From a Quantum State to a Quantum State. Life as a Temporary Emergence of a Differentiated Physicality

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Abstract Introduction: Neither Life nor a quantum state are isolated phenomena; both are inter-related systems with mutual dependency and shared doctrines. Material/Method: Public domain records were searched for identifiable observations that were considered relevant to Life principles of systems science; similarities with quantum space-time were explored. Results/Conclusions: A quantum state has directionality within its cycle, from a very long expansion/inflation to a very short contraction/deflation through singularities of reversals in a Black Hole, all followed by a new Big Bang with a new inflationary phase. Living systems represent recapitulation of their evolutionary history and carry it within own coded genome. Sun, Earth, and Life are estimated to have emerged almost simultaneously, within a plateau of about 600 million years (4.6-4 billion years ago), at the transition from the inflationary/expanding quantum state of the Universe to the deflationary/contracting one with the appearance of a definable manifestation of quantum system’s output, the emergence, in the physicality of Sun, Earth, Life, etc. Life has its own Big Bang, symbolized by the unwinding of the nuclear DNA spiral during embryogenesis; within its scale, it is just as massive and rapid as the inflation following the Big Bang in the Universe that is generally dated to about 14 billion years ago. A pathway is also explored to consider ‘how we know that we know’, an outcome of translation of signal processing to cognitive understanding that impact measurements and observations.

Keywords: life, systems science, sensory processing and perceptual meaning, quantum space-time

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1. Introduction

... we must ... find a theory that will give us a complete description of nature.
Lee Smolin [1].

It is all about memory, a passage of systems through relationships that leave a record; much is to learn about the Universe by studying Life that has chronicled the best the Universe has yet to offer. [Figure 1]

Life is the most sophisticated emergence, an outcome of optimized relationships, within the quantum state. This evolutionary achievement implies that all its foundational principles have been carried forward in various living forms and represent a record of how quantum state has transformed into Life.

The infinite quantum world of the Universe can be considered a system and Life as its sub-system, both recording their mutual existence in each other. Two principles of Life, one of inter-relationships among systems, and the other, a principle of isomorphism that allow an extrapolation from the known to the unknown, on all scales of systems, can offer new understanding where previously only data points existed. [Figure 2]

The extensive research data and theories on cosmology that are available in the public domain seem to focus mostly on the Big Bang and the estimation of events that have followed. The goal of this conceptual paper is to highlight what is significant for Life on Earth, at the current level of understanding, and look back toward the Big Bang and beyond, with a framework not of mathematical equations and probability estimates but with the support of biologic principles. When, eventually, confirmed by basic sciences, answers to the following questions are anticipated be in synchrony with systems science principles. Questions such as: How did Life begin? Is Life continuing to evolve or has it entered a phase of devolution? Is Life and Big Bang singular events or is there a likelihood of oscillating cycles for both? Is the Universe still expanding or is it already contracting with the expectation of a major loss and rebirth of new Life? How does neuro-net of biologic systems translate the electro-chemical signals of sensory input into understandable thoughts? Does space-time deformation exist within a ‘personal space’?

The unknowns of the Universe and Life on Earth continue to be studied but mostly along differing paths. In spite of, what is considered a fundamental difference between those two fields of inquiry, one considered non-living and the other living, a common denominator does exist on multiple levels and will be explored in this study.
Research questions: How do we know that we know? Can systems science principles be applied to the quantum state of the Universe? Can similarities be observed? Can this conceptual research point to principles that ‘resonate’ between systems science and the quantum state?

2. Material/Method

Literature, available to the author through on-line searches and relevant to the topic of this research, was reviewed; selected publications have been used as references and are cited.

The principle methodology was systems science that is based on observations of healthy living entities that demonstrate existential as well as functional cycles, with capacity for reproduction and repair as well as adaptation and evolution; each healthy system has numerous components that are in hierarchical relationships of organized complexity that form fractal patterns with self-similarity and self-affinity on all scales.

Dynamic Systems Model differentiates healthy from unhealthy systems, those in Health Territory and those in either Chaos or Entropy [Figure 3a-d].

Health Territory demonstrates organized complexity and generates value as its emergence. To achieve it, it needs relationships with reciprocity, fairness, empathy and trust and hierarchy that support self-organization of systems components; each system must maintain semi-permeable boundary with active decluttering.

Chaos zone is characterized by disorganized complexity and randomness.

Entropy region has dominance of non-functionality and diminished complexity.

