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The Computational Unified Field Theory (CUFT) – Revising Quantum & Relativistic Models

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1. Introduction

1.1. The Computational Unified Field Theory (CUFT)

Over the past three years, a new hypothetical 'Computational Unified Field Theory' (CUFT) has been discovered which sets to unify between Quantum Mechanics and Relativity Theory (e.g., whose current theoretical contradiction is considered to be most likely the greatest unresolved enigma in modern Science). Indeed, several previous articles have demonstrated that this new hypothetical CUFT is capable of resolving the principle quantum-relativistic theoretical inconsistencies, replicating all of their key empirical phenomena, and was able to identify (three) "differential-critical" predictions differentiating it from both quantum and relativistic models of physical reality; Indeed, before proceeding to describe a (recent) empirical validation of one of these three CUFT 'differential-critical' predictions it may be helpful to delineate the key theoretical postulates underlying the CUFT as well as its associated "'Cinematic-Film Metaphor";

1.1.1. The 'Duality Principle'

The first theoretical postulate underlying the CUFT is the computational **'Duality Principle'** [4] which identified a basic "computational flaw" associated with both Quantum and Rela-tivistic computational systems; The Duality Principle demonstrates that both quantum and relativistic computational systems comprise a 'Self-Referential Ontological Computational System' (SROCS) which assumes that it is possible to determine the value of any given 'y' (e.g., subatomic 'target' or relativistic 'space-time' or 'energy-mass' entity) strictly based on its direct (or indirect) physical interaction with another (exhaustive) 'x' factor/s (e.g., subatomic 'probe' or relativistic observer). It proves that such SROCS computational structure inevitably leads

to both "logical inconsistency" and "computational indeterminacy" which are contradicted by robust empirical evidence indicating the capacity of both quantum and relativistic to determine the particular value of any given subatomic 'target' element or relativistic 'space-time' or 'energy-mass' phenomenon. Hence, the 'Duality Principle' negates the assumed SROCS computational structure underlying both quantum and relativistic computational systems, instead pointing at the existence of a (singular) higher-ordered 'Universal Computational Principle' (UCP) which computes the "simultaneous co-occurrence" of all exhaustive subatomic 'probe-target' or relativistic 'observer- (space-time or energy-mass) phenomenon' physical interactions (at any given point in time).

Indeed, the identification of such a singular **'Universal Computational Principle' (UCP)** responsible for the computation of all quantum and relativistic (exhaustive) physical interactions which is also postulated to possess three **'Computational Dimensions'** constitutes the second theoretical postulate of the CUFT; In order to perhaps better sense these three *'Computational Dimensions'* of the UCP let us examine a closely related **"Cinematic-Film Metaphor"** which may be used to explain these three 'Computational Dimensions' (as well as some other features and aspects of the CUFT):

Imagine yourself sitting in a cinema film presentation (e.g., seeing a film for the first time – unaware of the 'mechanics' of a film being presented to you)... In this case you could measure (for instance) the "velocity" (or energy) of a jet-plane zooming through the screen, the "time" it took this jet-plane to get from point 'A' to point 'B' (on the screen), the "spatial" length of the plane etc. – being unaware that (in truth) all of these 'spatial', 'temporal', 'energy' (and 'mass') "physical" features are produced based on the 'higher-ordered' computation of the degree of "displacement" or "lack of displacement" occurring across the series of cinematic-film frames!? Thus, for instance, the plane's "energy" (or velocity) is computed based on the number of 'pixels' that plane has been displaced across a given series of frames... Conversely, the plane's "spatial" measure is give based on the computation of the number of 'spatial pixels' that remain constant across a series of cinematic film frames (e.g., resulting in the fact that the plane's length doesn't "increase" or "decrease" across these frames)... Likewise, the "temporal" length of the plane's flight is computed based on the number of changes that occur in- or around- the plane (across a given number of film frames): imagine for instance what would happen to that plane's flight temporal value if the frames were projected more slowly (e.g., in "slow-motion" where there is a smaller number of changes taking place in the plane's flight, giving rise to a "dilated time" measure) or in a case in which precisely the same frame was presented over and over again for say one minute – time would "stand-still"... Similarly, we can devise a special 'cinematic-film' operation in which any given object is projected at "below-threshold" intensity at any given single frame such that only the presentation of the same object (in the same spatial configuration) across multiple number of frames may produce a visible object and that its apparent "mass" value will be computed as a function of the number of frames in which that object appeared 'spatially-consistent'... So, we can see that at least in the "cinematic-film metaphor", 'energy', 'space'; 'time' or 'mass' – are all produced as secondary computational measures being computed by a higher-ordered (singular) computation relating to the degree of 'changes'- or 'lack of changes'- of a given object across the frame, or as measured in the object itself (across a given series of cinematic film-frames)...

Quite similarly, the CUFT posits that the four basic physical features of 'space', 'time', 'energy' and 'mass' are produced through the computation of a singular (higher-ordered) 'Universal Computational Principle' (represented by the Hebrew letter "yud") – of the degree of 'consistency' or 'inconsistency' across a series of extremely rapid (c^2/h) 'Universal Simultaneous Computational Frames' (USCF's): According to the CUFT, this Universal Computational Principle (UCP) employs two 'Computational Dimensions' to compute these four (secondary computational) physical features of 'space', 'time', 'energy' and 'mass' which are: 'Consistency' ('consistent' vs. 'inconsistent') and 'Framework' ('frame' vs. 'object'), and an additional Computational Dimension of 'Locus' ('global' vs. 'local') which accounts for relativistic phenomena.

1.1.2. The UCP's computational dimensions

Hence, the CUFT hypothesizes that the above mentioned 'Universal Computational Principle' (UCP) possesses three 'Computational Dimensions': The *'Framework'* Dimension relates to certain 'computational features' that are computed at the 'object' level, or at the 'frame' (USCF's) level; The 'Consistency' Dimension relates to the UCP's computation of the degree of 'consistency' or 'inconsistency' of an object across a series of USCF's frames (e.g., regarding its above mentioned 'object' or 'frame' measures and also relating to the below mentioned 'Locus' Dimension computation); and the 'Locus Dimension' relates to the UCP's computation of any 'Framework-Consistency' combination from computational perspective of the 'frame' (termed: 'global') or from the 'object's' computational perspective (termed: 'local'); The fascinating facet of these UCP's three Computational Dimensions is that they produce the four physical features of 'space', 'energy', 'mass' and 'time' – i.e., as secondary computational combinations of the 'Framework' and 'Consistency' Computational Dimensions: The CUFT posits that 'space' and 'energy' emerge as a result of the UCP's computation of the degree of 'consistent' or 'inconsistent' measure of an 'object' (e.g., comprising one of the computational levels of the 'Framework' Dimension) the 'Framework' Dimension; Likewise, the basic physical features of 'mass' and 'time' arise as secondary computational features associated with the degree of 'consistent' or 'inconsistent' measure of an object relative to the 'frame' (also comprising the 'Framework' Dimension)!

Hence, the (new) computational definitions of 'space', 'energy', 'mass' and 'energy' are given by:

S:(fi{x,y,z}[USCF(*i*)]+… f*j*{x,y,z}[USCF(*n*)]) / h x n{USCF's}

such that:

fj{x,y,z}[USCF(i)]) ≤ fi{x+(hxn),y+(hxn),z+(hxn)}[USCF(i…n)]

where the 'space' measure of a given object (or event) is computed based on a *frame consistent* computation that adds the specific USCF's (x,y,z) localization across a series of USCF's [1...n] – which nevertheless do *not exceed* the threshold of Planck's constant per each ('n') number of frames (e.g., thereby providing the CUFT's definition of "space" as 'frame-consistent' USCF's measure).

