How some conundrums of reality can be solved by applying a finite 9 dimensional (9-D) spinning model

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An Abstracted Perspective Overview of the Seventeen Conundrums

The current Standard Model of Physics (SMP) allows us to experience almost all of reality. However, it has significant limitations with some apparent quantum contradictions, and certain areas remain unsolved conundrums. The SMP is based on the 3 spatial dimensions embedded in a moment in time (the present) (3S-1t). This *3S-1t experience* reflects the *overt* part of our *existence* that we're aware of while alive and awake. But reality appears to be broader than overt human experience, and much of it involves the *covert* hidden higher finite dimensions, ultimately all embedded within the infinite.

Neppe and Close have proposed the 'Triadic Dimensional-Distinction Vortical Paradigm' (TDVP). In TDVP, the fundamental principles of the SMP are *not negated* but are incorporated into a broader higher dimensional fabric: They demonstrate by several different mathematical and theoretical physics lines of evidence that reality appears to be far more complex than what we as sentient beings *experience* in the limited aspects of 3S-1t that we directly perceive. Specifically, their findings strongly suggest that *finite* reality involves specifically a 9-dimensional (9D) spin reality. This mathematical derivation based on particle physics was not surprising because we had postulated this would be so based on the TDVP model. By so doing, we extend the SMP beyond 3S-1t to a 9D model. An axiom of TDVP is that it consists of a triad of substrates Space, Time and the extent of Consciousness (C_e) (STC). STC is always tethered together so that not only is there necessarily 'Space-Time' but 'Space-Time-Consciousness'. We have proposed, but not yet definitively proven that the components of these 9 spinning dimensions of the finite reality consist of 3 dimensions each of Space, Time and Consciousness.

The pixilated finite volumetric reality, also has a higher quantized level than the 9D finite spin: This is the transfinite reality, a countable infinity, that can also be regarded as the higher *'10^{th} plus dimension'*. This too is contained within the continuous infinite. We call this finite and transfinite together the 'metafinite' —the quantized integrated reality. In turn, these *finite* quantized, pixilated, metafinite volumetric components of reality are necessarily embedded in a continuous *infinite* reality: The infinite pervades all of the finite necessarily.

The infinite is not quantized: Instead, it reflects as a *continuous* non-quantized reality that

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is unbroken and extends forever and is an unending repository of information. This information is expressed in the metafinite to sentient beings as meaningful information that we call 'content consciousness' (C_c). Like with the extent of STC, there is a triad of content namely mass-energy- C_c (MEC). Everything that exists, whether living or inanimate, even atoms, consists of MEC. This unification of the finite and the infinite, and of STC and MEC necessarily results in the new Neppe-Close philosophical model called 'Unified Monism' (UM).

TDVP involves several new mathematical applications and extensions of previous theorems. This has been required to evaluate and support multidimensional realities. We briefly summarize those specific findings:

- Close and Neppe previously applied 'dimensional extrapolation' with spin. This showed that we necessarily had a multidimensional finite reality and that 9 dimensions could work.
- Further, the definitive 9D spin derivation was initially demonstrated through mathematical physics derivations demonstrating this to be so. The major aspect demonstrated that a strange, heretofore unexplained, angle size in fermions, namely the Cabibbo mixing angle, could not be derived through our Standard Model of Physics, but could be derived by applying the 9-dimensional finite vortical (spin) model proposed by TDVP. Close and Neppe demonstrated that this strange angle size of the Cabibbo mixing angle in fermions (13.04 degrees) could be derived by applying the 9 dimensional finite vortical (spin) model as previously predicted by TDVP. [2] It could not be derived from any other dimensional models such as the SMP, 4, 5, 8, 10, 11 or 26.
- The 9D spin components are also supported mathematically by their demonstrating another new discovery, that electrons exhibit intrinsic spin based on their angular momentum.
- The authors also showed how so-called 'weak universality' can also fit the 9D-spin model.
- They have also mathematically replicated the finding of 9-dimensional spin finite reality appears through a thought experiment where the Cabibbo angle works out at 13.038 degrees.
- In a side-line, yet remarkable derivation, they also showed that electrons cannot be completely spherical in our current 3 dimensional space physical reality because the angular velocity of electron spin would exceed the speed of light (300,000K per second), which general relativity deems impossible, certainly locally.

