Skeletons of a CTMU Unified Field Theory

by Thomas Goloboy

Part 1: Introduction

Mathematician Georg Cantor, the founder of set theory, said, “I am so in favor of the actual infinite that instead of admitting that Nature abhors it, as is commonly said, I hold that Nature makes frequent use of it everywhere, in order to show more effectively the perfections of its Author. Thus, I believe that there is no part of matter which is not - I do not say divisible - but actually divisible, and consequently, the least particle ought to be considered as a world full of an infinity of different creatures.”

The fundamental axiom of a CTMU Unified Field Theory is this: that the finite things we see in the world reflect and refine the Identity of the Infinite One, who gives life to the universe at all scales.

The quest for a unified field theory is an adventure in syndiffeonesis, a term coined by Christopher Michael Langan, the author of the Cognitive-Theoretic Model of the Universe (CTMU), to denote that positing the absolute difference between two fundamental aspects of reality is as absurd as positing the absolute difference between the head and tail of a coin: “the expression and/or existence of any difference relation entails a common medium and syntax” (Langan, 2002). Therefore, if we can express the difference between the formalisms of quantum mechanics and general relativity, we can also express their correspondence within a sufficiently robust formal language incorporating both theories.

Unifying the fundamental forces of nature requires unifying quantum field theory, a powerful and general extension of quantum mechanics, and Albert Einstein's general theory of relativity, the most successful and consistently confirmed physical theory in the history of the physical sciences. Although these two formalisms have been highly successful separately from one another, their century-long quest for unification, bringing together the micro- and macro-scales of reality, has yielded little progress towards a valid theory of everything (ToE) or grand unified theory (GUT), the holy grail of the physical sciences.

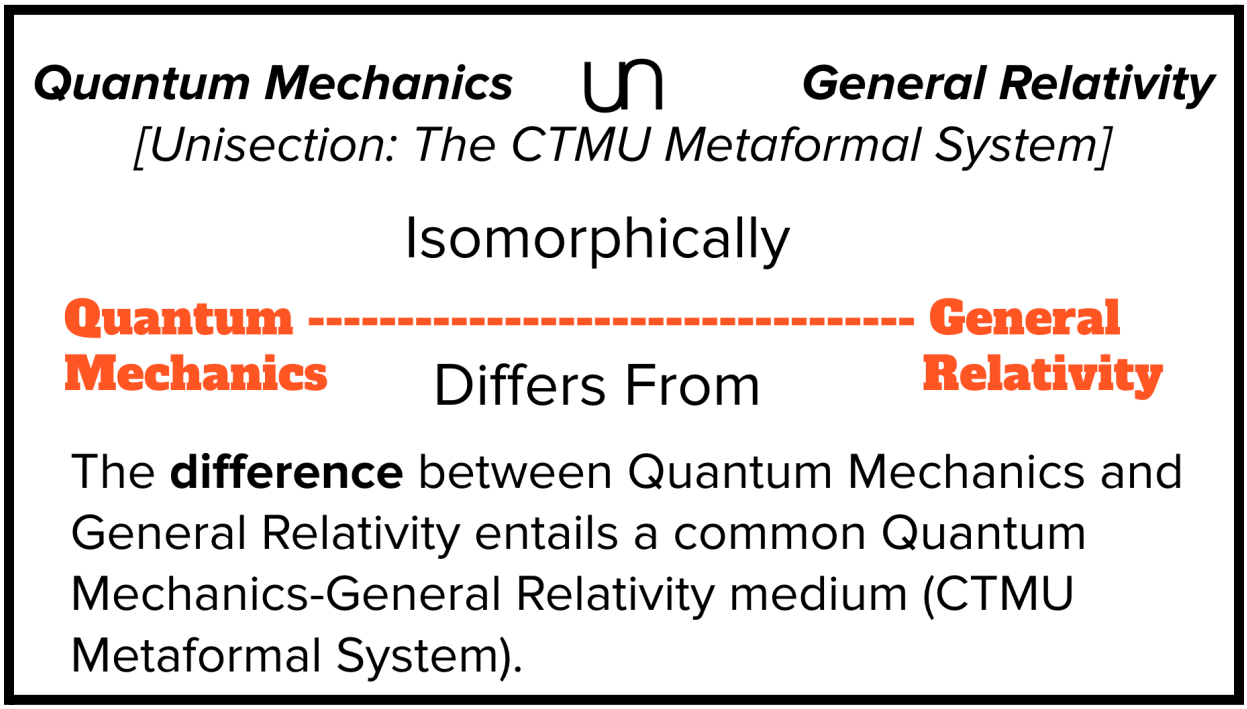

Fig 1.1: *A syndiffeonic diagram relating quantum mechanics and general relativity to the Metaformal System (Langan, 2018b) – the intrinsic language of reality – in a CTMU Unified Field Theory.*

Christopher Langan, whose CTMU theory seems, in the author's opinion, to be the most promising avenue towards this proposed unification, argues that a true "theory of everything" must explain not only the unification of gravity (described by the formalism of general relativity) with the electromagnetic force and the strong and weak nuclear forces (described by the formalism of quantum mechanics), but also "the nature and extent of reality, the origin and nature of life, the nature of mind and consciousness, the origin of the cosmos, the nature of space, time, and causality, the essence of human existence and spirituality, so-called paranormal phenomena, and other matters seemingly resistant to mechanical, material, or physical explanation" (Langan, 2019). This grand unified theory of reality, long sought by physicists and philosophers alike, had already been discovered by self-taught cosmologist and reality theorist Christopher Langan before the turn of the last millennium. In a paper published in Noesis, a periodical for the Mega Society – a high-IQ society Langan belonged to – Christopher Langan writes, "The universe has now been solved. We are among the angels and demons who, by leave of God, shape reality for good or evil through cognition and telesis, mind and will. I show you this for love of Self that you may save yourselves and each other. And I tell you this: there are none so blind as those who will not see, nor so lame as those who will not stand" (Langan, 1992).

Langan writes that in the CTMU, "our cognitive models of time become a model of time-as-cognition. And the languages of cognition and physics become one self-configuring, self-processing language of which time is the unified grammar" (Langan, 2001a). Welcome to the future of time. Welcome to the time of the future. Welcome to the future of cosmology. Welcome to the future of the Cosmos. Welcome to the Cognitive-Theoretic Model of the Universe.