Clarification of terminology:

Data - information – knowledge, a process of extracting knowledge from data through patterned information [Figure 4a, b].
Data is a stream of sensory input.
Information represents data that formed a pattern.
Knowledge is the meaning extracted from patterns of information.
Optimizing is synonymous with healthy, positive; non-optimizing is the opposite.
Relationship refers to a connection, from ionic to cognitive, analogous to a term ‘entanglement’ in quantum research.
Self with capital ‘S’ refers to the whole of a single biologic system such as one person.

Life with a capital ‘L’ represents all living entities; a capital ‘N’ (in Nature) refers to the entire living system on Earth.
Physicality denotes an entity with physical attributes that are observable by senses.
Evolution is an attempt, by Nature, at a learned emergence.
Culture implies sharing of attributes within a group.
Value emerges when efficiency, effectiveness, risk management and proportionate cost are present as a combined outcome.

Figure 3a. Graphic schema of systems

Figure 3b. Zones with focus on complexity
Figure 3c. Zones with focus on common experiences

Figure 3d. Zones and their proclivities
3. Discussion

This paper has been written as a conceptual exploration of systems science, which is based on observed principles of living systems, and apply it to a quantum system. One principle that encourages such an exploration is isomorphism, expressing that, what is known about one system, e.g. Life, can be applied to a lesser-known system, such as the Universe, as principles are collective; anticipating similarities of doctrines in evolution of the Universe, Earth and Life, it is expected that there are foundational memories in each, based on the integrity of historic transference. Cells, for example, retain full memory of their embryonic origins. Life, in general, ‘remembers’ while its participants, such as humans, may not recall their life-changing decisions but the epigenome always remembers the choices that modified its coded sequences. [3,4]

A great mystery of Life is how it morphs and re-morphs, from a quantum state into its system’s emergence, the physicality of Life, and back to a quantum state, the proverbial ‘from dust to dust’. The temporary characteristics of Life move through states that encompass relationships, communication, hierarchy, metabolism, repair and regeneration
as well as reproduction with recycling and eventual return to its original elementary state. [5]

The prevailing concept of how Life began seems to carry traces of linearity as is the Big Bang theory of the Universe; Life, as an observable phenomenon, is subject to observations and measurements that go through the ‘reality filter’ of any observer; if the observer is dominated by linearity, so will the measurements, and conclusions will diverge among observers; the differentiating factor here is cognition, which, like wind, can only be measured indirectly by its impact.

Evolution of Life has progressed from ‘hard wiring’ of its key components to ‘dynamic connectivity’ in genes and the neuro-net; a few human genes are still deterministic/’hard wired’ but most are available for alternate splicing that follow cognitive decisions in the creation of a functional epigenome, for better or worse. Similarly, the neuro-net is even less ‘hard-wired’ as the dynamic synaptic clefs offer an infinite connectivity. As evolution progressed, the hierarchy among genes and the neuro-net, expressed in the initial domination of genes and reflexes, has shifted and is now strongly associated with the neuro-net as decisions represent the cognitive emergence, which easily modifies the UP/DOWN functionality of the epigenome. That implies that a degenerating neuro-net negatively alters the basic units of evolving Life, the genes, with long-term non-optimizing consequences for the entire biologic system.

The Universe and Life are recurring events. The Universe is expanding and contracting with Life that is emerging and regressing within the deflationary phase of the Universe; linearity, from ‘0’ to ‘now’, is artificial in Life and the Universe.

What we know about Life:

DNA is the foundational code of Life that evolved along a fractal path bound by cycles; Life is not linear. DNA is ‘packaged’ in a tight spiral in a cell nucleus, minimizing its need for cellular space. In his book, Evolution 2.0, Perry Marshall writes: DNA in one cell can hold a gigabyte of data while plant and animal tissues have a billion cells per cubic centimeter. The folding of DNA inside the nucleus of the cell is fractal allowing DNA to quickly unpack and repack during gene activation and cell replication. [6] The fractal storage of DNA information is an example of how healthy biologic systems store and rapidly retrieve massive amount of information without corrupting it. Efficacious cognitive memory follows similar fractal storage in hippocampus that is needed to be accessed during retrieval that involve re-engineering of neuro-net connections.