Conversely, the 'energy' of an object (e.g., whether it is the spatial dimensions of an object or event or whether it relates to the spatial location of an object) is computed based on the *frame's differences* of a given object's location/s or size/s across a series of USCF's, divided by the speed of light 'c' multiplied by the number of USCF's across which the object's energy value has been measured:

E:(fj{x,y,z}[USCF(n)])–fi{(x+n),(y+n),(z+n)} [USCF($i...n$)]) /c x n{USCF's}

such that:

fj{x,y,z}[USCF(n)])>fi{x+(hxn),y+(hxn),z+(hxn) [USCF($i…n$)])

wherein the energetic value of a given object, event etc. is computed based on the subtraction of that object's "universal pixels" location/s across a series of USCF's, divided by the speed of light multiplied by the number of USCF's.

In contrast, the of 'mass' of an object is computed based on a measure of the number of times an *'object'* is presented *'consistently'* across a series of USCF's, divided by Planck's constant (e.g., representing the minimal degree of inter-frame's changes):

M: Σ[oj{x,y,z} [USCF(n)] = o($i…j-1$) {(x),(y),(z)} {$USCF(i...n)$} / h x n{USCF's} {$USCF(1...n)$} / h x n{USCF's}

where the measure of 'mass' is computed based on a comparison of the number of instances in which an object's (or event's) 'universal-pixels' measures (e.g., along the three axes 'x', y' and 'z') is identical across a series of USCF's (e.g., Σoi{x,y,z} [USCF(n)] = oj{(x+m),(y+m),(z+m)} [USCF(1...n)]), divided by Planck's constant.

Again, the measure of 'mass' represents an *object-consistent* computational measure – e.g., regardless of any changes in that object's spatial (frame) position across these frames.

Finally, the *'time'* measure is computed based on an *'object-inconsistent'* computation of the number of instances in which an 'object' (i.e., corresponding to only a particular segment of the entire USCF) changes across two subsequent USCF's (e.g., Σ oi{x,y,z} [USCF(n)] ≠ oj{(x+m),(y+m),(z+m)}[USCF(1...n)]), ivided by 'c':

T : Σ oj{x,y,z} [USCF(n)] ≠ o($i…j-1$){(x),(y),(z)} [USCF($1...n$)] /c x n{USCF's}

such that:

T:Σoi{x,y,z}[USCF(n)]-j{(x+m),(y+m),(z+m)} [USCF($1...n$)] ≤ c x n{USCF's}

Hence, the measure of 'time' represents a computational measure of the number of *'object-inconsistent'* presentations any given object (or event) possesses across subsequent USCF' (e.g., once again- regardless of any changes in that object's 'frame's' spatial position across this series of USCF's). Finally, the combination of the 'Locus' Dimension together with the 'Framework-Consistency' Dimensions, e.g., producing the four physical features of 'space', 'energy', 'mass', and 'time' – produces all known relativistic effects and phenomenon, e.g., such as 'time-dilation', 'energy-mass' equivalence and even the curvature of 'space-time'!

1.1.3. The Computational Invariance Principle

Another key theoretical postulate comprising the CUFT is the 'Computational Invariance Principle' which identifies this 'Universal Computational Principle' as the sole 'computationally invariant' element which both produces all four 'computationally variant' physical features of 'space', 'time', 'energy' and 'mass' and also exists independently of these physical features "in-between" any two subsequent 'USCF's frames; As such, the 'Computational Invariance Principle' recognizes the Universal Computational Principle as the sole (and singular) 'invariant' reality underlying the production of the four secondary computational 'variant' physical properties of 'space', 'time', 'energy' and 'mass' (based in part on a well-known scientific principle: "Ockham's Razor" which prefers the simplest most parsimonious theoretical account for complex phenomena) [1]...

1.1.4. The Universal Computational Formula

Finally, this recognition of the Universal Computational Principle as the sole and singular reality producing and sustaining all four (secondary computational) physical properties of space, time, energy and mass has also lead to the formulation of a singular 'Universal Computational Formula' which completely integrates these four secondary computational physical properties, as well as all known quantum and relativistic properties (e.g., as embedded within the higher-ordered Universal Computational Formula):

$$\text{Universal Computational Formula}: \left\{ \frac{`c^2}{h} \right\} = \frac{s}{t} \times \frac{e}{m}$$

2. The CUFT: Quantum-relativistic harmonization- embedding- & transcendence

Hence, the next necessary step in validating the CUFT as a satisfactory TOE is to demonstrate that it's capable of harmonizing between quantum and relativistic models, embed both models within the CUFT's Universal Computational Formula, and providing certain "differential critical predictions" which transcend these quantum and relativistic models (e.g., and if validated empirically validate the CUFT as an satisfactory TOE!) First, we set to demonstrate that the CUFT is able to bridge the (above mentioned) key theoretical inconsistencies that seem to exist between quantum and relativistic models based on its reformulation- and embedding- of quantum and relativistic computation within the singular (higher-ordered) Universal Computational Principle (e.g., due to the Duality Principle's identification of a mutual computational flaw underlying both models, as shown above); Interestingly, based on the singularity of the Universal Computational Principle' computation of both quantum and relativistic relationships (e.g., as embedded within an exhaustive USCF's frames' series) the CUFT is able to embrace both quantum's probabilistic and

positivistic relativistic modeling. This is because the Universal Computational Principle's (rapid) production of all exhaustive spatial-pixels in the physical universe comprising each USCF frame – allows it to embed "single spatial-temporal" relativistic objects' (or subatomic 'particles') measurements as well as "multi spatial-temporal" subatomic 'wave' measures! In fact, one of the elegant features of the CUFT is precisely the fact that it conceptualizes such 'single spatial-temporal' relativistic 'objects' or subatomic quantum 'particles' and 'multi spatial-temporal' quantum subatomic 'wave' measurements – within the exhaustive computational framework of the Universal Computational Principle's rapid production of the series of USCF's frames (e.g., comprising all such 'single spatial-temporal' relativistic object or subatomic particle and 'multi spatial-temporal' quantum wave measurements...) Moreover, this exhaustive computational framework of the CUFT allows it to reconceptualize quantum's Uncertainty Principle's 'complimentary pairs' of 'space and energy' or 'time and mass' merely representing a computational constraint intrinsically embedded within the Universal Computational Principle's computation of the two 'Framework' and 'Consistency' Computational Dimensions – i.e., based on the fact that 'space' and 'energy' exhaustively comprise the Framework's Dimensions' 'frame' level, and likewise 'mass' and 'time' exhaustively comprising Framework's 'object' computational level... Hence, the CUFT is capable of embedding both 'single spatial-temporal' relativistic objects (and quantum 'particles'), and (apparently) 'probabilistic' 'multi spatial-temporal' quantum wave measures within the broader and more exhaustive Universal Computational Principle's rapid computation of the series of USCF's frames (e.g., thereby also resolving the 'particle-wave duality' postulate of Quantum Mechanics!)

The CUFT's resolution of the second key quantum-relativistic theoretical inconsistency relating to quantum's instantaneous 'entanglement' phenomenon as opposed to Relativity's speed of light constraint set on the transmission of any signal across space is also anchored in the above mentioned Universal Computational Principle's rapid computation of these USCF's frames ; Since the CUFT posits that the Universal Computational Principle's (rapid) computation of each of the Universal Simultaneous Computational Frame (USCF) simultaneously computes all of the spatial-pixels in the physical universe at a minimal time-point (e.g., c^2/h), then this computation extends the phenomenon of 'quantum entanglement' to all exhaustive spatial points in the universe (e.g., at any such minimal time-point! On the other hand, based on the above embedding of all 'single spatial-temporal' relativistic objects (or subatomic particles) as well as 'multi spatial-temporal' subatomic wave measures within the Universal Computational Principle's exhaustive USCF's computation – it allows for Relativity's apparent speed of light constraint imposed on any such 'single spatial-temporal' relativistic object (or subatomic 'particle') transmission!