This paper will provide a brief overview of the existing literature on the CTMU's metaphysical extension of physics and future directions for the proposed unification of general relativity and quantum mechanics in a CTMU 'unified field theory.'

Part 2: Quantum Mechanics

The quantum mechanical view of the CTMU can be summed up through an extension of the respected physicist John Wheeler's Participatory Universe idea, which says that "physics gives rise to observer-participancy; observer-participancy gives rise to information; and information gives rise to physics," and his 'It from Bit' cosmology which says that the information from observer-participants across time parameterizes the existence and evolution of the Universe (Wheeler, 1980). Langan generalizes observer-participancy to the 'agentive telesis' of observer-participants, redefining the role of human beings and other organisms of sufficient cognitive complexity to a 'secondary telor' that participates and informs the Reality Self Simulation (Langan, 2020). Therefore, Langan writes, "In the CTMU, human beings comprise a class of entities with a very specific mathematical formulation and an essential role in the structure and dynamics of reality" (Langan, 2018a).

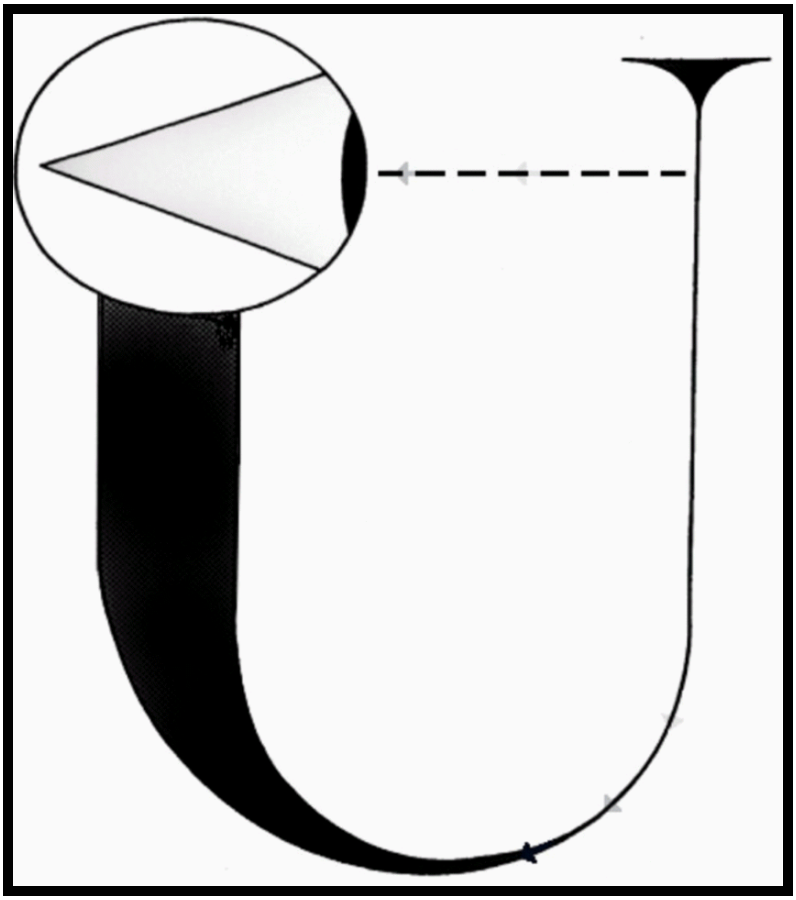

Fig 2.1: *John Wheeler's 'Self-Excited Circuit', a closed loop in which the observation of observer-participants (denoted by the eye in the top left corner of the image) gives tangible existence to the early history of the universe through the retrocausal decoherence of the quantum wave function, which in turn creates a reality habitable by observer-participants (Wheeler, 1980).*

Where observer-participants or 'sensor-controllers' of the kind discussed form an intermediate level of causation between the global and quantum strata of reality, understanding the nature of agentive telesis will prove to be the 'missing link' to finally

“synergistically relate the microscopic and macroscopic scales of reality to each other” (Langan, 2019).

The famous double-slit experiment that proved to modern physics the reality of ‘wave-particle duality’ in quantum mechanics shows that in between acts of observation, electrons when passed through a double-slit, produce an interference pattern or probability wave distribution or ‘quantum wave function’ on a screen and only ‘collapse’ to behave like particles once ‘registered’ (i.e., measured by scientists), meaning quantum particles – in some sense – seem to be sensitive to the act of human observation.

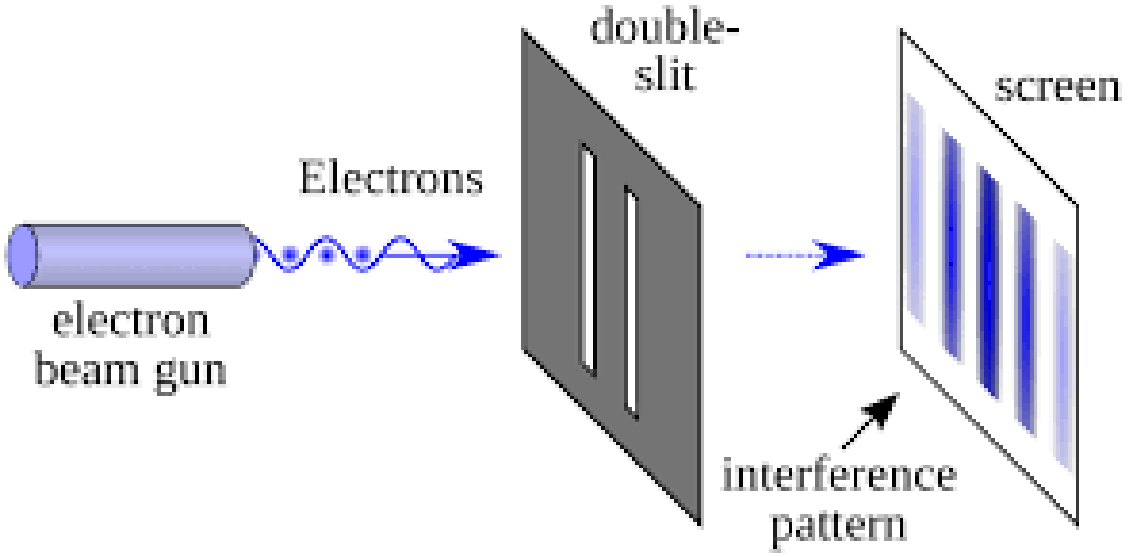

Fig 2.2: *Representation of the double slit experiment which demonstrates that quantum particles are analogous to probabilistic ‘waves’ and have no definite position or velocity*

until 'decohered'.