It is theorized, within a linear model that biologic systems began with ‘endosymbiosis’ among bacteria, a relationship state of one bacteria entering and living harmoniously in one another; throughout evolution, this relationship has been expanded, from its initial simplicity to the present complexity (e.g. currently, in a single human, it is estimated that there are more bacteria than cells). [7]

Life/Nature is the most advanced complex adaptive system in the known Universe. It has utilized periods of adaptation to allow for evolution of ‘what shows optimizing potential’, with temporary modifications of the epigenomes. All living entities exist within such a system but not all are successful participants. Smaller systems, including humans, should proactively adapt and evolve, not in linear but ecologically-dominant fractal patterns along with the cycles of Nature. Healthy, cognition-endowed systems, e.g. humans, are not genetically programmed to remain healthy but must make appropriate and concurrent decisions that favor organized relationship complexity that is capable of generating dynamic optimizing emergence; in turn, this sequence contributes to healthy Nature while also sustaining individual living systems in fitness. For evolution to continue, only those epigenetic modifications that are enhancing the sustainability of the system will remain. Complex adaptive systems retain, on balance, a lower system’s characteristics that are considered to enhance the inter- and intra-system functioning of a larger system. Human body can serve as a fragile but a responsive model of an ever-changing complex adaptive system where the ‘neuro-net’ plays the ‘deciding role’ in understanding Self, Nature and the Universe as inter-related and mutually dependent systems.

Humans are considered an evolutionary pinnacle of Life, not necessarily in the physical phenotype but in cognitive capacities. The aptitudes of neuro-net for processing ‘data’ and ‘perceptional meaning’ on one hand, is a valid measure of advanced adaptation and evolution; on the other hand, a progressive loss of such faculties would signal an evolutionary reversal. There are some indications that human life may be entering such a state, an entropy phase in general population: increasing prevalence of degeneration of its sub-systems, such as neuro-, cardiovascular, metabolic, etc. [8] A system in entropy is characterized by limited perception and voluminous sensory processing. The growing prevalence of degeneration among humans is not existentially significant to Life but degradation of the environment by them represents a non-optimizing influence on the ‘tree of Life’; eventually, such a state must be corrected by the larger system of Nature; past species extinctions have been recorded but not of Life itself outside its own cycle within the quantum oscillations.

Time, in a quantum state, is variable, multi-directional and multi-dimensional; it has been measured by the degree of deformation of light travelling in space influenced by physical properties, principally by the ‘mass’ of related objects; as ‘mass’ increases so does the gravitational deformation of space-time, which slows down the chronologic/linear time. Biologic time reflects how life is lived regardless of any ‘planetary movement’.

The concept of linearity is indigenous to humans but is foreign to Nature: flat Earth, Sun-centric Universe, Big Bang. Life as a singularity, etc. as Life is anything but linear with dominance of fractal patterns. It is understandable to use linearity of light, cosmic background radiation as well as gravitational waves, etc. for the study of the Universe, as these are the primary available methods of inquiry; but then, even light bends and can spiral with self-torque. [9]

Chronologic time is a human invention, an application of linearity; it is not, however, the existential time of the Universe; chronologic time carries the capacity to extinguish itself, as it simply ‘runs out of time’ to exist; e.g. falling meteors in the sky, birth-death records of living systems, singularity of Big Bang, etc. [10]
Cycles exist, from birth to death, from an expansion to contraction, from a Big Bang to a Black Hole, etc., and continue at infinitum. Cycles and reversals are readily observable in Nature and the Universe, with appearance-disappearance of living and non-living entities, such as Earth’s volcanic eruptions, movement of stars and planets, etc. Cycles have a beginning and an end. They are intimate and inseparable parts of life as well as the Universe, with phases of creation and destruction, expansion and contraction; when a cycle ends, an appropriate recycling needs to take place otherwise accumulation of non-functionality increases system’s entropy.

A quantum state has directionality within its cycle, from very long expansion/inflation to very short contraction/deflation through singularities of reversals in a Black Hole, followed by a new Big Bang with a new inflationary phase. During deceleration, a quantum state is gaining ‘mass’ among some particles; this process allows for the development of quantum system relationships with exchange of ‘data’ through a polarity charge, representing communication/processing among attractors using contact points/senses; such a process allows for the creation of components, sub-systems, with organic-inorganic molecular characteristics, etc.; as the complexity of relationships increases, within an overall quantum deflation, the exchange of ‘data’ is permitted to, first, aggregate along multiplying density of attractors that deform the quantum gravity relationship fields, and second, to form patterns.

Cycles of daytime light and night time darkness are intimately associated with living systems: one gives life, the other extracts meaning. The presence of light serves as a background for the majority of sensory input while darkness permits pruning and categorization of received data and information within the neuro-net, recorded as memories. Cognitive decisions are strongly affected by the degree of balance between these two states. [11]

Relationships range from ionic polarity to cognitive choices of attractors and the consequential decisions. Cognition can express great variability of decisions but all choices modify the system’s epigenome.

