, old age, and cyclical time).

- The death cycle that after all energy is exhausted, explodes information back into energy completing a zero sum total cycle that maintains the Universe immortal. And conserve the systems by reproduction in the e=I adult age of Max. momentum (as E x I is maximized when E=I).

It is important though to understand that all those functions must be studied both in qualitative, logic and quantitative, mathematical terms, and the bias towards one or other perspective depends greatly on how close the functions of existences we describe are to the human Si-scale, as we observe by mere anthropomorphic subjectivism, higher qualtative properties in closer species to us, and more abstract, quantitative, objective properties in species further away to us, Si-2,3,4.

We have shown thus with those examples, that the laws of the Function of Existence, of Fractal, internal space-time and its actions in the external space-time are truly the proper departure for a Unification of the Laws and space-time events of all systems of the Universe, despite the apparent difference between physical, biological and sociological systems.

Thus the generator equation of the fractal Universe, in any of its infinite varieties and iterations, the function of existence, E < = >T defines an immortal Universe made of infinite worldcycles of life and death, of energy

transformed into information and vice versa ad eternal, across an infinite relative number of scales of size in space.

Since, we shall also see in our study of astrophysical worlds, that the equation of unification of charges and masses, makes each atom self-similar to a galaxy in a Universe in which scales can be repeated as in any fractal ad infinitum; where all scales suffer ‘big-bang deaths’ of energy E<=>M(t) (Planck’s notation) and vice versa, the expansive accelerated space between galaxies collapses into vortices of galactic mass, as it happens in atoms that emit expansive electromagnetic waves, which collapse into electrons and quarks inside the galactic atom.

Space-time cycles as bio-logical actions: the program and function of existence

It is precisely this internal, vital role of those time cycles of each species of reality what abstract, absolute space-time lost. This role (cycles of feeding on energy, of gauging information, of reproduction, etc.) is actually the 'why' of those time cycles, the 'why' of the existence of those beings, the 'why' of their actions, the *ultimate why and program of survival of the Universe, which becomes an abstract description of how motions, speeds and lengths/measures*.

The very concept that species are programmed, logically and causally by their inner clocks (as computers are programmed by their logic cycles, measured in frequency Hertzs), which determine its cyclical actions in the outside Universe, which in turn define their ‘existence’ through their sum and order in a world cycle from birth to extinction, from life to death, completely disappears.

Since those space-time cycles are truly the essence of the existential actions of all systems.

Systems exist by means of internal time clocks that gauge and process information, as computers do, to enact time cycles in an external Universe.

The main purpose of those cycles is to absorb energy and information and iterate the system beyond its finite time duration, to ensure its survival.

Thus the vital, Darwinian purpose of reality disappears in all sciences and species, where lineal time imposes its simplification, especially in physics.

Other sciences such as biology and engineering do still keep some understanding of this essential working of all systems, in which circadian or mechanical, logic brain/chip cycles program the existence of the system, which will exchange energy and information with the external world, in the biological case, to ensure the survival and reproduction of the species, in the mechanical world, to perform tasks for which humans design those machines.

In the physical world the 2 particles, quarks and electrons, of which all physical systems are made, also 'gauge' information with its mathematical geometric action-reaction physical cycles and absorb energy from gravitational and electromagnetic fields, and they also 'decouple'≈ reproduce into new showers of particles when they feed on enough energy, so they ensure 'mechanically' the survival of its form beyond a possible big-bang death into pure energy without form.

And this is exactly what living beings do through their worldcycles of existence: feed on energy, gauge information and reproduce. Because regardless of difficult themes of consciousness and freedom, particles,

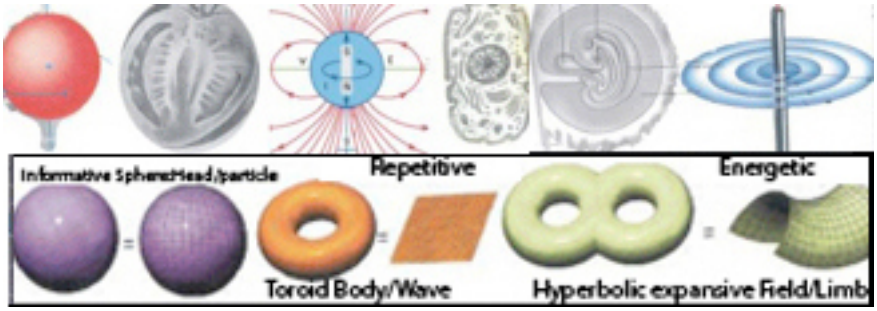
organisms or machines made by human who perform those cycles of energy and information, and reproduce (or are reproduced by human factories) survive in the future and those who don't do not survive.