The next step towards the validation of the CUFT as a satisfactory TOE involves an articulation of the embedding of quantum and relativistic models within the singular higher-ordered CUFT's Universal Computational Formula – i.e., which is shown to both maintain- and transcend- the (currently) known quantum and relativistic relationships! As can be seen from the two 'quantum' and 'relativistic' formats of the Universal Computational Principle (below), the highlighted portions of these formats conforms to the known mathematical relationships

found in quantum and relativistic models, e.g., Relativity's energy and mass equivalence, and Quantum's 'complimentary pairs' of 'space and energy', 'mass and time' as constrained by the Uncertainty Principle's 'h' Planck's constant simultaneous measurement accuracy constraint:

I. Relativistic Format: $e \times \dfrac{s}{t} = m \times \dfrac{c^2}{h}$

II. Quantum Format: $t \times m \times \dfrac{c^2}{h} = s \times e$

3. The CUFT's "differential-critical predictions"

However, it also becomes clear that the CUFT's Universal Computational Principle's embedding of those empirically validated quantum and relativistic relationships – also transcends and critically differs from these relationships! Indeed, these computational differences between the Universal Computational Formula's 'quantum' and 'relativistic' formats and the 'standard' relativistic 'E=Mc²' and quantum 'complimentary pairs' constitutes one (of three) "differentia-critical predictions" that differentiate the CUFT model from both quantum and relativistic predictions, e.g., thereby providing an empirically testable means for validating the CUFT as a satisfactory TOE...

Another key "differential-critical prediction" that differentiates the CUFT from both relativistic and quantum models' predictions are: the CUFT's prediction regarding the more consistent (spatial) presentation of more massive particles (or elements) – across a given series of USCF's frames, relative to less massive particles' appearance across the same series of USCF's frames. In fact, this 'differential critical prediction' regarding the more consistent spatial presentation of more massive particles (or elements) across a series of USCF's frames, relative to the spatial presentation of less massive particles (or elements) precisely replicates the empirical findings of the recently discovered 'Proton-Radius Puzzle', thereby providing a first empirical validation for the CUFT as a satisfactory TOE!

The third 'differential-critical prediction' differentiating the CUFT from both quantum and relativistic models involves a possible "reversal of the space-time spatial-electromagnetic pixels sequence" across a series of USCF's frames electromagnetic spatial-pixels' sequence of a given object or phenomenon; This may be achieved through a precise recording of that object (or phenomenon's) spatial-electromagnetic pixels values (across a given series of USCF's), and a manipulation of these electromagnetic-spatial pixels values (through precise electromagnetic stimulation) so as to produce the reverse sequence of the recorded spatial-electromagnetic values sequence! Interestingly, due to the fact that quantum theory precludes the possibility of the "un-collapse" of the probability wave function following a certain interaction between the any such probe particle and the target particle's wave function – this 'differential critical prediction' is ruled out as a possible prediction of Quantum Mechanics; Likewise, since Relativity sets the speed of light as a clear "unsurpassable" limit for the transference of any signals it also precludes the possibility of "reversing time"; In contrast, since the CUFT defines

'time' (e.g., alongside the other three physical features of 'space', 'energy' and 'mass') merely as a secondary computational property produced by the Universal Computational Principle's three Computational Dimensions' computation of the degree of an "object's-inconsistency" across a series of USCF's frames – then it should allow for the "reversal" of the 'space-time' sequence (e.g., of the particular spatial-electromagnetic pixels' values) across a series of USCF's frames!

4. Empirical validation of the CUFT as satisfactory 'TOE': The 'proton radius puzzle'

Fortunately, the second (abovementioned) 'differential-critical prediction' of the CUFT regarding the more consistent spatial presentations of a more massive particle (or element), relative to the spatial-consistency of a less massive particle (or element) across a given series of USCF's frames – has now received initial empirical validation through the findings associated with the 'Proton-Radius Puzzle'! This is because the 'Proton-Radius Puzzle' empirical findings indicate that the more massive 'Moun Hydrogen Proton' is measured (approximately) 200 times – smaller and more accurate than the standard Hydrogen (e.g., with the 200 times lighter electron particle instead of the Muon)... In order to fully understand how these 'Proton-Radius Puzzle' findings (Bernauer & Pohl, 2014) empirically confirm the differential-critical prediction of the CUFT, lets us return to the CUFT's computational definitions of "mass"; Mass is defined by the CUFT as a measure of the degree of "spatial-consistency" of a particle across a given series of USCF's frames! In mathematical terms, it is measured as the number of times that this particle was presented across the same spatial pixels (measured from within the object's frame of reference) across a series of USCF's frames... This computational definition of 'mass' implies at least two empirically measurable predictions:

a. That the more massive 'Muon' particle should be measured as more accurate- and as smaller- than the less massive electron particle; this is due to the fact that the more massive a particle is the greater its spatial-consistency across USCF's frames! And/or:

b. That more massive particles (e.g., such as the Muon) should be measured across a greater number of USCF's frames, relative to less massive particles (such as the electron); In other words, we could expect to measure the (more massive) Muon across a greater number of USCF's frames than the (lighter) electron!

Interestingly, the 'Proton-Radius Puzzle' precisely confirms the first of these two CUFT 'differential critical' predictions – i.e., indicating that the (200 times) more massive Muon particle (e.g., when embedded within the Hydrogen Proton) is measured as (200 times) 'smaller' and 'more accurate' than the (200 times) less massive electron (associated) Hydrogen Proton! Hence, these findings provide an initial empirical confirmation of the CUFT – as differing from the predictions of both quantum and relativistic models' predictions (e.g., which cannot account for these "Proton-Radius Puzzle" findings)!

Efforts should be made to empirically validate the second (abovementioned) aspect of the CUFT's differential-critical prediction regarding the appearance of 'more massive' particles such as the Muon across a greater number of USCF's frames than the appearance of less massive particles (such as the electron)!

5. The CUFT: Challenging quantum & relativistic "materialistic-reductionistic" assumption

Thus far, we've been able to demonstrate that the CUFT may be considered a satisfactory 'TOE' capable of resolving all major quantum-relativistic theoretical inconsistencies, replicating their primary empirical phenomena, identifying and empirically validating one of the CUFT's 'differential-critical' predictions differentiating it from both quantum and relativistic predictions... The primary aim of the current manuscript is to utilize this recognition of the CUFT as a satisfactory TOE, e.g., which also embeds both quantum and relativistic models within its broader more comprehensive (singular) 'Universal Computational Principle' theoretical framework – *towards recognizing the need to revise certain key theoretical aspects of both quantum and relativistic fields, i.e., based on the CUFT's singularity of the UCP sole production of the (extremely rapid: c^2/h) series of the 'Universal Simultaneous Computational Frames' (USCF's); Specifically, the CUFT's emphasis on the singularity of the UCP (rapid) production of the USCF's series – forces us to revise both Quantum and Relativistic "materialistic-reductionistic" basic assumption whereby any (quantum or relativistic) physical relationship (or entities, value/s, phenomenon) can be determined solely based on an exhaustive probe-target (subatomic) interaction or observer-phenomenon (e.g., space-time or energy-mass) relationship in such a manner as to point at the sole and singular production of all such quantum and relativistic entities, phenomena, relationship/s by the UCP's USCF's production...*

Indeed, if we revert back to the CUFT's (first) 'Duality Principle' theoretical postulate, we can see that both Quantum and Relativistic computational systems comprise a '*Self-Referential Ontological Computational Systems' (SROCS)* structure; this quantum and relativistic SROCS computational structure is synonymous with a **"materialistic-reductionistic" assumption**, wherein it is assumed that the determination of the "existence"/"non-existence" of any given 'y' entity (or value) is determined solely based on its direct (or indirect) physical interaction with another (exhaustive) 'x' factor/s... As we've seen, the Duality Principle in fact negates the validity of such assumed (quantum or relativistic) SROCS systems – instead, pointing at the existence of the singular higher-ordered (D2) 'Universal Computational Principle' (UCP) which alone computes the "simultaneous co-occurrence" of all (exhaustive) quantum and relativistic 'probe-target' and 'observer-phenomenon' pairs series (e.g., subsequently shown by the CUFT to comprise any minimal time-point 'Universal Simultaneous Computational Frame'). The CUFT further developed this 'Duality Principle' and 'UCP' (alongside its three 'Computational Dimensions') postulates towards the recognition of the '*Computational Invariance Principle'*: i.e., recognizing the fact that since only the UCP "exists" both 'during' each of the USCF's frames (in fact producing all of its exhaustive universal spatial pixels simultaneously at any such minimal time-point) as well as 'solely existing' "in-between" any two subsequent USCF frames (whereas the four secondary computational 'physical' features

of 'space', 'time', 'energy' and 'mass' only exist "during" the UCP's production of the USCF's and its computation of these four secondary computational physical features), then we must conclude that only this singular UCP comprises an invariant "reality" (whereas these four secondary-computational 'physical' features may only be considered *phenomenally' variant*)... Hence, the CUFT's 'Computational Invariance Principle' in fact points at the sole reality of the UCP (e.g., computationally invariant), as opposed to the "phenomenal" nature of the four secondary computational 'physical' features of 'space', 'time', 'energy' and 'mass' (e.g., computationally variant).