Any relationship, either optimizes/is pro-health, or is sabotaging/is unhealthy, for the larger system; among humans, such influence comes mostly from personal decisions/lifestyle choices, based on selected attractors and the extent of the attachment to them.

Relationships, on all levels, may express variable degrees of complexity, from organized to disorganized. In an article in Nature, Rolf Güsten and colleagues write about what could be considered an ‘ancient relationship’: a combination of helium and hydrogen into helium hydride (HeH+) that has been observed in a planetary nebula, NGC 7027, a remnant of what was once a sun-like star; it formed just after the Big Bang, nearly 14 billion years ago; a surprising finding was that the authors also discovered this molecule’s signature in Milky Way galaxy; it is thus considered to be the first, a primordial molecule that formed around 100,000 years after the Big Bang. [12]

Within ‘space-time’ of individuals, a ‘personal space’, human body has a ‘mass’ that is expressing its weight through Earth’s gravity, and the ‘energy’ of attachment to an attractor in relationships; the combined deformational load is categorized in this paper as a ‘quantum gravity attractor relationship’; its importance lies in the fact that, based on the state of health of the existing relationship, it changes its ‘time’: it slows down the perception of chronologic time and extends biologic time in healthy/optimizing relationships; in unhealthy ones, it is the chronologic time that is perceived as being prolonged but biologic time is actually shortened, mostly as an outcome of disease or stress/cognitive dissonance [Figure 5a,b]. [13]

![Figure 5a. Schema of space-time deformation by Earth (left) and personal space-time changes based on cognitive weight of attractors (right)](http://en.wikipedia.org/wiki/Gravity)
In contrast to the basic laws of physics that are explaining the gravitational space-time deformations in the larger cosmos, among living systems, cognition offers variable options to living systems that are reflected in parallel and causative deformations/changes of the quantum gravity attractor relationships space-time; this process is based on the messy ‘laws of choices’ among both healthy or unhealthy attractors; this dilemma of consequential choices, is either in synch or not with the inherited spiral geometry of Nature and represents the difference between a healthy, evolving system, and one that is unhealthy/devolving.

The ‘position-momentum/speed’ quantum dilemma, formulated as an Uncertainty Principle by Heisenberg, is likely related to the quantum gravity attractor relationship space-time deformations that are applicable to all human observations, where each ‘position’ or ‘momentum’ deforms the space-time differently. While space-time deformation in the Universe was initially measured by light deflection, the space-time deformation of quantum gravity attractor relationship will need specific cognitive measurements; at the present time, the ‘weight’ and the ‘energy power’ of an attachment can be judged via changes in the autonomic nervous system (cardiovascular response, such as blood pressure, heart rate, skin impedance, etc.). [14] Harrington and colleagues comment that ‘the act of measuring a quantum system, usually changes the way it behaves’. [15]

How do we know that we know? [Figure 6a-d]

Figure 6a. Schema of cascading influence of change on functional and structural levels of a biologic system

Figure 5b. Diagram of an attractor impact on personal space-time
Figure 6b. Propagating path with change

Figure 6c. Branching options that may activate divergent paths with change

Figure 6d. Initiation of system’s processes and selection of options by cognition
Figure 7. Formation of reality

To ‘know that we know’ begins with conscious awareness that trigger senses; the ‘data’ processing, however, is restricted to only selected attractors chosen by the already pre-programmed cognitive framework, representing individual reality; as new knowledge, new sensory perception is generated, a new reality paradigm can be formulated and be available for new sensory input, or the ‘past continues’. We are our memories, cognitive and epigenetic, which are derived from our relationships with Self and the world at large, representing our narrative [Figure 7].

Cognitive threshold represents a level of human sensory input beyond which comprehension rapidly declines; it is estimated that it is somewhere between 60 -120 bits per second; generally, human speech is comprehensible at about 60 bits per second. The continuous loop of our silent cognitive chatter of our mind is probably around that number as well, 60 bits per second. If the threshold gets overwhelmed with indiscriminate ‘noise’ during sensory processing, any additional data or information will not make it intact through the saturated threshold and subsequent decisions will carry that negative impact. [16]

Cognitive reserve is considered to be the degree of available cognition before the cognitive threshold is reached; if that amount is vanishing, it influences biologic system’s risk for entropy and neuro-net degeneration. [17,18].