According to the Copenhagen interpretation of quantum mechanics pioneered by Nobel Prize-winning physicists Werner Heisenberg, Niels Bohr, and others, quantum wave functions exist in between measurements as an infinite, expansive space of all potential states from which the 'quantum wave function collapse' (the decoherence of the wave function), probabilistically 'selects from' to actualize the particular position and momentum of a quantum particle. A poetical interpretation of the decoherence of the quantum wave function, that "a physicist is just an atom's way of looking at itself," has been attributed to Niels Bohr. The false quote seems to have been based on Nobel Prize-winning physiologist George Wald's lecture, Life and Mind in the Universe, in which he remarks, "A physicist is the atom's way of knowing about atoms" (Wald, 1984). Regardless, this reflects a fundamental principle of quantum mechanical interpretation, Niels Bohr's Correspondence Principle, which says that properties of large quantum mechanical systems must reproduce and 'correspond to' that which we should expect from the equations of classical physics (Bohr, 1920), and — in principle -– the mental activities of the scientists who study these equations, as well.

We can generalize Bohr's correspondence principle, owing to Langan's dictum that QM must relate the microscopic and macroscopic scales of reality, to include not only the requirement of reproducing classical physics but answering metaphysical questions as well, including but not limited to the evolution of biological organisms and consciousness for whose emergence the universe seems to be fine-tuned, the inception of the universe and its physical structure, and numerous other problems. A true Grand Unified Theory needs not only to adjoin quantum mechanics to general relativity but

also to correspond to the Darwinian model of biological evolution, solve the so-called ‘hard problem of consciousness,’ and account for the ‘fine-tuning problem’ of the constants in nature, the ‘anthropic’ principle in cosmology, and more in a way not preemptively closed off to teleology and advanced causation. It remains to be seen that if we are to take the results of the double-slit experiment seriously, an explanation of these problems and conundrums plaguing the physical sciences qua quantum mechanics amounts to an explanation of these problems and conundrums qua observation, where mainstream quantum mechanics supports a view of reality in which it is impossible to hold physical reality apart from a ‘generalized self-perception’ that determines its existence, evolution, and sustenance.

Langan’s CTMU holds that the universe begins in a state of ‘unbound telesis,’ “a realm of zero constraint and infinite possibility where neither boundary nor content exists” (Langan, 2002), which self-configures retrocausally by feedback between syntax and state and the information gained from the perception of its secondary telors, which amounts to ‘local self-perceptions’ in and of the universe which determine the laws and structure of the universe as they evolve in coupling with their instances in a way corresponding to Wheeler’s model of the participatory universe previously discussed. Unbound telesis is alternatively called the ‘syntactic metaverse’ (Langan, 2017), a set of infinite, expansive potential that describes the deep reality needed for a proper quantum mechanical interpretation, which must select from a ‘cosmic wave function’ in order to actualize a particular universe. The universe is created on the fly according to its own freely changing internal conditions and its imperative for the emergence of secondary telors who can fortify and renew its identity through local self-perceptions, agentive telesis, and observer-participancy.

We can thus show that at least three classical dictums are demonstrated by Langan's CTMU interpretation of quantum mechanics, called 'Quantum Meta-Mechanics' to reflect the fact that it exists as a codomain to provide ontological grounding to the various interpretations of quantum mechanics (Langan, 2019):

1. **Georg Berkeleys 'esse est percipi'—to be is to be perceived (Berkeley, 1710)**: Langan's Quantum Meta-Mechanics, defined as the 'meta-interpretive mapping' between quantum mechanics and reality, shows that reality is defined according to the perception and cognition of secondary images of the G.O.D. through which it defines the properties of the Reality Self-Simulation, and thus the set of truthful attributions included within reality, in accordance with the CTMU Reality Principle, which states that "reality contains all and only that which is real" and that reality, therefore, is predicated as a closed, descriptive manifold outside of which no real objects exist or relate to reality (Langan 2002). Therefore, the self-perception of the G.O.D. defines inclusion in reality.

2. **The Old Testament prophet Isaiah's prophecy that "he hath established it, he created it not in vain, he formed it to be inhabited: I am the LORD; and there is none else" (Kings James Bible, Isa. 45:18)**: This reflects the fact that the universe and quantum fields within it evolve towards the evolution of biological life and that the laws and structure of the universe reflect this end. Life originated not only biologically but metaphysically as well, existing as potential before its instantiation, driving forward cosmic evolution according to this drive for self-fulfillment. Life and the universe evolve in coupling with one another, and the driving force behind this

self-dual evolution is the unfolding teleology of the G.O.D., which exists and extends within and beyond the confines of the universe and whose stature as the ultimate reality and implicit coupling with its secondary images (including human beings) allows us to ascribe certain anthropic properties consistent with the definition of God in Abrahamic monotheism, with His influence and creative power enveloping all of reality. The CTMU also supports the theological model of 'hological panentheism' or 'holopantheism' (Langan, 1998) in which the entire universe exists within God, and God's self-perception and sentience are equivalent to the constructive, creative intelligence of the universe. Truly, 'there is none else.'

3. **A generalization of 'cogito ergo sum – I think therefore I am,' René Descartes's famous conclusion of his philosophical doubt in Discourse on the Method (Descartes 1637)**: This constructive, creative intelligence, of whom we are secondary images, is not only related to being but is the 'ultimate being,' in terms of which all other beings are defined. Thus, the G.O.D. could alternatively and more secularly be termed the Universal Mind, putting mind and the universe into mutual contact and serving as a medium for all of our individual minds. Christopher Langan writes, "In explaining this relationship, the CTMU shows that reality possesses a complex property akin to self-awareness. That is, just as the mind is real, reality is in some respects like a mind. But when we attempt to answer the obvious question, "Whose mind?" the answer turns out to be a mathematical and scientific definition of God. This implies that we all exist in what can be called "the Mind of God" and that our individual minds are

parts of God's Mind" (Langan 2000). The powers of analogy and association ('thoughts') of this Universal Mind generate the reality we exist within and relate cognition and Being in a way reminiscent of Descartes's cogito.