In that regard, we can define based in the 3 fundamental functions of relational space-time, the function of existence≈momentum, the worldcycle of energy and information that integrates it along time, and the derived actions in space of that function, fundamental law of behavior of all systems:

1.8: Any function of existence will try to maximize the momentum and duration of its worldcycle, by maximizing its actions of existence and minimizing its expenditure of energy.

And this is the final element for a fast overview of relational space-time: the understanding of a program of existence for all systems, based in its actions, which however, despite all the efforts of the system to exist forever will finally end up in a zero sum.

The isomorphic laws of all systems.



A final element is needed to reorganize the disciplines of science in the new frame of the scales of relational, fractal space and cyclical time, along the 5th dimension: the concept of isomorphic laws of nature.

That is, the laws derived from the properties of space and time, the space-time actions of its species and the flows of energy and information between the scales of the Universe.

Those laws describe the existence of all beings, as dual systems of space and time (1st set of isomorphic laws), made of 'bidimensional membranes of fractal space', (2nd isomorphism) which live through the 3 ages of life-death worldcycles (3rd), exchange energy and information through ST±4 universal planes (4th), by means of the 5 existential actions (5th isomorphism). And those 5 isomorphisms follow a series of quantifying ratios, constants, proportions and social numbers, which are also common to all species.

Thus the proper way to show the pantheist Universe and the unity of all its space-time systems, is by deriving the particular laws of each species from those isomorphic laws, themselves derived from the fundamental dimensions and properties of scalar space time.

In the graph, we see the 2nd isomorphism, which defines all systems as ternary assemblies of spherical 'particles/heads of information', toroid reproductive waves/bodies and hyperbolic energy fields/limbs, which respond to the 3 canonical varieties of 2-manifolds (membranes, sum of fractal points, cells, atoms, heads... whereas the points form a plane with minimal height, X>Z>>>Y, as the paper or computer screen that carries the information of this text) Since the sphere is the geometry that stores maximal information in minimal space, the hyperbole, the maximal space of minimal information and the toroid a mixture of both.

Thus since there are only 3 topological varieties of 2-manifolds, the evolution and organization of systems is restricted to those 3 'diffeomorphic' organs, which become

the 3 components of all systems: STe<STra>sTo, themselves symmetric to the 3 ages/dimensions of time (entropic, past fields/limbs; repetitive waves/bodies and future informative heads/particles, which become the logic, future guidance of the system).

Thus the symmetries of space and time explain the bidimensionality of such system and have multiple applications in all forms of nature ($2^{nd} \approx 3^{rd}$ isomorphic space-time symmetry). The example shows how rich in meanings and explanations of reality is the complex version of relational space-time embedded in those isomorphisms, which are the second, advanced course of this web on relational space-time (3^{rd} and 4^{th} lines that study them in detail and then each fundamental species of the Universe through those equal laws).

Leibniz and Einstein vs. Newton and classic physics.

Why we talk of relational space-time? Because as we shall see soon, the existence of infinite such cycles, with more or less duration, from those so simple and fast that we can see its traces in space-time directly (rotation of simple particles, frequency waves), to those so long in space-time that occupy the entire duration of a galaxy and perhaps a Universe (big-bang, quasar space-time cycles, explained by the 3 'ages' NOT parallel Universes of Einstein's space-time equations, the young big-bang age, steady state, mature solution and 3^{rd} Godel's vortex age), requires its 'ordering' and classification, according to its size in space, speed in time and synchronicities with other space-time cycles. And this webs a relational world, in which infinite fractal space-time cycles relate to each other into simultaneous, non-simultaneous, synchronous, inverse, past to future, future to past, present-repetitive space-time

directions.