Consciousness of a living system is present when sensory input can be translated into a form of an internal language, utilizing words, codes/symbols/signs, sounds, etc. that carry a message that is understandable to the living system, based on learning precedence; it provides a framework for decisions; all living systems must have that ability in order to allow for adaptation and evolution within the larger ecologic system; choices are translated into the individual epigenome allowing for survival-enhancing or non-enhancing phenotype modifications. Consciousness is the internal form of communication with Self; the ‘Morse code’-like sensory signals that are interpreted into the ‘native tongue’ to be available for decisions and understanding; utilizing this broad view, cognition, an umbrella term for forming thinking, memory, recall, etc., is present in all living entities and is distributed on all levels of a living system that communicate - cells with cells, muscles with bones, spinal cord with bodily parts, brain with all of the above, etc.

This process begins with learning a language, taught by parents, teachers, etc.; while we are taught to read, write, speak, we are also taught how to think, one word/letter/symbol at a time, a struggle between inherent biological child-like non-linear curiosity and mostly a linear educational system; unfortunately, through such an approach, a linear model of the world is developed and offered for understanding of life that is, however, fully multidimensional; some recognize this historic dichotomy and gradually switch to a non-linear thinking while others retain linearity in thinking through life; not a healthy framework for optimizing lifetime decisions.

Our knowledge of Life and the Universe depends on our senses and the cognitive interpretation of what we encounter; we are able to sense much more than we can understand; we may have the same eyes for the same ‘data’ but we ‘see’ different things with our cognition (e.g. inflation or deflation, etc.).
Learning a language that becomes a communication medium, the ‘silent chatter of the mind, the native tongue’ of thoughts, requires the epigenome to be UP/DOWN functionally regulated by experience in order to configure the neuro-net to a specific language frequency. Humans need about 18 years of incremental ‘word-meaning’ acquisition to learn the first language, the initial founding blocks of the mind’s operating system, estimated to be adding about 1.5 MB of digital code, resembling a large puzzle being built in the maturing neuro-net; it is a process during which a conscious framework of the mind is being shared between a parent and an offspring, and from many sounds a single word emerges, from many images a single meaning is formulated, etc.; this construct is reapplied throughout life and can be, metaphorically, termed the Rosetta stone App, an aggregation of various processing codes under one term, image, etc. The importance of each step, during the learning curve, has critical influence on any future sensory processing and perception, as well as selection of attractors; a limited ‘internal language of the mind’ leads to similarly limited reality perception of an individual [Figure 8]. [19,20]

Objective reality is the limited scope of extracted ‘data’ potentials that are converted into ‘patterns of information’, which can lead to ‘knowledge/meaning’ generation by cognition. Reality is what perception selected, processed, and translated into thoughts; all living entities have different realities, though the same potentials are available to others for processing and perception. It is this perspective on reality that guided research and writing of this paper.

Life evolves and devolves within its principles that are the focus of study by systems science. Initially conceptualized by Bertalanfly in the 1960s, though preceded by systems thinkers, such as Ashby, Boulding, and others. Ashby’s coined the Law of Requisite Variety, also known as the First Law of Cybernetics, which states that the degree of control of a system is proportional to the amount of information available. Boulding addressed an ‘open system’ [e.g. any living organism], which cannot be unilaterally [e.g. top-down] controlled unless it is converted into a ‘closed system’ [which heads toward extinction]; he also conceptualized systems inter-relationships, stating that all lower level systems are embedded in systems of a higher order and become their sub-systems, but higher level systems have unique characteristics’. [21,22,23]

Systems science outlines basic principles of Life that have been tested by evolution; it identifies patterns that are self-similar and show self-affinity within any up and down hierarchy, leading to an emergence, a system’s outcome, such as intelligence.

Systems science is scalable, extracting observations that fit this definition, and categorizes them as principles.

All living entities are systems, expressing doctrines, from cells to societies, and even the entire ecosystem; each system has identifiable components engaged in relationships where healthy function determines structure; however, when structure dominates, it limits function; such a system is considered unhealthy/non-optimized/fragile and heads toward a state of entropy or chaos.

A rationale for looking at the evolving Universe through systems science is as follows: living systems/entities represent recapitulation of their evolutionary history and carry it within own coded genome. Sun, Earth, and Life are estimated to have emerged almost simultaneously, within about 600 million years (4.6-4 billion years ago), at the transition from the inflationary/expanding quantum state of the Universe to the deflationary/contracting one with the appearance of a definable manifestation of quantum system’s output, the emergence, in the physicality of Sun, Earth, Life, etc.