It is hereby suggested that a deeper analysis of these three particular theoretical postulates of the CUFT (e.g., the 'Duality Principle', 'Universal Computational Principle' and 'Computational Invariance Principle') may negate the current (quantum and relativistic) *"materialistic-reductionistic assumption"* (e.g., represented by the SROCS computational structure) based on the sole and singular reality of the 'Universal Computational Principle'; This is made particularly clear based on (above mentioned) 'Computational Invariance' Principle's proof for the singular reality of the Universal Computational Principle – which is the only 'computationally invariant' element which "exists" both during its sole production the (rapid series of) USCF's frames, and "in-between" any two such (subsequent) USCF's frames! This is because based on this 'Computational Invariance Principle', the four physical features of 'space', 'time', 'energy' and 'mass' constitute computationally 'variant' properties and are therefore 'transient' (i.e., exist only "during" the Universal Computational Principle's production of the USCF's frames but ceases to exist "in-between" any two such USCF's frames)... Indeed, their "computational variant" composition makes them possess only "phenomenal" validity as opposed to the singular reality of the 'Universal Computational Principle' which exists permanently (and solely) – both as producing these 'phenomenal' (computationally variant) four 'physical' features "during" the USCF's frames and also "in-between" these USCF's frames... Therefore, the sole production- sustenance- and "transference" of any of these four "physical" features – during or across – any USCF frame/s is only made possible through the singular existence (and operation) of the 'Universal Computational Principle'! In other words, since these four 'phenomenal-physical' features "exist" only during each USCF frame, e.g., as produced by the singular 'Universal Computational Principle', but not "in-between" any two such subsequent USCF's frames – as opposed to the singularity of the UCP which solely produces these four physical features "during" the USCF's frames and also exists "in-between" the USCF's frames; then, we must conclude that the only means for the "production"- "sustenance"- or "transference" of any given 'physical' feature across any two (subsequent) USCF's frames may only be done based on the UCP!

Hence, we must conclude that the basic assumption of "materialistic-reductionism", e.g., whereby it is possible to determine the "existence" or "non-existence" of any given 'physical' 'y' feature solely based on its direct or indirect physical interaction with another (exhaustive) 'x' factor/s – is negated (not only by the above mentioned Duality Principle) but even more explicitly through the recognition that it is not possible for any of these four (phenomenal) 'physical' features to be "transferred" across any two subsequent USCF's frames – except through the computation of the Universal Computational Principle, which constitutes the sole

(computationally invariant) "reality" (which exists both "during" the USCF frames producing these four phenomena 'physical' features and solely exists "in-between" any two USCF's frames...) What this means is that the basic "materialistic-reductionistic" assumption underlying both quantum and relativistic SROCS computational systems, i.e., which assumes that the "existence" (or "non-existence") of any given subatomic 'target' or relativistic (space-time or energy-mass) -'phenomenon' is determined solely based on their direct or indirect physical interaction/s with another (exhaustive) subatomic 'probe' element or relativistic 'observer' – is negated! Instead, the 'production'- 'sustenance'- or 'development'- of any 'physical' feature (relationship or phenomenon) – at the quantum or relativistic frameworks can only be computed through the singularity of the Universal Computational Principle!

6. Revising physics: UCP a-causal computation

Hence, there seems to arise a necessity to revise both quantum and relativistic computational systems such that the 'existence' of any of the four (computationally variant phenomenal) physical features (of 'space', 'time', 'energy' or 'mass') in either quantum or relativistic theoretical frameworks be solely produced- sustained- or developed- solely based on the Universal Computational Principle's singular production of all spatial pixels in the universe at any minimal USCF frame/s time-point; Note, however, that this revision does not represent merely a 'philosophical' concept – i.e., in fact, it is suggested that this revision signifies a fundamental shift in Physics as it relies on the **UCP** singular (higher-ordered) **"A-Causal Computation"**!

In order to fully grasp the potential significance of this (novel) UCP 'A-Causal Computation', it may be helpful to specify the theoretical ramifications of recognizing the fact that in both Quantum Mechanics and Relativity Theory the sole production- sustenance- and development- of any of the four 'physical' (phenomenal) features can only be computed by the UCP; Given the fact that the UCP is postulated to compute *"simultaneous co-occurrence"* of all (exhaustive) quantum 'probe-target' and relativistic 'observer-phenomenon' relationships, this means that both within a *single USCF* frame and across a *series* of such *USCF's* frames – we cannot (any longer) rely on any 'materialistic-reductionistic' (SROCS) subatomic 'probe-target' or relativistic 'observer-phenomenon' interactions for determining any of the four (quantum or relativistic) 'physical' features... Instead, we must revise any such quantum or relativistic 'physical' feature based on the UCP computation of the "simultaneous co-occurrence" of all (exhaustive) quantum and relativistic relationships comprising any (single or multiple) USCF frame/s! Indeed, this fundamental shift from the current "materialistic-reductionistic" quantum or relativistic (SROCS) assumption towards a recognition of the sole computation of the UCP of all 'simultaneously co-occurring' quantum and relativistic ('probe-target' and 'observer-phenomenon') interactions is termed: the 'UCP A-Causal Computation' (i.e., of all 'simultaneously co-occurring quantum and relativistic relationships comprising any single or multiple USCF's)...

Now, in order to understand the far reaching theoretical implications of recognizing this UCP (singular) higher-ordered 'A-Causal Computation' let us turn our attention to the two

(overarching) conceptual models of the "probabilistic interpretation of Quantum Mechanics" (i.e., represented by the 'probability wave function' and its "collapse" following any given subatomic probe measurement) and Einstein's (famous) General Relativity Einstein field equations (EFE): $R_{\mu\nu} - \frac{1}{2} g_{\mu\nu} R + g_{\mu\nu} \Lambda = \frac{8\pi G}{c^4} T_{\mu\nu}$ (describing the dynamic interaction that exists between massive object's curvature of the fabric of 'space-time' which in return determines their travelling pathway, and vice versa...) It is suggested that in both of these cases, their current theoretical formulation represents the above mentioned "materialistic-reductionistic" assumption – i.e., whereby it is the direct or indirect physical interaction/s between a given subatomic 'probe' and 'probability wave function' target element which determines the "collapse" of that wave function and hence the value of the measured 'target particle; or it is the direct physical interaction of a given (massive) object with the 'space-time' which determines its curvature – and this curvature of 'space-time' (in return) interacts with this given (massive) object thereby determining its pathway movement...

Indeed, the 'materialistic-reductionistic' structure of any such (hypothetical) quantum 'probe-target' or relativistic 'observer-phenomenon' relationships was analyzed earlier, and proven to comprise a SROCS computational structure, e.g., being negated by the CUFT 'Duality Principle' – pointing at the necessity to reformulate both quantum and relativistic computational systems based on the singularity of the Universal Computational Principle...