The implications of these findings are critically important, both in terms of extensions and conceptualizations of findings in quantum physics, as well, as for broader speculative ideas pertaining to the fundamental nature of reality.

Essentially, Neppe and Close motivate the idea that reality may be more complex than what we as sentient beings perceive within our restricted 3S-1t experience. Their finite reality findings specifically demonstrate that their TDVP hypothesis that finite reality consists of a 9 dimensional spin reality, with some of the dimensions being hidden (unavailable to our physical senses), is correct. These in turn are indicative of a deeper and meaningful continuous infinite and transfinite reality.

Close and Neppe describe some remarkable new findings: The finite nine-dimensional spin model has been further amplified by applying Triadic Rotational Units of Equivalence (TRUE). We preliminarily report that the Periodic Table shows differences depending on the

ratio of a third necessary substance that we call 'gimmel' [c] to TRUE. Hydrogen contains more gimmel than any other element or compound. Thereafter, the other elements of life (Carbon, Nitrogen, Oxygen, Sulfur, Phosphorus, Calcium and Magnesium) contain higher proportions of gimmel than any of the elements that are less essential for life. These life projections are consistent extending to molecules and even RNA and DNA. Each component has specific properties. Based on this model, 'silicon' has life-properties—a testable hypothesis; and the inert elements, helium and neon, also have the same high level of 'gimmel' but are non-reactive.

Moreover, mathematically, based on three different analyses—elements having quantal volumes, masses, mass-energies and volumetric equivalents—no atoms in the Periodic Table of the Elements would be stable enough to exist permanently unless there was this third substance ('gimmel') besides neutrons (N), protons (P) and electrons (E): The cube root of the sum of the numbers of N+P+E in any of the elements does not equal the required integer solution. This failure ostensibly refutes the hypothesis of 'materialism', as atoms would be unstable with only N, P and E. Adding gimmel allows the calculations to work.

Remarkably, the ratio of gimmel to total TRUE of hydrogen and helium in the cosmos appears to correlate with the ratio of Dark Matter plus Dark Energy to the whole composition of the cosmos. This supports the hypothesis of this third substance (gimmel) in the cosmos.
The implications of these findings are critically important, both in terms of extensions and conceptualizations of findings in quantum physics; as well, as for broader speculative ideas pertaining to the fundamental nature of reality.

The authors then address two key areas: the justification of a new philosophy "Unified Monism" based on scientific empiricism and mathematics as in their TDVP model, and the reality of dimensions: Why mathematics and dimensions are not just pure operators.

Importantly, these multiple areas of productive application of TDVP are so linked that they overlap greatly. Consequently, it is artificial to completely separate the discussions into these compartments. They dynamically interface, with the mathematics being the thread through all. However, the authors hope that the background and literature in these areas will allow comprehension of the hypotheses, methodology, and discussion involved.
This series consists of this abstract, an introduction differentiating the 17 conundrums, separate sections on each conundrum, and the references section. [d] [e]

Keywords: *3S-1t, 9-D, 9-D spin, 9-dimensional rotational model, 9 dimensions, angle, angular momentum, asymmetry, Bell curve, Bohr radius, Cabibbo angle, calculus of distinctions, Close, consciousness, daled, dark energy, dark matter, degrees, dextrorotatory, dimension, dimensional biopsychophysics, dimensional extrapolation, dilution, dimension, dimensionometry, dimensional substrates, distinction, electron cloud, electrons, falsification, feasibility, Fermat's last theorem, fermions, finite reality, future, folding dimensions, gimmel, Heisenberg Uncertainty Principle, hidden reality, higher dimensional realities, homeopathy, Hydrogen atom, infinite continuity, levorotatory, LFAF, Lorentz correction, mathematics, metaparadigm, mixing angle, Neppe, non-spherical electron, normal distribution, orthogonality, paradigm, Planck probe, quantal, quarks, radian, radius, relative non-locality, relative reality, research, rotation, Rubik's cube, space, spin, spin rotation, Standard Model of Physics, STC, SQ, subquantal, superstable, TDVP, Theory of Everything, TOE, thought experiment, time, triadic, Triadic Dimensional Distinction Vortical Paradigm, TRUE, Triadic Rotational Units of Equivalence, UM, Unified Monism, velocity of light, vortex, vortical model, water, weak universality.*