Life, as a model of quantum state’s emergence with many shared principles, is invaluable for the study of even larger and older systems. The advantage is that individual life can be observed from the moment of birth to the moment of death, gaining invaluable ‘hands-on’ insight. The light years of the Universe and the astronomical time dimensions make any assessment of ‘birth’ and ‘death’ or even ‘transformation’ of anything ‘out there’, just a matter of sophisticated speculation as what we observe ‘now’ likely happened ‘eons’ ago. [24]

Connecting quantum to life.

A quantum state is one of ‘potentials’, throughout its inflation, and ‘physicalities’, during its deflation, with the arrival of gravity as an expression of deformational space-time by physical forms; those are characterized by movement and intensity; extremes exist at both ends of the spectrum – ‘excessive’, in the zone of chaos and ‘inadequate’, in the entropy zone of the Dynamic Systems Model; the ‘goldilocks’/health territory is where Life can develop as there is just enough movement and intensity to allow for ‘physicality’ to emerge and sustain its temporary evolution. [25,26]

A most recent report, from the Physics of Condensed Matter and Complex Systems group at Los Alamos National Laboratory, discusses the quantum-to-classical transition - when the quantum effects go away and the system starts to behave more classically, an observation that seems to parallel the above-discussed research, of change from quantum inflationary state into quantum deflationary state, with the appearance of ‘physicalities’, demonstrating more ‘classical’/physical behavior of ‘particles and waves’. [27]

The geometry of counterclockwise/spiral movement, from a galaxy to planet Earth and living entities, e.g. trees, organogenesis (that’s why hearts of vertebrates moves to the left from original midline location), and even DNA with left-handed amino acids, indicate a profound quantum space-time connection to Life with directionality of quantum energy vortex. It is likely that other features, observable in life, are similarly in resonance with those in quantum state, such as cycles, boundaries, emergence, inter-relationships with communication, and emergence. [28]

The compression and expansion of a spiral that reflect accumulating and dissipating internal forces, are likely recurring phenomena. [29]
The existence of such a spiral movement, in an optimized quantum state, would suggest a sinusoid continuity from a Big Bang to a Black Hole and an emergence of a new Big Bang, etc.; the reacceleration of spin, the uncoiling, can be conceptualized to occur during the passage through a Black Hole and manifesting as a new Big Bang; eventually, the quantum state exhibits deceleration and a deflationary phase begins. Evolution has perfected the left-handed spiral form and found it to be the most efficacious way for memory storage and retrieval, with consequential function and structure. Fred Hoyle, an English astronomer, rejected the prevailing theory of Big Bang uniqueness. [30]

The fact that a counterclockwise spin of DNA and amino acids (only L-/left-handed amino acids are biologically active) is also present within galaxies must be significant on a fundamental level. Expansion of the cosmic spiral eventually reaches a point of reversal and contraction begins with new observable classic ‘physicalities’: objects with mass in the Universe, Earth and its Life, etc. When contraction reaches a maximal point of imagined ‘tightness’, a new Big Bang of unwinding occurs and releases massive energy. When nuclear DNA spiral expands during its inflation, a new life emerges as ‘physicality’ but shortly after, in humans after a few decades, deflation/aging begins.

Boundary: Quantum state has formed ‘physicalities’ during its deflationary phase; one, known as Earth, appeared about 4 billion years ago; it eventually formatted its atmospheric boundary, which has remained proximate to the planet due its gravitational deformation of space-time. Among all known cosmic object, only Earth has specific semipermeable boundary permitting Life. Healthy living entities have similar periphery on all levels of differentiation that allow them to adapt and evolve, repair and regenerated; it is a key requirement for life.

A long-term twin study of astronauts by NASA revealed the following detrimental impact on life, from a long-term space existence, without Earth’s boundary: loss of muscle mass, decalcification of bones, stress on the heart, damage to the eyes, changes in the immune system, disruption of the genome, chromosomal inversions, gene transpositions and an actual shortening of life expectancy. [31]

Beyond limitations, systems science is not a theory, which should be subjected to falsifiability as a criterion of its validity; it should not be judged as such as no one can disprove Life and its wisdom; systems science is expressing principles observed in Nature that are operational in all living entities. Systems science is a young methodology and the current conclusions will need to be verified with longer observations. Applying systems science to the known time-span of the Universe that lead to Life, is taking proven patterns of fractal existence, a framework of Life in the last 4 billion years, and then looking at the ‘time before’ through such a context.