But, what becomes apparent here, e.g., based on the recognition of the UCP "A-Causal Computation" is that the basic (overarching) theoretical model of both Quantum Mechanics and (General) Relativity Theory must be revised based on this 'UCP A-Causal Computation'! This is because once we accept the CUFT assertion that there exists only one singular (computationally invariant) UCP "reality" and that this UCP singular 'reality' solely computes the "simultaneous co-occurrence" of all exhaustive (quantum and relativistic) relationships comprising a (minimal time-point) USCF frame/s (e.g., termed: 'UCP A-Causal Computation'), then we cannot (any longer) retain either QM's current model regarding the 'materisalistic-reductionistic collapse of the probability wave function' or General Relativity's EFE. This is because both QM's assumed (SROCS) collapse of the probability wave function, as well as RT's assumed SROCS (massive) object –space-time curvature computational structure – are based on this "materialistic-reductionistic SROCS' assumption; In the case of QM this 'materialistic-reductionistic' SROCS computational structure is represented in the assumption wherein the determination of the values of any subatomic 'target' (probability wave function) element is contingent upon its direct (or indirect) physical interaction with another subatomic 'probe' element – i.e., which "causes" the "collapse" of the probability wave function (see earlier description of the Quantum 'probe-target' SROCS structure and its violation of the Duality Principle); In the case of (General) Relativity Theory, this 'materialistic-reductionistic SROCS assumption' is represented by through Relativity's EFE which determines the 'curvature of space-time' based on its direct physical interaction with 'massive objects' and vice versa determines the movement of these 'massive objects' based on their interaction with the curvature of 'space-time' (also see the earlier Duality Principle's analysis of relativistic 'observer-phenomenon' SROCS computational structure);

However, based on the above recognition of the singular reality of the UCP which solely computes the "simultaneous co-occurrence" of all (exhaustive) quantum and relativistic interactions, i.e., comprising any single or multiple USCF's frames (e.g., termed: the UCP 'A-Causal Computation), we must revise this basic 'materialistic-reductionistic SROCS assumption' based on this higher-ordered singular UCP A Causal Computation! In other words, since the sole production- sustenance- and development- of any of the four (phenomenal) 'physical' features (e.g., say in the quantum domain) is based on the UCP 'A-Causal Computation', i.e., of all exhaustive 'probe-probability wave function target' interactions comprising a single (or multiple) USCF frame/s, then we must also conclude that the apparent "collapse" of the probability wave function – cannot be "caused" by the direct interaction between any given probe element and given probability wave function! This is simply due to the fact that according to the above 'UCP A-Causal Computation' all exhaustive values of all quantum subatomic 'probe-probability wave function target' interactions are *computed simultaneously by the UCP – comprising all spatial pixels comprising any single or multiple USCF frame/s...* And since the only "transference" of any of the four (phenomenal) 'physical' features from one USCF frame to another – can only be carried out through the singular operation of the UCP's production- sustenance- and development- of any spatial pixel in te universe (across USCF's frames), then we cannot attribute the "collapse of the wave function" to any physical interaction taking place between any 'probe' and 'probability wave function target' entities (e.g., at any particular USCF frame/s)... Hence, the UCP's A-Causal Computation which produces simultaneously all exhaustive quantum 'probe-target' interactions – at any single or multiple USCF frame/s negates the validity of the "materialistic-reductionistic SROCS" assumption of the "collapse of the probability wave function" (target element) as a result of its direct interaction with another subatomic 'probe' element.

Likewise, based on the recognition of the UCP's singular 'A-Causal Computation' which is solely responsible for the production- sustenance- and development- of all exhaustive 'observer – (space-time, energy-mass) phenomenon' interactions comprising any (single or multiple) USCF frame/s, we must revise the current EFE representing a "materialistic-reductionistic SROCS assumption"; Once again, this is due to the fact that contrary to this 'materialistic-reductionistic SROCS' assumption represented by Relativity Theory EFE according to the UCP's singular 'A-Causal Computation' the UCP computes the "simultaneous co-occurrence" of all exhaustive relativistic 'observer – (space-time or energy-mass) phenomenon' relationships comprising any (single or multiple) USCF frame/s! Therefore, contrary to (General) Relativity Theory's currently assumed 'materialistic-reductionistic SROCS' assumption, wherein the 'curvature of space-time' is determined through its direct physical interaction with 'massive objects' (and vice versa, the movement of these 'massive objects' is determined strictly based on the 'curvature of space-time') – the UCP's A-Causal Computation asserts that it is solely the singularity of the UCP which computes the "simultaneous co-occurrences" of all exhaustive relativistic 'observer – (space-time or energy-mass) phenomenon' interactions (e.g., comprising any single or multiple USCF/s)...

Hence, the fundamental necessary revision of both (contemporary) probabilistic interpretation of QM and of (General) Relativity Theory involves a shift from the current 'materialistic-

reductionistic SROCS' assumption underlying both QM and RT – towards the UCP's singular 'A-Causal Computation'! Essentially, this revision implies that instead of the currently assumed (quantum or relativistic) 'materialistic-reductionistic SROCS' assumption wherein the "collapse of the target probability wave function' is "caused" by its direct physical interaction with the subatomic 'probe' element, and the 'curvature of space-time' is "caused" by its direct physical interaction with 'massive object/s' (and vice versa the movement of these 'massive object/s' is "caused" by the 'curvature of 'space-time'; the UCP 'A-Causal Computation' negates any such 'materialistic-reductionistic' "causal" relationships, instead pointing at the fact that it is only the singularity of the UCP which computes the "simultaneous co-occurrence" of all (exhaustive) quantum 'probe-target' and relativistic 'observer-phenomenon' interactions comprising any (single or multiple) USCF frame/s... Perhaps another (lucid) manner of demonstrating the UCP's negation of contemporary Quantum and Relativistic 'materialistic-reductionistic SROCS' computational structure can be given through an analysis of the minimal-temporal, i.e., USCF's frames dynamics representing Quantum Mechanics' currently assumed "collapse of the target probability wave function", as well of the USCF's frames' dynamics representing Relativity's EFE (e.g., describing the interactive effect of 'massive objects' on the 'curvature of space-time' and vice versa as explained above); According to the contemporary 'probabilistic interpretation of QM' the target's probability wave function "collapses" as a result of its direct physical interaction with another subatomic probe element: this means that at a particular minimal-time USCF frame there occurs a direct physical interaction between the 'target's probability wave function' and the 'probe element' – and that based on this direct 'probe-target probability wave function' physical interaction this 'target probability wave function' "collapses"; But since each (single) USCF frame comprises the "minimal time-point" (possible) at which the (singular) UCP produces all exhaustive (quantum and relativistic) spatial-pixels in the universe, then necessarily the initial direct physical interaction between the 'probe' element and the 'target's probability wave function' – takes place at a given USCF frame, whereas the (assumed) "resulting collapse" of this 'target's probability wave function' must occur at a subsequent USCF frame! But, since according to the above mentioned 'Computational Invariance Principle' the sole and singular (computationally invariant) principle which exists both "during" and "in-between" any two subsequent USCF frames is the UCP (whereas the four phenomenal 'physical' features of 'space', 'time', 'energy' and 'mass' exist only "during" any given USCF frame), then the sole 'production'-sustenance- and 'development' of any quantum (or relativistic) (phenomenal) 'physical' feature may only be carried out by the singularity of the UCP – which indeed computes the "simultaneous co-occurrence" of all exhaustive quantum (or relativistic) 'probe-target' interactions comprising any single or multiple USCF's... Hence, since it is not possible for any physical interaction (say) between the 'subatomic probe' and (assumed) 'target's probability wave function' at a given USCF frame (i) to have any effect on their (phenomenal) 'physical' features at a subsequent USCF frame (i+1) – but rather it is the sole (and singular) computation of the UCP of the "simultaneous co-occurrences" of any exhaustive 'probe-target' subatomic interaction/s (at any single or multiple USCF/s frames) which produces- sustains- and develops- any exhaustive subatomic probe-target relationships! Likewise, we can show that based on such 'minimal time-point' USCF's frames analysis, that the currently assumed