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[c] We had to use a new term, in this instance, 'gimmel', because there is no term for it in the current paradigm.
[d] Like all articles by Drs. Neppe and Close on this topic, this article is peer-reviewed. It requires different areas of expertise so, at times, it requires different specialists for the different sections. We thank these peer review colleagues for their feedback.
[e] The footnotes in this paper usually either describe more technical information directed towards mathematicians and physicists, or contain aside comments sometimes, very obvious, and basic and are so excluded from the text.

General Challenges involving the Neppe and Close research: Why we should approach the many conundrums of reality.

Vernon M. Neppe MD, PhD, FRSSAf and Edward R. Close PhD

Because there are several sections in this paper that all move toward the same unitary theme, it may be easier at this point to prioritize. This we do here by listing briefly the various sections. We can treat this as a summary of what is to come, so as not to be overwhelmed by detail. This paper is all about solving conundrums or certainly attempts to do so. Several aspects of our already published research are alluded to [3], though some findings are very new such as the analysis of elements using TRUE units, the dark matter and dark energy gimmel cosmology, and Unified Monism, plus some of the new hypotheses to test. [3]

- We begin at the General at the first conundrum: Neppe and Close discuss the first great conundrum: Can the standard scientific model be used to develop a theory of reality? Briefly, it cannot. There are limitations of the Standard Model of Physics (SMP). Essentially this usual model involving reducing everything to the physical, works almost every time. It is applicable when we need to examine the experiences of day-to-day reality, physical or otherwise. But it does not always fit into certain well-known scientific enterprises like evolution and also aspects of cosmology (like the big bang). These require a historical examination of the past and inductive reasoning to the present. The SMP does not adequately explain important exceptions in physics and many aspects of psi phenomena [f].
- The second conundrum: We demonstrate that falsifiability is not enough; we need to apply feasibility as well: Popperian falsifiability has become the current defining characteristic of a scientific theory. Yet, we recognize this must be extended. We introduce the concept of a new method of validating data namely 'lower dimensional feasibility, absent falsification' (LFAF) and of paradigm shifts and theories of everything. In this LFAF model, we examine feasibility as well as the ability to be falsified. This is so as almost any multidimensional or cosmological or evolutionary model requires an extension of scientific analyses, When logically indicated, we need to apply a new approach to the philosophy of science which we call *'LFAF'* (lower dimensional feasibility—absent falsification /falsified).
- The third conundrum: We describe the broad brushstrokes of the great conundrum. Is there a model that allows for a broad theory of reality? We argue strongly that there is, and we provide a theoretical basis explaining the essential elements of the Neppe-Close Triadic Dimensional-Distinction Vortical Paradigm (TDVP). [4] This model is critical because we have postulated a 9-Dimensional finite spin model derived directly from the proposed concepts in TDVP, and TDVP provides a logical basis for developing that nine-dimensional finite spin model. [4]

[f] "Psi" is a composite term for so-called "psychic phenomena" which traditionally subdivide into "extrasensory perception" and "psychokinesis".