All observations, of the smallest and the largest forms, from bacteria to the Universe, are subject to interpretation by an observer, a construct of perception; such is the nature of all living systems, vagaries of Life. Successful adaptation and evolution requires a path that searches for value, a system’s emergence, at every step of its movement and intensity, in order to reach the ‘next optimizing level’. Intelligence is a capacity to make healthy/optimizing decisions for Self and others that are in a ‘cluster’ of quantum gravity attractor relationships with features of rationality and responsibility; this capacity offers the ability to solve problems not previously encountered, based on a tight decision-consequence learning feedback loop, the only path for a sustainable merit. Intelligence has evolved, among living entities, from ‘distributive intelligence’ of their own parts, to subsequent cognitive intelligence of biologic systems, and an option for
‘collective intelligence’ of a given cultural cluster; health and intelligence are closely related as each decision is ‘counted’ by individual epigenome and transcriptome.

Nature is the master of intelligence, continuously solving problems previously not encountered, through ongoing adaptation and evolution, keeping and promoting what works, and discarding what does not, utilizing a system’s principle of ‘decluttering’ and eluding entropy. Nature has an amazing cognition, ability to not only receive and process inputs but also communicate, have memory, and make decisions, etc. on an all-encompassing scale of Life. Humans demonstrate that the speed of input processing cannot be used as a measure of intelligence as it is only the understanding of what all the input is about that matters in life, any machine learning notwithstanding. It is possible to speak of Nature with ‘consciousness’ as conscious awareness is a system emergence, sometimes referred to as an epiphenomenon; Nature is very much ‘aware’.

Intelligence cannot be a human invention. Intelligence of the Universe, its optimizing self-organizational influence, permeates the ubiquitous space-time, including any personal space; this state of abundant emergence influences the self-organization among optimized/healthy living entities including the neuro-net of biologic systems; it is in such relationships that brilliant ideas originate; to have access to the intelligence of the Universe, living systems have to operate within the same ‘harmonic musicality’ of Nature’s organized complexity. The judgment of what is or what is not intelligent belongs to the larger hierarchical system; self-referential declarations will just not do; and, what is not optimizing the larger system of Nature, cannot be intelligent, as intelligence connotes rationality and responsibility vis-à-vis all related systems.

4. Results

Life, as an observable phenomenon, evolves and devolves within the omnipresent Universe and its space-time; the ‘physicality’ of Life emerges from the quantum state during its deflationary phase with observable properties of mass and energy as well as its function and structure, all gained by quantum deceleration and the establishment of relationships. Life’s principles, formulated as systems science, are the extrapolated codes of the Universe observed in Life, with differing weighted relationships. The expansion and contraction of Life and the Universe are recurring events.

All electro-chemical signals, generated during sensory input processing of living systems, are expressed in basic opposites, positive-negative polarity, etc.; these signals have to be converted into a context understandable to them. In this paper, the conversion vortex in humans is termed a cognitive ‘Rosetta stone App’; it is based on gradual learning of native tongue, through instructions by parents, and further advanced by education; it represents a transformation of the initial single words/symbols of linearity into an analogue of understanding. This ‘App’ allows living entities to become not only ‘self-referential’ but also ‘Life-referential’; to what extent, depends on the level of ‘Self-actualization’.

Measurement and observation are primarily cognitive processes during which an observer imposes his ‘reality framework’ on the observed; if the ‘reality’ is only one-dimensional, dominated by linearity, so will be the measurement.

Quantum gravity attractor relationship is formulated in this text as an expression of interpersonal space-time deformations by mass-energy of living entities; selected attractors by participants, from the overall awareness, form relevant nodes in a relationship framework; attractors are either healthy/optimizing or unhealthy/non-optimizing, such as power or despair. The intensity of attachment to a chosen attractor, determines the deformational ‘weight’ of each biologic system within a given relationship. The quantum gravity attractor relationship also changes the perception of ‘time’, based on the state of health of involved biologic systems (e.g. slower acuity of chronologic time and an extension of biologic time in healthy but inverse in unhealthy systems). Similarly, human behavior changes under observation, as the act of measurement/judgment changes the quantum gravity attractor relationship.

Figure 10. Schema of recurring Big Bang and Life cycles
Answers to researched questions:

Systems science principles can be applied to the quantum state of the Universe.

The methods for studying Life are and always will be infinitely greater than what is available for the study the Universe, from genes to societies and Nature. Life can exist only within the relationships of its ionic components, physicalities of quantum itself. Principles of Life have evolved from within the Universe and carry memory of its origin, which can be explored/traced/mined.

Similarities between systems science and quantum state can be observed.

Life has its own Big Bang, symbolized by the unwinding of the nuclear DNA spiral during embryogenesis; within its scale, it is just as massive and rapid as the inflation following the Big Bang in the universe.