It is thus a wild world, but once the reader understands the basis of its classification, he will finally understand the harmonies of the Universe. This, Einstein knew it, when he realized that time cycles run at different speeds. Then he notices 'I seem to be the only physicists that thinks there are multiple time speeds in the Universe', and then quipped, 'Leibniz is right but if so we need to restart western science from scratch'. So he settled with a simpler concept the 4D metrics of space-time.

We did not. So we shall introduce a full mathematical new model of relational space-time, the fractal Universe, the metrics of the 5th dimension, the non-Euclidean concept of points as time cycles and the Non-Aristotelian logic of the 3 arrows of time that move in each fractal cycle, first towards the future and then towards the past.

Do not be scare. It might seem complex at the beginning, but this revolution is rather like the revolution of Copernicus, which at the beginning with less accuracy than the complex epicycles of Ptolemy, simplified enormously the Universe, by properly putting the place of each planet.

Relational, cyclical space-time and the metrics of the 5th dimension will seem to you at the beginning, as Copernicus simple cycles seemed to the high popes of astronomy of the age, schooled in the complexities of Ptolemy extants and epicycles, probably too simple. It might seem as Copernicus cycles were till the refinement of Kepler's elliptical orbits adjusted it, less accurate than the complex metrics of Einstein's 4D or the certainly far more difficult Hilbert spaces and probability operator of quantum physics, which are still valid but we shall try to explain in its paradoxes from a simpler perspective.

But once you start to understand that ‘god is simple but not malicious’ (Einstein), and realize that relational space-time, NOT only applies to physics, but mainly applies to biology, sociology, human life-death cycles and solves the ultimate existential questions, the whys of the Universe, you will no longer shun off those texts. Specially if you are not a stuck up physicist of the old school.

Relational space-time is a deep concept of philosophy of science, which we formalize for the first time in the history of science in this site, but has a long tradition in the history of mankind, which always understood time as a cyclical process.

Since we connect it with modern science, we rather consider its modern formulation. As such cyclical relational space-time was first enunciated by Leibniz, with his ideas opposed to those of Newton about a Universe in which beings *were made of a fractal part of vital space and lasted a quantity of time cycles,* as opposed to the 'abstract' artifact developed by Descartes - the Cartesian graph, in which beings were 'put' to measure its motion in space/time. The first mathematical physicists, such as Kepler or Newton, made a 'Kantian error' of thought, confusing the artifact – the mechanical clock and the Cartesian graph, in which they uncoiled and equalized all cycles of reality with the absolute.

Thus Kepler said: the Universe is a clock and god its clock maker who have waited 5000 (biblical) years to find and intelligence like his, who understands his work.

So those earlier scientists affirmed that the Universe was similar to a pen and paper 'Cartesian Universal graph', or background absolute, continuous Space with a single Time dimension of 'lineal duration', obtained by uncoiling all those infinite time cycles of which we were made (circadian biological cycles, mass and particle rotatory

cycles, stars and planets orbital cycles, cyclical actions of feeding, perceiving, reproducing which construct the beats of the Universe), and equalizing all of them with the cycle of the mechanical clock.

The graph and Kepler's concept shows truly the core problem of Physicists worldview: it makes them confuse their artifacts with reality. So if Kepler thought the Universe was a clock, now it is fashionable to think it is a computer. And if he considered that science consisted 'only in making measures with clocks', which extracts all the properties of it worth to know, now most of the scientific community just feeds data in computers and models reality with the mind of the computer.

Leibniz was much more profound. He realized we were made of spatial vital energy and temporal clocks that lasted our life-death cycle. As when we say 'I don't have energy and time to do this'. We are *made of energy and time in perpetual cyclical motion and we do actions of energy and time, which is truly the substance of the Universe*.

But Newton with the help of the P.R.ess at a time when England started to build his empire with clocks and cannonballs and take over the world of the industry of information won the public battle and Leibniz who had also discovered calculus was accused of plagiarism and left behind in Brunswick to die alone, when his employer the Duke was chosen king of England, banned by Newton.