The essential insight of the CTMU model of Wheeler's Participatory Universe that the existence of the universe owes to the self-perception of the G.O.D. was captured by a poetical interpretation of Berkeley's 'esse es percipi' dictum in the form of a limerick composed by English theologian Ronald Knox and responded to by an anonymous author:

There once was a man who said: "God
Must think it exceedingly odd
If he finds that this tree
Continues to be
When there's no one about in the Quad."

Dear Sir,
Your astonishment's odd.
I am always about in the Quad.
And that's why the tree
Will continue to be
Since observed by

Yours faithfully,

God (Knox & Anonymous, 1924)

The CTMU reveals that the quantum wave function collapse is not random, deterministic, or stochastic but rather according to the mind and will (agentive telesis) and needs of the secondary images of the G.O.D. across time, who are observer-participants in the Reality Self-Simulation created by, for, and through their existence and evolution. The laws and structure of the universe are due to three levels of quanta: the G.O.D. (primary telor and syntactor), observer-participants (secondary telors and syntactors), and subordinate quanta (tertiary syntactors), the smallest discrete units of reality. In the CTMU, syntactors are coherent processors responsive to telic recursion (the advanced causation/programming of the 'conspansive manifold') (Langan, 2002), and telors are "structurally complex syntactors that can "factorize telesis" or actualize ontic potential, and have sufficient complexity to consciously generate internal representations of themselves and their relationships with the external environment" (Langan, 2018). Tertiary syntactors – or 'syntactic operators' – 'conspand' to form a continuous medium of existence called the conspansive manifold', which – as opposed to the classical manifold of physics and Cartesian coordinate spaces of mathematics – are not quantized in terms of zero-dimensional cuts. Christopher Langan writes that the problem with such mathematical quantization is that "'of zero extent in a given space' means 'nonexistent in that space' – existence in a space means taking up space in it – and we cannot assert the existence of a space consisting of nonexistent points that take up no space at all" (Langan, 2019).

Instead, the CTMU maps the classical manifold into a conspansive manifold, a mathematical structure representing reality's fundamental nature as it evolves over time. It is a multidimensional space that encompasses all possible states of the

universe, and the dynamics of the manifold determine the evolution of the universe. The universe is a self-simulation by, for, and through ultimate reality. Reality is an identity operator that identifies with itself through the process of creation and then attributes existence to its own identity.

In the CTMU, 'God' is called the G.O.D., the Global Operator-Descriptor, of this reality self-simulation. The internal logic of the self-simulation is through the metaformal system, an intrinsic language that Reality uses to communicate with itself, also called M. Christopher Langan writes, "the evolution of the conspansive manifold is that of M itself… QM [quantum mechanics] is thus mapped to the open top layer of the conspansive manifold," (Langan, 2019) the 'surface structure' of the metaformal system in which the terminal display of physical reality is located, and thus the excitations of the deep reality which are represented by the formalisms of the Schrödinger equation and the logico-geometric structure of the conspansive manifold itself.

The conspansive manifold evolves through a two-stage process called conspansion where points in the manifold 'inner expand' to include all potential states and 'requantize' according to the time-dependent information of the telors and syntactors through which M self-quantizes and generates its future states through a 'state-transition syntax' consisting of the metaformal grammar ΓMU, which maps between M and its secondary images. The two phases of the conspansive process are analogous to M's design and actualization of the universe as a whole and "related to the familiar wave-particle duality of quantum mechanics" (Langan, 2002). Each new state is created within the image of the previous one, transforming "a superposition of many possible states into a single eigenstate" (Langan, 2019), meaning the entire universe is rescaling and requantizing at every moment in time. Because reality is a closed,

descriptive manifold that omits no essential predicate, its self-description is isomorphic to its self-instantiation, and by syndiffeonesis, there is, therefore, a deeper level of reality which includes both its linguistic and logical structure as well as its geometric and physical instantiation. Thus begins 'Langan's regress' which ultimately requires that reality be fundamentally logico-geometric, or – alternatively – a language that both describes its object universe and creates the universe it describes: a 'metalinguistic metaobject' or 'self-configuring, self-processing language (SCSPL)' (Langan, 2004).

The 'points' in the conspansive manifold are thus mapped to syntactic operators who achieve spatial extension and state-transition syntax according to the teleology of the Metaformal System and evolve by transforming the deep structure of the SCSPL universe in a way equivalent to the grammatical transformations of the 'start symbol' in formal grammar theory, through which intelligible expressions of a language are derived (Chomsky, 1957).

Quantum meta-mechanics, therefore, comprises the correspondence between the formalisms of quantum mechanics and the linguistic or 'metaformal' structure of reality itself by mapping the quantum wave function collapse into the conspansive manifold and thus, "by distributing the design phase of reality over the actualization phase, conspansive spacetime also provides a distributed mechanism for Intelligent Design, adjoining to the restrictive principle of natural selection a basic means of generating information and complexity" (Langan, 2002). The position and momentum of quantum particles, therefore, are not 'random' or 'determined' but rather the expression of the metaformal identity M and its secondary images, which can scale over time to form complex systems with 'teleodynamics' (Langan, 2019), a generalization of classical mechanics that focuses on the universe's expression of teleology over time, including

the course of cosmic and biological evolution. The quanta of the universe (telors, syntactors, etc.) scale to telic coherence (in a way reminiscent of Bohr's Correspondence Principle) through the metalinguistic grammar Γ_{MU}, which attaches the G.O.D. to its secondary images and determines the evolution of the universe over time.

Reality consists of a "generic level of [M's] own self-attributed being as ontic potential, generatively actualizing itself from that potential in the form required for existential self-identification and scientific intelligibility." This form, the syntax, rules, and structure of every operator and descriptor in the conspansive manifold, is called the 'universal distributed form' (UDF) of the G.O.D. and is what relates all of the several parts of the universe to one another and to the whole. Therefore, reality is self-similar at all levels and could creatively be termed a 'fractal,' whose detailed structure reflects and instantiates the universe as a whole through an 'extended superposition' that allows all quanta of the universe to non-locally interact with one another and to the whole. In the language of Greek philosophy, the G.O.D. could be considered the 'form' of the universe, forming the essential basis of reality, giving life and coherence to the cosmos, and comprising the metaphysical essence of all things.