- The fourth conundrum: We discuss how some of the fundamental mathematical constructs of TDVP are applied. These are important new methods combining mathematics, geometry, and logic. They include 'dimensionometry', 3S-1t reality being relative and not absolute [5 4], concepts of orthogonality at higher dimensions [4; 6; 7], the application of new mathematical techniques like the 'calculus of distinctions' [8] and 'dimensional extrapolation' [8]. We apply the method indicated for evaluating scientific findings, namely LFAF (lower dimensional feasibility, absent falsification) to the generated data because multidimensional analysis are often not directly falsifiable in our 3S-1t (three dimensions of space in a moment of time) experiential reality. The importance of these new techniques integrating mathematics, dimensional geometry, and logic cannot be overstated. [7; 9]
- We move to the specific at the fifth conundrum: Close and Neppe demonstrate the initial application of mathematical dimensional extrapolation upwards and downwards showing multidimensionality and feasibility of 9D, but not specifically demonstrating 9D as opposed to other dimensions. [7; 9]
- The sixth conundrum: We discuss what is known about the mixing angle of quarks. The conundrum here is how little is known. The Cabibbo mixing angle is an empirically derived angle in Theoretical Physics [10], and it cannot be derived from the prevalent current Standard Model of Particle Physics. It appears that the derivation problem may have been neglected because of lack of progress made by applying the Standard Model. [10-12]
- The seventh conundrum: A big one! We derive mathematically the Cabibbo mixing angle in fermions (quarks and electrons). [6; 7] It is a critical finding. We show how only a 9-dimensional vortical (spin) model produces a logically consistent derivation. Hence, inter alia, both the Standard Model of Particle Physics involving 4-dimensions and the various String Theories (none of which involve 9-dimensional spin) fail. We derive the Cabibbo mixing angle at 13.032 degrees (applied to 5 significant figures). [6; 7; 9] This finding can *only* be derived by applying the dynamic rotation of elementary particles as nine-dimensional objects. [6; 7; 9].

  Though previously relatively unknown, the Cabibbo angle is critically important: Derivation of the Cabibbo is one of the ways we have been able to show that we live in a 9-dimensional reality. We also validate the proposed component of TDVP that postulated that finite reality has 9 spinning (vortical) dimensions. Though 9D spin is supported, the mathematical derivation does not amplify the nature of any of the specific dimensional substrates involved, namely, if there are for example, 3 dimensions each of Space, Time and a postulated 'Consciousness'. [2] We have found no evidence that anyone has attempted to explain the Cabibbo mixing angle using a 9-D spin hypothesis before. Its actual empirically derived value of 13.04 degrees consequently perplexed scientists for 50 years. This value is not obtainable using any other dimensional model including the Standard Model of Particle Physics and the various String Theory models (which also would, require rotational models not folding). [13-17] Yet, this result can be derived easily by applying the relatively simple mathematics of the conservation of angular momentum with appropriate relativistic adjustments to the dynamic rotation of elementary particles as nine-dimensional objects. [2; 6; 18] Our results support the hypothesis that the Cabibbo angle could result from the interaction

of the fields, waves and particles of modern physics, but we are able to distinguish only part of this finite reality, reflecting only our four-dimensional subjective 3S-1t experience. [6; 7; 9]