Well known is the counter-clockwise movement of galaxies but less known is similar movement of microscopic cilia during embryogenesis, determining the final position as well as health of various organs.

Cycles are part of the Universe, from inflation to deflation, with variable movements and function; suns give out light and black holes take it back - a cycle of life and death on Earth. Similarly, Life has its own Black Hole, an aging process, marked by degeneration, before its ultimate return to its original quantum state though at variable time intervals (e.g. some trees do live thousands of years).

The current conceptual research points to ‘resonance of principles’ between systems science and the quantum state:

- Movement and intensity, through spirals, cycles, complexity, and emergence.
- Fractals with self-similarity and self-affinity leading to patterns.
- Semi-permeability of boundaries and recycling/decluttering.
- Relationships extending beyond linearity.

The Universe and Life are infinite but have periodic ‘near death experiences’.

5. Conclusions

The systems science-based principle of isomorphism, a capacity for applying the ‘known’ to the ‘unknown’, was underlying this conceptual study; it was fully supported by realization that so much is known about Life and so little about the Universe. The inference was that looking at Life should allow richer understanding of the Universe, principally that Life is not linear and neither can be the Universe.

To postulate Big Bang in the Universe as a singularity, is likely due to a very long/astronomic time cycle, recording only its ‘beginning’; this incredible event has a mirror image, at a different scale but just as dynamic, in the reproductive cycles of living entities that are continuously repeating with unwinding of DNA, the Big Bang of living systems.

Evolution is being shaped by either optimizing or non-optimizing events/encounters. Dynamic Systems Model has the capacity to draw functional and structural conclusions about a single biologic system or a cluster, such as a society, and topologically place it in a state of optimized or non-optimized health, generating positive or negative emergence/outcome; such a modeling could infer changes in the quantum state as it is through human sensory input processing and perception that we are aware of the Universe.

Movement and intensity, through left-handed spirals, cycles, relationships, complexity, and emergence are features of living systems; their core characteristics can also be identified in the Universe.

Quantum state always existed and always will, only its oscillating expansion-contraction phases change. Life is a differentiated quantum state, a physicality, evolving and devolving during its deflationary cycle, awaiting the next Big Bang of the Universe.

Recycling/decluttering, returning the physical properties into the quantum realm, is an essential process of Life, as all must eventually end their cycle of ‘living sequence’
and be reused in a new creation, a metaphorical conversion from ‘dust to dust’; absence of this process would lead to entropy of the larger system.

Human perception involves translation of electro-chemical signals of sensory processing into the ‘mother tongue’, the ‘lingua franca’ of the mind, so that they can be understood. This process, labeled in the text as the cognitive ‘Rosetta stone App’, represents memory recollections, demonstrating an accumulation of extensive coded instructions that pertain to a given meaning, received while learning a native tongue and subsequent education.

The emergence of cognition, in the evolution of living entities, is not a permanent and a forward-moving trend but is related to the state of health of biologic systems; devolutionary regression of living systems, beginning with neuro-net faltering, recapitulates evolutionary steps but in reverse with loss of organized complexity and lack of optimized output/emergence, a process of dedifferentiation/degeneration.

Space-time deformation, labeled in the text as quantum gravity attractor relationship, is based on the degree of cognitive attachment to chosen attractors that have impact on gravitational pull.

Conceptual linearity is not inherent in Nature; it is a human construct that begins in childhood, while learning a language, prosecuted by educational system, and implemented by technology; unfortunately, it is not automatically given up when language is mastered, distorting/”flattening” human perspective of Self and others, Nature, and the Universe.

The importance of quantum gravity attractor relationship lies in the fact that, based on the health of the existing relationship, it changes time; it slows down the perception of chronologic time and extends biologic time in healthy/optimizing relationships; in unhealthy ones, it is the chronologic time that is perceived as being prolonged but biologic time is actually shortened.

It is, indeed, all about memory, one that is attempting to implement the past into the future; it asserts its dominance at the beginning of a given cycle, in all scales and with all its ‘fury’; at such a moment, remarkable similarities can be seen among the hippocampal burst within the neuro-net, embryogenesis of a new life, and the Big Bang of the Universe; it is always sudden, dramatic and repeatable; it is not a singularity and the outcome is related to what preceded the ‘burst’: was there a fractal storage of meaningful patterns within a counter-clockwise spiral, as this is the only way for any system to reach a subsequent healthy emergence with value creation? Anything less is just a random occurrence.

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Note

Additional extensive bibliography and numerous complementary figures, on related topics, are available within the listed named references of the author.

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