In the language of Greco-Christian theology, the CTMU Metaformal System M seems to qualify as a technical definition of the Logos (Ancient Greek for "Word"), making the ultimate identity of reality linguistic in nature. Thus, the scriptural passage "In the beginning was the Word, and the Word was with God, and the Word was God" (John 1:1) can be interpreted in the CTMU Metaformal System, reflecting the coupling of M and the G.O.D. in the CTMU concept of God and Ultimate Reality.

We said that reality is fractal in nature, and yet it has shocking coherence at all strata, including its highest level of identity. What binds all strata, diversity, and multiplicity in

the Universe? Clearly, the answer – as it has always been – is Logos: the intrinsic metalanguage that unites the terminal (actualization) and non-terminal (design) domains of reality through its distributed metaformal grammar and connects the life and consciousness in and of the universe to M, thereby allowing it to fortify and renew its identity. In the CTMU Metaformal System, the design and actualization of “life and consciousness are specifically quantized as innately coherent secondary telors whose coherent existence surpasses their physical emergence” (Langan, 2019). Therefore, according to CTMU quantum meta-mechanics, life originated metaphysically as well as biologically and exists to allow the universe to instantiate Logos/M over time through its ‘secondary images’/observer-participants.

Part 3: Special and General Relativity

Albert Einstein's theory of relativity breaks down into two parts: the theory of special relativity and the theory of general relativity.

Special relativity builds itself from two opposing and well-established scientific principles: the principle of relativity and the invariance of the speed of light. The principle of relativity, originally formulated by Galileo Galilei, says that whenever something is moving, what one is really saying is that it's moving relative to something, some stationary object. Yet, from their perspective, the observer is getting further away, not them. From a third perspective, they're both moving relative to another stable body. This throws our entire conception of position in space, upon which our experience and science itself rely, into disarray. A stationary perspective is called an inertial frame of reference, meaning an object traveling at a constant velocity that won't change speed or direction unless acted upon by an outside force, where the laws of physics are the same

for all inertial frames of reference. We thus must substitute our unstable notion of motion with motion relative to a rigid body of reference (Stannard, 2008).

A seemingly contrary principle in science is that the speed of light is 299,792 kilometers per second, a constant denoted by C regardless of the inertial frame of reference. This was proven by Albert A. Michelson and Edward W. Morley years before Einstein based on experiments regarding 'binary stars,' which showed that the speed of light cannot depend on the velocity of the object from which it's emitted (Michelson & Morley, 1887).

Einstein's special relativity makes it clear that our concept of time cannot be separated from space and position. The CTMU takes this one step further and shows that time is the distributed processing or 'state-transition syntax' for space, which allows it to exist, evolve, and extend into the future through conspansion. Einstein introduces a t-axis, joining it to our standard XYZ coordinate plane. This means that every object can be treated as an event that exists in a particular position at a particular time. We can build a four-dimensional 'block universe' by putting together every event that is, was, or ever will be into a static manifold, with each cross-section representing a frozen frame of three-dimensional space.

We can briefly summarize Einstein's theory of special relativity by explaining that observers in relative motion have different viewpoints and thus observe different projections of the 4D block universe. As a consequence of relativity, the kinetic energy of an object can no longer be found by the equations of classical mechanics, which say: $E[Energy] = 1/2 * M[Mass]V[Velocity]^2$. This equation must be transformed into the famous special relativity equation:

$E[Energy] = M[Mass]C[Speed\ of\ Light]^2 \div \sqrt{V[Velocity]^2/C^2}$, approximating the standard kinetic energy equation at low velocities (Einstein, 1916).

Despite the clear vision and sheer genius of special relativity, it's evident that it needs a revamp. The trouble with relativity is not that it's untrue but that it's incomplete. When we consider the view of the universe that relativity gives us, we end up with nothing but an arbitrary and deterministic 4D manifold that makes no distinction between past, present, and future and thus cannot account for causality or generativity in any real sense. The CTMU Metaformal System infuses every event with its metaphysical/metalinguistic identity through the conspansive manifold. It replaces the concept of an event, an infinitesimal point, with a syntactic operator that transforms the syntax of the SCSPL universe, creating reality according to the expression of teleology, thus bringing the ‘events’ of special relativity into coincidence with the ‘wave-particle duality’ of quantum meta-mechanics and mapping both into the open top layer of the conspansive manifold/ terminal domain T. These operators and descriptors take on physical extension through the geometry of conspansive spacetime.

When you combine all of these syntactic operators, instead of getting a block universe, you get the conspansive manifold, embedding the universe in a tapestry of infinite, expansive potential through which it can exist and evolve. In the conspansive manifold, “states can never leave the overall manifold or primary point (as there is nowhere else for them to go)... and are outwardly rescaled even as they have been replaced by new states and receded into the past, nesting and progressively interpenetrating as the manifold evolves” (Langan, 2019). This contrasts with the special relativity 4-dimensional ‘block world’ in which nothing changes in space and time (Stannard, 2008). The CTMU adjoins a distributed mechanism of generativity to special relativity

through which the universe can create new states within itself instead of evolving into a pre-determined future. The future exists only as unbound potential, which is actualized by telors and syntactors (not including syntactic operators/tertiary syntactors, which have no volition and only instantiate higher-order teleodyanmics) with absolute self-generative freedom and self-modeling capacity with respect to configuration, transforming information about past states and collapsing this ontic potential into a new state according to its state-transition syntax, which is syntactically equivalent to the universal distributed form of the G.O.D., through which the universe is endowed with a volitional capacity of its own.