In this manner a false but 'simpler' easier to grasp and use for measure, the Cartesian Universal background continuous space-time was born. And the true essence of the Universe, to be a 'game of vital spaces with quanta of energy' that performed cyclical motions called time cycles, through the actions of infinite beings was lost. Leibniz died poor, alone and forgotten except for his calculus 300

years ago.

Now run forward 200 years more. The abstract Cartesian Universal background and the mechanical single clock, whose ticks were elongated into space according to the formula, V=S/T was all that humans wanted to know about time cycles. And it worked to do measures of motion in space that lasted a time.

It didn't work at all to understand the nature of the life-death cycle, the main time cycle of humans, neither of the longer time cycles of evolution that changed the internal form of the beings not only its external motion. But it worked very well to enthrone the mechanical clock, motion, weapons that moved and needed to be calculated in their speed and aim (Galileo was a maker of ballistic instruments, hence you learn the v=s/t formulae with cannonball trajectories).

But alas!, quantum physicists suddenly found that space was made of 'quanta of energy' in motion, they called H-constants. And those H-constants were 'actions of energy and time cycles', measured with frequencies.

And they *condensed, forming particles according to Heisenberg's Principles. So we were all made of 'plankton' of light condensed into particles of cyclical time and energetic motions, electron nebulae in perpetual motion, masses rotating, quarks pulsating*.

And then Einstein found that in different places of the Universe time clocks ran at different speeds, so there were infinite time clocks.

And yet because physicist as Feynman put it 'never ask the why' and they had been for 200 years using a single clock and a continuous space-time graph, they didn't change its

Newtonian model. Einstein said 'Leibniz is right but if so we have to start the scaffolding of science from the beginning'.

So for 100 years more, we were left with a model, absolute space and time, which we all knew it was wrong, but it worked fine to do measures with clocks. Problem is it didn't explain much of it, just measured the hows. And that is where we are still, because most physical 'big science projects' are today no more than industry of machine measures.

Now, this previous paragraph will surprise the reader, despite its obviousness (there are time cycles everywhere that close a vital space, and so they are the essential unit of bidimensional space-time), since nobody really studied them in great detail, till I focused my research a couple of decades ago on the study of time cycles, starting an astounding adventure of the human mind which has yielded new fields of knowledge in all sciences.

In that regard, the study of internal, vital spaces enclosed by space-time topologies, and space-time cycles performed by all kind of systems in the external absolute space-time is an entire fresh field of inquire about space and time, grossly neglected by science.

Why? The main reason is the predominance of physical studies on absolute space-time, which has become due to that 'absolute' term the only space-time physicists care about. And this has been especially harmful for the scientific understanding of those time cycles, which are 'equalized' and reduced to 'intervals' of that infinite line of time duration, void of form and purpose.

Indeed, the problem of using only an absolute timeline of infinite ‘duration’ to represent all the cyclical time clocks of the Universe is that we simplify all those time cycles

into a single time. Thus on one hand, we simplify its curved forms, and on the other, we omit the specific finite duration of all those time cycles, which differ for each species.

Hence we eliminate the information of the worldcycles of finite duration of all those Universal species, into a single 'whole' timeline.

In doing so we loose an enormous amount of relevant in-form-ation about those species, which is carried in the frequency and form of its time cycles.

Finally we deform the geometry of time, which becomes lineal. The result is the shallow understanding of time cycles in physics, which uses a timeline basically to measure motions≈speeds on space, through the Galilean formula, T=s/v: Time=space/speed on space. The more sophisticated but similar Einstein's formula does the same. So this limited timeline of physics makes time merely a parameter of space-speed, the so-called 4D of space.

A timeline looses the knowledge of the different real 'durations', different forms and different speeds of each of those cycles by adding 'ad infinitum', their 'frequency".

A new paradigm of science. The whys of Vital relational space-time vs. the hows of mechanical clocks.