'materialistic-reductionistic SROCS' General Relativity Theory model's interactive 'curvature of space-time' based on its direct physical interaction with 'massive objects' (and vice versa) is negated – instead, pointing at the sole production- sustenance- and development- of any of the four phenomenal 'physical' features (of 'space', 'time', 'energy' and 'mass') including the phenomena of the curvature of 'space-time' or of the (apparent) movement of massive objects solely based on the singular UCP 'A-Causal Computation'; In order to demonstrate the impossibility of the currently assumed Relativistic 'materialistic-reductionistic SROCS' assumption, let us (once again) imagine the 'minimal time-point dynamics' of the currently assumed (General) Relativity 'materialistic-reductionistic SROCS' direct physical interaction between certain massive object/s and the curvature of space time (and vice versa, as outlined above): According to this 'materialistic-reductionistic SROCS' Relativistic assumption, it is the direct physical interaction that exists between (one or more) 'massive object/s' and 'space-time' which "causes" this 'space-time' (fabric) to curve, and vice versa, this 'curvature of space-time' "causes" any given 'massive object/s' to travel in a particular (curved) space-time pathway... But, when analyzed from the perspective of a 'minimal time-point' USCF frame/s, then we see that in the first (hypothetical) USCF frame, there is a direct physical interaction between the given 'massive object' and the (fabric of) 'space-time', whereas this 'curving of space-time' may affect the space-time movement pathway of this 'massive object' – only in a subsequent USCF frame/s... However, such 'materialistic-reductionistic' (SROCS) relativistic assumption – not only violates the Duality Principle (as shown earlier and previously), but in the context of this 'minimal time-point' USCF's frames analysis seems to negate the (proven) singularity of the UCP's 'A-Causal Computation': This is because, according to the above 'materialistic-reductionisitc' relativistic assumption it is the direct physical interaction between the given 'massive object' and the (fabric of) 'space-time' – in the first USCF frame/s which "causes" this (fabric of 'space-time') to curve in subsequent USCF frame/s, and this 'curvature of space-time' in turn "causes" this given "massive object" to travel in a "curved space-time pathway" in still later USCF frame/s... However, based on the UCP's 'A-Causal Computation', which computes the "simultaneous co-occurrences" of all exhaustive relativistic 'observer-phenomenon' relationships, we have to negate this relativistic 'materialistic-reductionistic SROCS' assumption – since there cannot exist any "cause and effect" relationship between any direct (or indirect) physical interactions (e.g., such as 'massive object/s' which 'curve the fabric of space-time') at an initial USCF frame/s, and its effect on the 'space-time movement pathway of that massive object' at a subsequent USCF/s... Instead, the singularity of UCP's 'A-Causal Computation' forces us to recognize its computation of the 'simultaneous co-occurrences' of all (four) phenomenal 'physical' features – i.e., including the simultaneous computation of any 'massive object' and any 'curvature of space-time'!

Hence, we reach the inevitable conclusion whereby both Quantum and Relativistic models have to be revised in terms of their basic 'materialistic-reductionistic SROCS' assumption, i.e., recognizing the fact that either Quantum Mechanics' assumed 'collapse of target's probability wave function' as 'caused' by its direct physical interaction with another subatomic 'probe' element; or Relativity's assumed 'curvature of space-time' as "caused" by its direct physical interaction with 'massive objects' – is negated by the CUFT's recognition of the singularity of the Universal Computational Principle's (UCP) (higher-ordered) 'A-Causal Computation',

which computes the 'simultaneous co-occurrences' of all quantum and relativistic (exhaustive) 'probe-target' and 'observer-phenomenon' interactions. The key revision brought about by the UCP (higher-ordered) 'A-Causal Computation' is that it negates, i.e., in principle, the existence of any 'materialistic-reductionistic SROCS "causal" relationships in QM or Relativity Theory; this is because once we accept the UCP's (higher-ordered) 'A-Causal Computation' as the sole and singular source for producing- sustaining- and evolving- any of the four phenomenal 'physical' features (of 'space', 'time', 'energy' and 'mass'), e.g., across all exhaustive spatial-pixels (in the universe) comprising any single or multiple USCF frame/s (at the minimal USCF time-point), then we must reject any 'materialistic-reductionistic SROCS' physical relationship/s between any hypothetical quantum 'probe' and 'target' or between any relativistic 'observer' and 'phenomenon' entities as "causing" any hypothetical change or effect in that subatomic target (e.g., such as the assumed "collapse of the target's probability wave function" as "caused" by its interaction with the subatomic probe element) or as "causing" any effect in the given relativistic 'phenomenon' (e.g., such as in Relativity's assumed "curvature of space-time" as "caused" by its interaction with 'massive objects'). Thus, the necessary revision in both QM and RT brought about by the UCP's 'A-Causal Computation' is to base all 'phenomenal' (quantum or relativistic) physical features of 'space', 'time', 'energy' and 'mass' on the singularity of the UCP which solely produces- sustains- or evolves- all of these physical features at all spatial-pixels in the universe comprising any (single or multiple) exhaustive USCF's frame/s...

7. The CUFT's embedding & transcendence of QM and RT models

It should, nevertheless, be made clear that this necessary revision of both Quantum Mechanical and Relativistic Models – does not negate any of the validated empirical phenomena or known quantum or relativistic laws and relationships, but rather broadens our theoretical under-standing of these quantum and relativistic phenomena, as embedded in- and (indeed) transcended by- the CUFT theoretical framework; This is due to the fact that whereas Relativity Theory may represent the characterization of single spatial-temporal (relativistic) objects and phenomena, and Quantum Mechanics represents multi spatial-temporal 'probability wave function' (subatomic) entities (e.g., which also embeds 'single' multi spatial-temporal 'particle' elements) – the CUFT expands the theoretical framework to include all single- multiple- and indeed *exhaustive*- spatial-pixels comprising any minimal time-point USCF frame/s... By doing so, and based on the CUFT's identification of this minimal time-point (extremely rapid-series: 'c^2/h') series of USCF's produced solely by the singular 'Universal Computational Principle', the CUFT is capable of fully integrating between quantum and relativistic components and phenomena – which is made most apparent in the CUFT's Universal Computational Formula (e.g. that fully integrates between quantum and relativistic relationships, as well as between the four basic 'physical' features of 'space', 'time', 'energy' and 'mass'):

$$\frac{`c^2}{h} = \frac{s}{t} \times \frac{e}{m}$$

This embedding- and transcendence- of both quantum and relativistic phenomena and relationships within the broader (higher-ordered) CUFT is made most apparent in the two (above mentioned) Relativistic and Quantum formats, which include the known relativistic 'energy and mass equivalence' ($E = Mc^2$) and the quantum 'complimentary pairs';

I. Relativistic Format: $e \times \dfrac{s}{t} = m \times \dfrac{c^2}{h}$

II. Quantum Format: $t \times m \times \dfrac{c^2}{h} = s \times e$

Note, however, that in both quantum and relativistic formats the Universal Computational Formula transcends these (known) quantum and relativistic relationships based on the incorporation of these known relationships within the broader (quantum and relativistic) formats computational structure: Specifically, it becomes apparent that these known quantum and relativistic relationships may represent "special cases" – within the broader Relativistic or Quantum Formats, which in fact represent the complete integration of both "quantum" and "relativistic" computational components within the singular higher-ordered (fully integrated) CUFT's Universal Computational Formula; *Indeed, a more comprehensive mathematical (and empirical) validation of these two Quantum and Relativistic Formats – as different from the (above-mentioned) known quantum and relativistic relationships constituted one of the three (abovementioned) "differential-critical predictions" differentiating the CUFT from both QM and RT* [2], *and should be further investigated and validated – i.e., both mathematically and empirically.*