While Einsteinian spacetime is incapable of the kind of generativity needed for ontic closure, its essential insights and formalisms can be easily mapped into Langanian conspansive spacetime. Concerning this mapping, Langan writes, “Spacetime too is ectomorphic, consisting of points called “events” which are specified by four coordinates, three of space and one of time, that are separated by spacetime geodesics called worldlines. Spacetime can be overlaid on a continuously collapsed idealization of the terminal point-set T of the conspansive manifold, the points of which are fully collapsed tertiary syntactors already conveniently coupled in mutual identification events… spacetime is just a kind of “ectomorphic dual” of the conspansive manifold. Spacetime approximates T in the sense that objects “move” by skipping along timelike gradients like stones on the surface of a pond, their paths effectively interpolated between points generated on the surface. But unlike spacetime, the surface itself is regenerated with each skip of the “stone” or tertiary identity, and while spacetime can only confine its evolution to an ectomorphic scenario devoid of any extrinsic pregeometric background, T resides on an intrinsic background, the nonterminal domain N. T is thus adjoined to the deeper structure supporting teleodynamics, which cannot

reside on the surface of the manifold and is not actually supported there" (Langan, 2019). In short, spacetime is merely the tip of the iceberg – so to speak – and the true dynamics of the universe reside in the 'deep structure' of the conspansive manifold. The CTMU embeds classical spacetime in the non-terminal domain N, the world of design and potential, to adjoin it to the deeper structure that supports the necessary teleodynamics to create, evolve, and sustain the real universe.

All of Aristotle's 'four causes' (Aristotle, n.d.) are mapped into the structure of the conspansive manifold, providing its own physical material (material cause), metaphysical design (formal cause), self-operation (efficient cause), and teleology (final cause). Because each of these strata of causation is observed to occur at both the quantum and global life, "the CTMU conspansive manifold [is] conceived as a joint medium for QM [quantum mechanics] and General Relativity" (Langan, 2019). The conspansive manifold is a metaformal extension of the theoretical framework of quantum field theory (QFT), a formalism that combines classical field theory, special relativity, and quantum mechanics (Peskin & Schroeder, 1995). QFT describes quantum objects as excitations or 'excited states' of 'quantum fields' in a way obviously analogous to the inner expansion and re-quantization of the underlying 'quantum metafield' of the conspansive manifold, in which the wave-particle duality becomes 'field-particle duality' as "the field [is] internal to the points just as the points are internal to the field." Langan embeds QFT and General Relativity into this "quantum metafield where physical systems superpose directly on deeper levels of metaphysical structure and dynamics" (Langan, 2019).

John Wheeler's famous saying summarizes general relativity, "Spacetime tells matter how to move; matter tells spacetime how to curve" (Wheeler, 1998). This sort of

feedback required for spacetime curvature and thus gravitation can only be achieved through the conspansive manifold, which “is dynamic, with dual outward and inward gradients accounting for gravity and the relative linear gradient of the conspansive manifold, which is dual to the timelike collapse gradients of T [the terminal domain, which is equivalent to classical spacetime]” (Langan, 2019). The weak and strong equivalence principles in general relativity, respectively, say that one cannot distinguish between motion under gravity and acceleration and that all physical behavior is the same under gravity and acceleration (Stannard, 2008).b

According to Christopher Langan, the CTMU ‘meta-axiom’ or ‘master equation’ realityINT=*realityEXT of Analytic Reality Closure (ARC) – which says that reality’s intension and extension are self-dual to one another, thereby rendering reality analytically self-contained – “can be regarded as a logical generalization of Einstein’s Equation [E=MC2], with a medium on one side and its content on the other” (Langan, 2018b). General relativity must be affixed to an ‘intrinsic background’ because reality is a closed descriptive manifold and any external background against which the differential geometry of general relativity could be affixed “would simply imply the existence of a deeper level of reality to which the scale is intrinsic and by which it is itself intrinsically explained as a relative function of other ingredients… using a distributed-syntactic “tangent space,” the structure of spacetime is tensorially defined in terms of the masses and relative positions of its own material contents, resulting in an intrinsic MAP-like definition of spacetime. Unfortunately, the basic formalism of GR, differential geometry, is not self-contained with respect to time; as currently formulated, it tacitly relies on an embedding (conspansive) medium to provide it with temporal potential” (Langan, 2002). The CTMU can thus be understood as a ‘hological principle of relativity,’ embedding the differential geometry of general relativity into each point of the

intrinsic background of the conspansive manifold. Hology is “a form of self-similarity whereby the overall structure of the universe is everywhere distributed within it as accepting and transductive syntax, resulting in a homogeneous syntactic medium” (Langan, 2002).

General relativity is thusly formulated as “a deterministic subtheory of the CTMU, related therein to a nondeterministic quantum subtheory” (Langan, 2002). The intrinsic self-determinacy of the conspansive manifold itself relates the two.

Christopher Langan writes, “In the CTMU, gravity does indeed arise through the Telic Principle (teleology), but as a property of the conspansive manifold rather than as a 'force' (the gradient of a classical potential)” (The Cognitive-Theoretic Model of the Universe (Chris Langan's CTMU Group), Langan, 2017). Because this property scales from the quantum to the global strata of matter and spacetime, one can thusly assert that the CTMU Metaformal System is a ‘theory of quantum gravity,’ a fact which Langan once wrote, “will no doubt eventually emerge” (Langan, 2019).

Christopher Langan writes elsewhere, “The QM-GR relationship is defined by a convergent model (consistent interpretation mapping) in a common framework (metaphysical structure), the CTMU. In other words, both physical theories can be simultaneously modeled in one metaphysical framework with some degree of overlap” (The Cognitive-Theoretic Model of the Universe (Chris Langan's CTMU Group), Langan, 2017). Although a CTMU unified field theory seems within sight of a careful and intelligent reader of this paper, I will leave the presentation of the high-level logico-mathematical structure of such a grand unified physical theory to Mr. Langan himself.

Part 4: Cosmological Implications

By the Metaphysical Autology Principle (M.A.P.), which says that the real universe is a closed, descriptive manifold outside of which nothing can relate to reality, saying (tautologically) that reality contains all and only that which is real (Langan, 2002), implying that the real universe must be self-creating, self-sustaining, self-contained, and self-explanatory (Langan 1998a). This connects with the late Stephen Hawking's *No Boundary Proposal*, which says that "the universe is completely self-contained, and that there is nothing outside the universe… the boundary conditions of the universe are that there is no boundary" (Hawking, 1998). Hawking uses 'imaginary time,' a generalization of time expressed in terms of imaginary numbers, such as $\sqrt{-1}(i)$. Special relativity spacetime is typically mathematically represented as $d^2 = x^2 + y^2 + z^2 - t^2$, which is equal to $d^2 = x^2 + y^2 + z^2 + (it)^2$, and allows us to treat imaginary time (*it*) as a fourth spatial dimension. The main application of imaginary time to a previously undecidable problem is that of the origin of space and time themselves. Imaginary time smooths out what appears as gravitational singularities in ordinary time, including the Big Bang, allowing us to treat it in the same way as any other point in four-dimensional spacetime (Hawking, 1998). This is reminiscent of the cosmological principle or super-Copernican principle, which says that there is no special point in space and time (Harrison, 1981; Wheeler, 1989) and the extended superposition principle in the CTMU, which "makes cosmogony a distributed, coherent, ongoing event rather than a spent and discarded moment from the ancient history of the cosmos" (Langan, 2002). This is achieved by distributing the singularity in ordinary time over every point in space and time. Therefore, the universe has no inception or boundary and can properly be described as self-contained and self-explanatory.