In other philosophical texts I explain that science, as journalism does on any news, has asked first about the Universe and its meaning. So the who, when, where, how and why, are also the ages of science. Firs the who was

answered mythically: ‘God created the Universe’, and this was the age of Abrahamic religions; then the when shuttered the who, as evolution theory and the age of the earth broke the 5500 years of Mr. Kepler, and this was the age of evolution. At the same time, the where, changed, shifting away from human anthropomorphic points of view, to the Earth, then to the sun, then to the light-space of the galaxy (Einstein’s fixed c-speed) and now we shall change it even further, to an scalar Universe of infinite ‘sizes’ in fractal space, and ‘cycles’ of time speed.

All those previous phases thus gave us hows, and science is full of hows, specially physics, which basically is built as an experimental endeavor of collection of data and trial and error of equations to fit that data, refined as time goes by. We shall though achieve the ‘existential whys’ derived of the nature of time cycles and the fractal spaces and space-time actions and ‘survival strategies’ of the systems created with those cycles. It is thus an entire new adventure. If we escape the Abrahamic, mythic age, we could talk of a new age of science; after the when, where and how, the 4th paradigm is the age of the why. And this means the ‘measure obsession’ of the how age, which we shall enclose in the why, the quantitative part, which by the principle of correspondence will fit within the 4th paradigm, is however less important than the logic why.

This is let us be clear from the beginning a paradigm where Time becomes more important than space. If in the how age of mathematical science only, geometry and space became the king, and time was reduced to a single dimension of lineal duration as a parameter of space, in the 4th paradigm, the king is the logic, biologic and topologic time cycle. Topology substitutes geometry as it has motion, and bidimensional surfaces which are ‘cycles’ become the fundamental new ‘points-parts’ of reality (here we can connect in the deepest mathematical analysis with the worldsheets of strings, but we shall take many

‘months’ before we get into such detailed studies). What matters now is to understand that in relational time-space, time matters more. Space becomes then both, a mere ‘sheet’ of the flow of time, and specifically a relative ‘present’, slice of it.

We have advanced those concepts which are more proper of the philosophical sections of this blog, because humans are dogmatic by nature, and physicists as the high popes of sciences, and 4D metrics, which has reached an enormous sophistication in its analysis of lineal durations and motions, will easily dismiss this effort as Newton dismissed Leibniz. They should not. Relational space-time immediately illuminates all other sciences, specially history and evolution, social sciences and biology, and within physics, cosmology. It requires still some work to be done in the more complex, specialized systems of physics. I have not had time enough to complete the translation of the more complex parts of it – string theory, quantum physics and all those parts of science which are not fully within the realm of human perception will for that reason not be included beyond some logical understanding of its details. The basis for generations of future researchers though will be lay down by the time I finish, the year I plan to be working in this blog (2016).

The most important element in that sense, of relational space-time is the understanding of the life-death cycle of any system of the Universe, through the concept of a worldcycle, a cycle that through the 3 dimensions of past-present and future and any manifestation enlightens the whys of all sciences (for example, gas, liquid, solid state in thermodynamics; epic, military, sensorial and baroque, informative art in the collective subconscious mind of a civilization born and killed by war; or I, II and III horizon of a species with increasing information, such as man in the Australopithecus, 500 cc, erectus 1000 cc and sapiens 1500 horizon; if we were to consider 3 examples of the 3

great realms of scientific disciplines).

And to fully grasp those cycles, the reader has to break with the concept that time is only the 'full worldline', the full lineal duration of a space-time cycle or life-death cycle and depart from geometrical representations of time into a full logic understanding of it, more akin to evolutionary time, to classic philosophy of time as change. That is, it has to realize that Physicists only study a very specific limited type of time-change, with a very specific type of formula, v=s/t or the similar metrics of 4D, and that is fine, as long as the reader does not stretch as physicists do their concept into philosophy, with the absurd idea that entropy=lineal time=past-death expansion is the only future of time; that their abstract timeline is the only absolute time tic of the entire Universe, etc.

Of course, Copernicus, Leibniz and this author will have a hard time, and probably will die before anyone recognizes his r=evolution of times. That is granted. But the reader should use his intelligence before authority accepts the unavoidable advances of science, to understand himself as a species made of time clocks and vital, fractal spaces, enclosed by those time cycles.

If he is interested in the full model, he can read further at www.generalsystems.wordpress.com