On the principle theoretical level, it can be pointed out that whereas the current 'Quantum Mechanical' and 'Relativistic' models represent particular phenomena and relationships – corresponding to 'single' spatial-temporal relativistic objects (and phenomena) or subatomic 'multi spatial-temporal' "wave" (and embedded 'single spatial-temporal' "particle") elements and phenomena, the CUFT fully integrates these apparently distinct, particular phenomena within the higher-ordered series of exhaustive Universal Simultaneous Computational Frames (USCF's) which is produced by the Universal Computational Principle based on its singular 'A-Causal Computation' – which produces- sustains- and evolves- all four (phenomenal) 'physical' features of 'space', 'time', 'energy' and 'mass'; Indeed, as we've seen, this singular (higher-ordered) UCP 'A-Causal Computation' negates any "materialistic-reductionistic" (SROCS) quantum or relativistic physical relationships (e.g., such as RT's SROCS assumption regarding the 'curvature of space-time' as "caused" by 'mass', or as QM's SROCS assumed 'collapse of the target's probability wave function' as "caused" by its direct physical interaction with another 'subatomic probe element'); Instead, the singularity of this higher-ordered UCP brings about the complete integration- and indeed transcendence- of the four (quantum and relativistic) phenomenal 'physical' features of 'space', 'time', 'energy' and 'mass'; A such, the CUFT goes beyond RT's integration of 'space-time' and 'energy-mass', and its curvature of space-time by mass (and vice versa) – by fully integrating 'space', 'time', 'energy' and 'mass' as four secondary computational (phenomenal) 'physical' features produced- sustained- and evolved- by the singular (computationally invariant) UCP... Likewise, the CUFT goes beyond QM's complimentary pairs of 'space and energy', 'time and mass' as constrained by Planck's constant ('h' simultaneous accuracy measurement) – as representing the exhaustive (compli-

mentary) computational levels of the two UCP's Computational Dimensions of (Framework and Consistency) (as explained in [1]. Ultimately, the CUFT completely integrates the apparently "distinct" aspects of Quantum and Relativistic models as comprising integral computational aspects of the same singular higher-ordered UCP 'A-Causal Computation' – i.e., such as the complete integration of Relativity's 'c^2' (associated with the speed of light constraint imposed on the transmission of any signal) with Quantum's Planck's constant ('h', associated with subatomic complimentary pairs' simultaneous measurement accuracy constraint) to signify the CUFT's identified rate of UCP rapid production of the series of USCF's frames. Finally, as noted above, the CUFT's unique recognition of the singularity of the UCP's (e.g., computationally invariant) higher-ordered 'A-Causal Computation' which solely produces- sustains- and evolves- all four (e.g., computationally variant) phenomenal 'physical' features of 'space', 'time', 'energy' and 'mass' negates the current basic "materialistic-reductionistic" (SROCS) assumption underlying QM and RT – and forces Physics to recognize this singular UCP 'A-Causal Computation' as the sole reality giving rise to the phenomenology of all 'physical' features, including all quantum and relativistic phenomena and relationships.

8. The CUFT revision of 'dark energy/matter' & 'second law of thermodynamics'

One of the initial theoretical implications of the acceptance of the CUFT as a satisfactory TOE and the acceptance of its singular (higher-ordered) UCP 'A-Causal Computation' as revising contemporary Physics' Quantum and Relativistic "materialistic-reductionistic" SROCS assumption – is its capacity to explain the unresolved "enigma" of 'Dark Matter' and 'Dark Energy' and its potential revision of the 'Second Law of Thermodynamics' (and its associated 'Arrow of Time' enigma); Essentially, the 'Dark Matter, Dark Energy' enigma constitutes the inability of contemporary Physics to account for the acceleration in the rate of expansion of the physical universe – solely based on the observed (and calculated) total mass and energy associated with all planetary object comprising this physical universe... According to these calculations roughly 70-90% of all the mass and energy in the universe is "missing", i.e., cannot be observed! Hence, the working assumption (of Contemporary Physics) is that this (70-90%) of the "missing" mass and energy in the universe is "dark", i.e., it cannot be observed empirically (for some unexplained reason)...

Interestingly, this 'Dark Matter, Dark Energy' enigma is closely connected with the above mentioned UCP 'A-Causal Computation' constraining Relativity's SROCS (interactive) determination of 'massive objects' "causing" the 'curvature of space-time' and vice versa: 'curved space-time' "causing" these 'massive objects' to travel along curved space-time pathways... As delineated above, both the CUFT's 'Duality Principle' theoretical postulate and the discovery of the UCP's singular 'A-Causal Computation' prove (unequivocally) the impossibility of any such Relativity's SROCS "materialistic-reductionistic" assumption: e.g., due to such Relativistic SROCS inevitably leading to both 'logical inconsistency' and ensuing 'computational indeterminacy' which are contradicted by Relativistic Systems empirical capacity to determine both the curvature of space-time and the movement pathways of massive

objects; as well as due to the UCP's 'A-Causal Computation' "minimal time-point" USCF's analysis which indicates that based on the 'Computational Invariance Principle' proof that only the 'computationally invariant' UCP exists constantly both "during" the USCF frames and also "in-between" USCF frames, whereas the four phenomenal 'physical' features of 'space', 'time', 'energy' and 'mass' only exist "during" the USCF frames as produced by the singular UCP but cease to exist "in-between" these USCF frames – we must conclude that it is not possible for any of these four phenomenal 'physical' features to "cause" any change across USCF's frames... In other words, the discovery of the UCP singular 'A-Causal Computation' (alongside the Duality Principle) negates the basic "materialistic-reductionistic" SROCS (Relativistic) current assumption, wherein it may be possible for any direct (phenomenal) 'physical' interaction, e.g., of any of these four phenomenal 'physical' features (of 'space', 'time', 'energy' and 'mass') to "cause" any change (or effect) upon another physical attribute (e.g., such as the abovementioned 'curvature of space-time by massive objects' or its vice versa: 'curved space-time' "causing" 'massive object to move along these curved space-time pathways...) Instead, the UCP asserts that the only singular 'A-Causal Computation' solely responsible for the production- sustenance- and development- of any of these four 'phenomenal physical' features (e.g., at any hypothetical 'spatial pixels' comprising any single or multiple USCF's) is singularly conducted by the UCP's computation of the "simultaneous co-occurrence" of all spatial pixels comprising any such USCF.

Hence, the UCP's singular (proven) computation of the 'simultaneous co-occurrence' of all (four) phenomenal 'physical' features of 'space', 'time', 'energy' and 'mass' comprising all spatial pixels in the universe at any minimal time-point (single or multiple) USCF's necessarily negates the possibility of any 'materialistic-reductionistic' relationship existing between any of these four (secondary computational) phenomenal 'physical' features – i.e., including both the curvature of space time by massive objects (or vice versa) as well as the "expansion of the physical universe" – as "caused" by the phenomenal features of the amount of "mass" or "energy" comprising any single or multiple 'USCF' frame/s... In other words, based on the CUFT's proven singularity of the UCP – in producing- sustaining- and developing- all (four) phenomenal 'physical' features of 'space', 'time', energy' and 'mass' (across all exhaustive spatial pixels comprising the totality of the physical universe at any minimal time-point single or multiple USCF frame/s), the UCP's 'A-Causal Computation' is seen as solely responsible for all quantum, relativistic and CUFT known (or predicted) phenomena: This includes also the observed accelerated expansion of the physical universe – i.e., which indeed cannot be accounted for through any 'materialistic-reductionistic ' interactions between any of these secondary computational phenomenal 'physical' features. Indeed, viewed from this singular (higher-ordered) perspective of the UCP'S sole production- sustenance- and evolution- of all spatial pixels in the universe (comprising any minimal time-point single or multiple USCF frame/s) all quantum and relativistic phenomena, e.g., including the accelerated expansion of the physical universe must be accounted for solely through the UCP Causal Computation; Hence, according to the CUFT the relativistic phenomenon of the accelerated expansion of the physical universe cannot be accounted for by the currently assumed "Dark Energy and Dar Matter" – which represent a "materialistic-reductionistic" assumption (as explained in detail

above), but instead must be explained as arising from the sole and singular production-sustenance- and evolution- of the physical universe by the UCP...