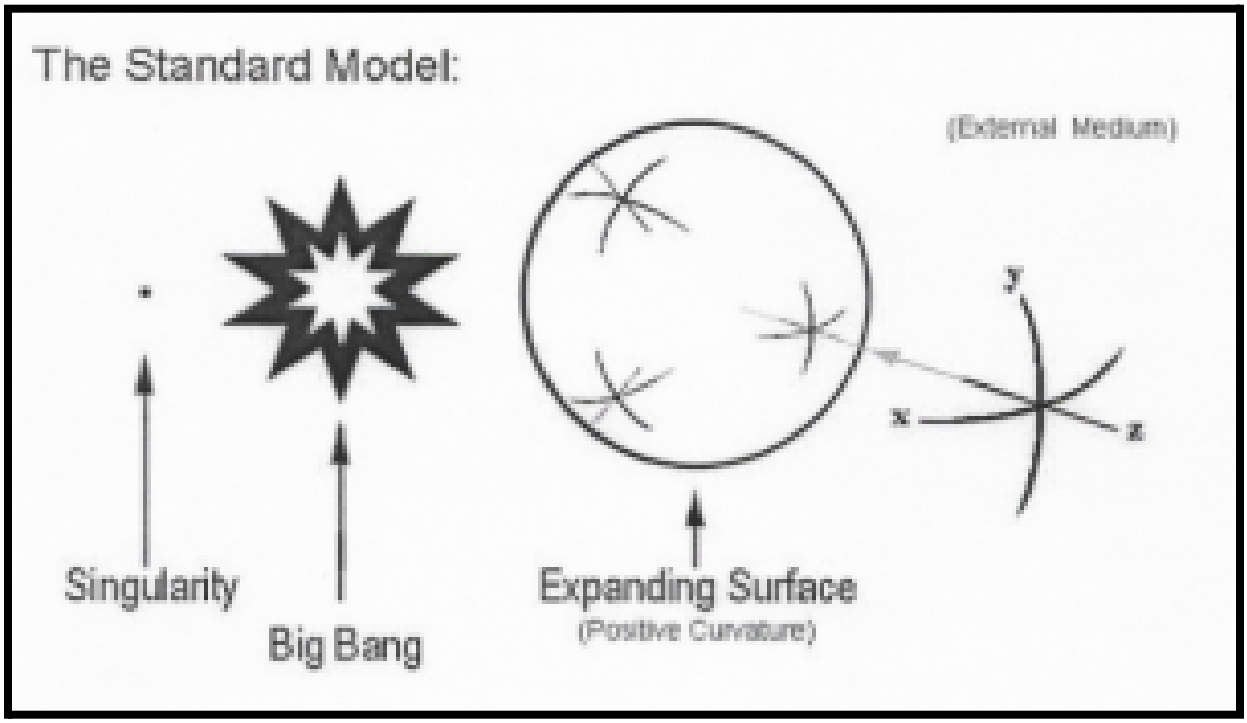

Fig 4.1: *The standard model of spacetime, which consists of a finite surface expanding into a nebulous external space in three dimensions – in contrast to Langan and Hawking's 'intrinsic cosmology' in which the universe is self-contained and it's inception event ('big bang') is evenly distributed throughout all points in space and time (Langan, 2001b).*

The imaginary time 'intrinsic cosmology' also resolves the problem of *ex nihilo* cosmogony (how the universe emerges out of nothingness) by making the universe a self-collapsing quantum wave function which retrodicts its own existence, transforming the point particles of statistical mechanics into quantum harmonic oscilators (quantized as tertiary syntactors/syntactic operators in the CTMU) which are excitations of quantum fields. After the universe's inception, it evolves according to fixed laws for which Hawking does not offer an explanation. Despite the profundity and vision of

Hawking's 'intrinsic cosmology' idea, it falls short because it only uses the terminal domain (L_0/T) as explanation for the inception of the universe or its laws. It is for this reason that Chris Langan describes the CTMU as "a cross between John Archibald Wheeler's Participatory Universe and the Stephen Hawking-James Hartle "imaginary time" theory of cosmology" because it defines the boundary conditions of the universe as once of self-creation through the observer-participancy of its secondary telors and the inception of its laws through the universal distributed form of "SCSPL syntactic operators containing within themselves the syntactic rules by which they internally process each other to create new states of physical reality" (Langan, 1998a), and thus the emergence of laws and states in coupling with the unfolding teleology of the universe, rather than one deterministically causing the other. Langan completes Hawking's *No Boundary Proposal* by showing that the initial (timeless) state of the universe is a coherent cosmic wave function ('unbound telesis') which decoheres through retrocausal telic recursion in "meta-time" and that the universe has an 'intrinsic background' against which it evolves.

Chris Langan writes, "CTMU monism says that the universe consists of one 'dual-aspect' substance, *infocognition*, created by internal feedback within an even more basic (one-aspect) substance called telesis" (Langan, 1998b). The universe is thus quantized in terms of a protean metasubstance defined on its ability to create itself and to generate conspansive spacetime.

In the CTMU, reality's fundamental "stuff" is not matter, energy, or information, but instead telesis, which combines the intentions of the G.O.D. and its sensor controllers with energy and information. The CTMU calls this 'telesis' because it is evolving towards a teleology, from the Greek telos for "end" or "purpose". Telesis self-replicates and self-selects to choose the most utile configurations of itself, adjusting on the fly to

a self-optimative metric called ‘generalized utility’, and thus refines itself by cross-definition of laws and states from its primordial state of ‘unbound telesis’ or the coherent cosmic wave functions, so that it can fortify and renew its identity.

The CTMU thus inaugurates a new ‘meaning of life, the universe, and everything’, this generalized utility which is equivalent to the universe’s intrinsic need for self-fulfillment and self-identification: “with respect to meaningful content, the universe remains steady in the process of self-creation” (Langan, 1998b. The real universe ‘self-simulation’ of the unfolding teleology of the G.O.D. through the ontic medium of telesis.

In his popular interview with the MSCS Media Podcast, Chris Langan says "the Universe is constantly creating, it's in the process of Creation… It's constantly looking for opportunities to nucleate itself. It's a potential. It wants to self-actualize so it's constantly looking for things around which it can self-actualize… Telesis consists of future realities, possible futures” (Langan & Kneightley, 2023). The CTMU thus adjoins to Hawking’s *No Boundary Proposal* a mechanism for the self-creation and self-evolution of the universe according to the will of the primary telor/G.O.D., defined in terms of a primary state of ontic potential from which the universe self-selects and optimizes for generalized utility over time (Langan, 2002). The universe retrodicts itself using telic recursion to actualize a timeline which leads to its self-emergence and self-organization. Regarding the cosmological features of a CTMU universe and the necessary revision of basic physical concepts like time and space. Langan writes, "Space, once a featureless medium aimlessly proliferating through cosmic expansion, becomes a distributed syntactic structure iteratively reborn of matter and subject to conspansive evacuation and rescaling. Time, previously envisioned as a quasi-spatial linear dimension along which the cosmos hurtles like a runaway locomotive, becomes

the means by which the universe self-configures…an SCSPL-grammatical symphony of logico-linguistic transformations played by the self-creating cosmos" (Langan, 1998a).

In his inaugural paper on relativity, Albert Einstein writes of 'the possibility of a 'finite' yet 'unbounded' universe' as one of the considerations on the universe as a whole based on the special and general theories of relativity (Einstein, 1916). Along these lines, Chris Langan writes, "It makes perfect sense to speak of an "infinite but closed" universe….and of a "big bang" and "big crunch" which may be "infinitely" far away in the past and future, and yet identically distributed over time. By the way, eternity must be treated like infinity; it "lasts" long enough to encompass any discrete HSCS-syntaxified process but is instantaneous at the identic level of reality. In fact, time and space as we know them arise only as artifacts of metasyntactic restriction; without the attending inductive stratification, the universe is an atemporal, "instantaneous" flash of parallel self-differentiation" (Langan, 1993).

In the words of the great German philosopher Georg Hegel,

"The chalice of this realm of spirits Foams forth to God His own Infinitude" (Hegel, 1807).

From infinity to infinity. And beyond.

Works Cited

Langan, C. (2002): *The Cognitive-Theoretic Model of the Universe: A New Kind of Reality Theory*.

Langan, C. (2018b): *The Metaformal System: Completing the Theory of Language*.

Langan, C. (2019): *Introduction to Quantum Metamechanics*.

Langan, C. (1992): *The Mathematical and Metaphysical Bases of Choice, Purpose, and Free Will*

Langan, C. (2001a): *A Very Brief History of Time*.

Wheeler, J.A. (1980): *Beyond the Black Hole*.

Langan C. (2020): *The Reality Self-Simulation Principle: Reality is a Self-Simulation*.

Langan, C. (2018a): *Metareligion as the Human Singularity*.

Wald, G. (1984): *Life and Mind in the Universe*.

Bohr, N. (1920): *Über die Serienspektra der Elemente ["About the serial spectra of the elements"]*.

Langan, C. (2017): *An Introduction to Mathematical Metaphysics*.

Berkeley, G. (1710): *Treatise Concerning the Principles of Human Knowledge*.

Stuart, J., et al (1611): *The King James Bible*.

Langan, C. (1998): *Introduction to the CTMU*.

Descartes, R. (1637): *Discourse on the Method*.

Langan, C. (2000): *On the CTMU*.

Knox, R. & Anonymous (1924): *The Tree in the Quad*.

Chomsky, N. (1957): *Syntactic Structures*.

Stannard, R. (2008): *Relativity: A Very Short Introduction*.

Einstein, A. (1916): *Relativity: The Special and General Theory*.

Michelson, A. & Morley, E. (1887): *On the Relative Motion of the Earth and the Luminiferous Ether*.

Aristotle (n.d.): *Metaphysics*.

Peskin, M. & Schroeder, D. (1995): *An Introduction to Quantum Field Theory*.

Wheeler, J. (1998): *Geons, Black Holes, and Quantum Foam: A Life in Physics*.

Langan, C. (2017): *Response to post about the nature of gravity and reality in the CTMU [https://www.facebook.com/groups/ctmurealitytheory/permalink/10155387745007486/?comment_id=10155388003157486&comment_tracking=%7B%22tn%22%3A%22R%22%7D]*.

Langan, C. (2017): *Response to post about how the CTMU reconciles quantum mechanics with relativity [https://www.facebook.com/groups/ctmurealitytheory/permalink/10155794310692486/?comment_id=10155795670592486&comment_tracking=%7B%22tn%22%3A%22R1%22%7D]*.

Langan, C. (1998a): *The CTMU as the Nexus of Spirituality and Cosmology: An Interdisciplinary Approach to Reality*.

Hawking, S. (1988): *A Brief History of Time*.

Hawking, S. (2001): *The Universe in a Nutshell*.

Harrison, E. (1981): *Cosmology: The Science of the Universe*.

Wheeler, J.A. (1989): *Information, Physics, and the Quantum: The Search for Links*.

Langan, C. (2001b): *CTMU Diagrams*.

Langan, C. (1998b): *Flash from Deep Space: Supernews on Supernovas/Physics and Metaphysics*.

Langan, C. & Kneightley, T. (2023): *Chris Langan: IQ 210, Einstein's 160 #1 In World? Simulation, Theory Of Everything | Mscs Media *334* [https://www.youtube.com/watch?v=4zT6_6sUflc].

Langan, C. (1993): *On the Reification of Many-Valued Logic and Infinity*.

Hegel, G. (1807): *The Phenomenology of Spirit*. (*Adaptation of Schiller's Die Freundschaft ad fin.; cp. also Schiller's Philos. Briefe, "Gott").*