Another interesting potential theoretical ramification of the adoption of the CUFT as a satisfactory 'TOE' – including its discovery of the UCP singular 'A-Causal Computation', may be its potential revision of the 'Second Law of Thermodynamic' (and associated 'Arrow of Time' phenomenon). The 'Arrow of Time' enigma refers to the observation that the laws of Physics are "biased" in such a manner that events (and phenomena) always occur in a uni-directional temporal direction: thus, for instance, a glass may break into a hundred pieces – but those hundred pieces will not (of themselves) revert back to form a single unitary glass... Indeed, closely associated with this 'Arrow of Time' unidirectional temporal characteristic of physical phenomena is the (famous) 'Second Law of Thermodynamics' which states that in any given physical system the degree of entropy always increases with time... However, based on the CUFT's discovery of the singular UCP 'A-Causal Computation' – which was shown (above) to negate the basic "materialistic-reductionistic" assumption (underlying both Quantum and Relativistic models of physical reality), and one of the CUFT's (previous: [2] 'differential-critical' predictions regarding the possibility of "reversing the sequence of spatial-electromagnetic pixels" based on the application of certain electromagnetic effects, we may need to revise this Second Law of Thermodynamics (and associated 'Arrow of Time' enigma); This is because as explained earlier, none of the quantum or relativistic physical phenomena, relationships (or even laws) can continue to be based on any "materialistic-reductionistic" assumption/s. Hence, as shown above, neither the curvature of space-time by massive objects or (vice versa) the determination of the movement of massive objects based on the curvature of space-time, nor the observed accelerated expansion of the physical universe – can be explained by the current 'materialistic-reductionistic' relativistic (or quantum) assumption, but must be based on the singularity of the UCP 'A-Causal Computation'; Indeed, as we've shown (above), a fine temporal analysis of the dynamics of this singular UCP's production-sustenance- and evolution- of every (exhaustive) spatial pixel in the universe (comprising any single or multiple USCF frame/s) indicates that there cannot exist any 'materialistic-reductionistic' effect of any of the four phenomenal 'physical' features (of 'space', 'time', 'energy' or 'mass') between any two (or more) spatial pixels, i.e., either within the same USCF frames or across different USCF frames. This is due to the UCP's singular asserted computation of the "simultaneous co-occurrence" of all spatial pixels in a given USCF frame (which prohibits any "causal" materialistic-reductionistic" effects existing between any two or more spatial pixels in the same USCF frame), as well as the UCP 's 'A-Causal Computation' associated 'Computational Invariance Principle' which indicates that the sole and singular reality existing invariantly "during" the USCF's frame/s (e.g., as producing, sustaining and evolving any of the four phenomenal 'physical' features of all of its spatial pixels) and "in-between" these USCF's frames is the UCP. Hence, the only source for producing- sustaining- and evolving-any spatial pixel in the physical universe (e.g., at any given USCF frame/s) is the singular UCP, but not any of its (computationally variant) phenomenally produced 'physical' features...

Therefore, also the 'Second Law of Thermodynamics' which asserts the increase in entropy of any physical system with the progression of time – must be revised based on this new higher-

ordered recognition of the singularity of the UCP 'A-Causal Computation': Hence, instead of the currently assumed 'materialsitic-reductionistic' basis for this Second Law of Thermody‐ namics, i.e., wherein it is the physical relationships that exist between a given physical system's material components which "causes" the degree of entropy in that system to necessarily increase with time, the UCP's 'A-Causal Computation' points unequivocally at the singularity of the UCP as producing- sustaining- and evolving- all spatial pixels in the universe and all associated physical phenomena and laws... Moreover, since all four phenomenal 'physical' features of 'space', 'time', 'energy' and 'mass' – are shown to comprise only 'computationally variant' features singularly produced by this UCP then we can foresee a condition in which the spatial-temporal sequence of a given USCF's frames can be reversed (i.e., at least when it is limited to a particular physical phenomenon); This was indeed predicted as one of the CUFT's 'differential-critical' predictions [2] – i.e., regarding the possibility of reversing the 'spatial-electromgnetic' sequence of a given phenomenon such as the growth and decay of a given amoeba. Essentially, this 'critical-differential' prediction of the CUFT states that it should be possible at least in principle) to reverse any given physical phenomenon by recording its precise USCF's spatial-electromagnetic values (e.g., of each of its constituting spatial pixels across a give number of USCF's frames), and then applying a specific electromagnetic stimulation (to each of this phenomenon or physical object's spatial pixels) in such a manner as to produce the "reversed spatial electromagnetic sequence" across the same number of given USCF's frames! Therefore, this CUFT's 'differential-critical' prediction predicted that it should be possible (at least in principle) to "cause" an 'amoeba' to "go back in time" – reversing its spatial-electromagnetic spatial pixels' sequence (by applying the particular electromagnetic stimulation to each of its spatial-pixels across a given number of USCF's frames... More generally then, the CUFT asserts the possibility of reversing the sequence of temporal events comprising any physical phenomenon! Therefore, it should be possible to increase the degree of entropy in any given physical system – contrary to the (currently accepted) 'Second Law of Thermodynamics'!

Although apparently "radical" this 'differential-critical' prediction of the CUFT does not aim to "topple down" the foundations of theoretical Physics, but rather expand our understanding of the physical reality by incorporating both Quantum Mechanics and Relativity Theory within a broader (higher-ordered) theoretical framework based on the discovery (and initial empirical verification) of the CUFT and its associated singularity of the UCP 'A-Causal Computation'; This is simply because in light of contemporary Physics basic contradiction between its two primary theoretical pillars (e.g., Quantum Mechanics and Relativity Theory) which has been shown to be resolved by the CUFT, the (initial) empirical validation of the CUFT's 'differential-critical' prediction associated with the 'Proton-Radius Puzzle', and its discovery of the singularity of the UCP's 'A-Causal Computation' – the fundamental concepts of 'space', 'time', 'energy' and 'mass' as representing merely secondary ('computationally variant') 'phenom‐ enal' features produced by the sole reality of the ('computationally invariant') UCP have to be revised: Specifically, since "time" (alongside all three other 'phenomenal' physical features) is conceptualized as being singularly produced by the UCP – e.g., representing the degree of change of any given object or phenomena across a series of USCF's frames, then it should be possible (at least in principle) to reverse the sequence of spatial-change across frames (through

the application of specific electromagnetic stimulation to the relevant spatial pixels comprising this physical phenomenon), thereby reversing the temporal events comprising this physical phenomenon... Hence, it may be said that the Second Law of Thermodynamics accurately represents the "natural progression" or temporal phenomena – but must be revised to include the possibility of reversing these 'natural phenomena' (thereby increasing their measured degree of entropy) across a series of USCF's frames. In a broader theoretical sense, the discovery of the CUFT's 'A-Causal Computation' necessitates us to revise our basic 'materialistic-reductionistic' assumptions underlying contemporary Physics, in such a manner that Quantum Mechanics and Relativity Theory will be anchored and based on the singular higher-ordered operation of the UCP's A-Causal Computation...

Therefore, we see that there is an urgent need to revise both quantum and relativistic models (laws and phenomena) based on the CUFT's discovery of the singularity of the UCP's production- sustenance- and evolution- of the physical universe; This important task involves several future steps, including: an empirical and mathematical verification of all of the CUFT's "differential-critical" predictions (e.g., beyond the initial empirical validation of one of its 'differential-critical' predictions associated with the 'Proton-Radius Puzzle' findings, mentioned earlier), a revision of the laws of Physics based on the CUFT's 'Universal Computational Formula' (which in fact fully embeds and integrates the key quantum and relativistic components) and further explication and exploration of the new theoretical vistas offered by the CUFT higher-ordered and broader theoretical framework (including the potential connection between this singular Universal Computational/Consciousness Principle and individual human Consciousness).

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