- The eighth conundrum: We show that the same principles can be applied to a new concept of intrinsic electron spin and intrinsic angular momentum incorporating relativity. [6; 7; 9] This becomes a very important component to future thinking in particle physics that has not been recognized before and has not yet been fully explored. [6; 7; 9]
- The ninth conundrum: We show two different solutions to electron rotation implying either that it is not a perfect sphere or that there needs to be a modification to light speed relative to other dimensions. Both the ideas on time of Wheeler [19-21] and of Aharonov [22] may support this. If the electron shape is uniformly spherical then calculated spin velocities in our analysis would necessarily exceed the velocity of light, violating the most basic principle of relativity [23-27]. This finding is very exciting because it pioneers new thinking that also has not been fully recognized. [6; 9]
- The tenth conundrum: We extend the concept of weak universality based on the 9D findings. [9; 28-31]. This is a lesser issue in the context of the Cabibbo angle derivation, but is theoretically important.
- The eleventh conundrum: We briefly discuss another remarkable extension of our findings. We postulate electron clouds are distributed in a double Bell normal curve. [6; 9]
- The twelfth conundrum: We briefly discuss for the first time how one can replicate the 9 dimensional spin findings with a thought experiment. We derive the mixing angle at 13.038 degrees. This 5 significant figure derived value might be even more accurate than the original mean empirical finding of 13.04 (to 4 significant figures) ± 0.05 degrees. [6; 9]
- The thirteenth conundrum: This is the most developed and possibly the most important conundrum in this paper. We introduce for the first time an exceedingly important new concept, presented briefly but for the first time in any detail, namely *TRUE units*—Triadic Rotational Units of Equivalence. We examine how to apply this to subatomic particles and to the periodic table of the elements, finding a commonality for the elements that are associated with life. We propose a key new third substance that is fundamental to that commonality, which we call *'gimmel'*. We demonstrate mathematically in three ways that the standard model of the atom consisting of protons, electrons and neutrons alone cannot be correct as the resultant atom must be quantized and volumetric and it cannot be without the addition of that third substance. This proof refutes the hypothesis of materialism: There needs to be something else, mass-less and energy-less, and the most likely candidate for gimmel is consciousness at least as a component.
- The fourteenth conundrum: In this, we apply the proportion of Gimmel to TRUE units—Triadic Rotational Units of Equivalence. Remarkably, the proportions of Dark Matter plus Dark Energy in the Cosmos are the same.
- The fifteenth conundrum: We return to general principles with Neppe and Close applying the philosophical model of Unified Monism (UM): This is a direct consequence of TDVP and therefore, apparently the only philosophy based directly on scientific data. It is very versatile, recognizing that the extent of reality has three fundamental components Space, Time and "Consciousness Extent" and the its content of mass and energy is inextricably

always tethered with meaningful consciousness. UM is applicable in many scenarios, relative to our living sentient 3S-1t reality, in the context of 9 dimensions, and from the frameworks of the transfinite and the continuous infinite. All of reality is a single unit, hence the term 'unified monism'.

- In the sixteenth conundrum, Neppe and Close discuss the consequences of such thinking: We discuss immediate implications of these findings.
    - Some dimensions may be hidden from us in our restricted 3S-1t subjective reality.
    - We propose that the essential substance of finite reality manifests as various dimensionally related mixtures of matter, energy and consciousness in 9 finite dimensions even though we may only be perceiving three of space and a moment of time through our physical senses and extensions of them.
    - We demonstrate why mathematics and dimensional calculations are not just 'operators' but directly linked with the basis of reality.
- The seventeenth conundrum: We discuss how the mathematical derivation supports other significant implications for the future of appreciating and understanding our reality:
    - the potential to apply higher dimensional realities for future research;
    - the pertinence of spin, the application of relativity corrections in electron rotational velocity, and the conservation of angular momentum;
    - the derivation of the same approximate Cabibbo mixing angle linked with electron spin (as well as quarks);
    - the broadening of Cabibbo's concept of 'weak universality' by hypothesizing that all discrete phenomena result from specific dimensional extensions of the same elementary pattern inherent in the multi-dimensional substrate of reality; and
    - the applications of 'gimmel' and 'TRUE' units in further research.

These findings and the proposed ideas, because of their range and theoretical importance, could generate several novel ideas for testing and application.

We propose that we should be researching *what exists, not just what we experience*. This leads to re-examining these 17 conundrums within our 9-dimensional finite spinning existence. Furthermore, extensions outside this specific paper are important, such as examining 9-D spin as part of the broader unified reality involving the finite being embedded in the infinite, as well as the roles of the higher discrete, countable infinity that we call the transfinite.

The first conundrum: can the standard scientific model be applied to develop a complete theory of reality?

Vernon M. Neppe MD, PhD, FRSSAf and Edward R. Close PhD

Our current Standard Model of Physics is extremely useful but has limitations.

Our current conventional world-view is based on the 'Standard Model of Physics' (SMP). This has become very useful and might explain as much as 99.9% of the reality that we experience directly. This currently applied standard paradigmatic physicalist conventional materialist model is usually perceived as correct and the sole basis of reality. However, it is limited because it relates solely to the three dimensions of space (length, breadth, height) (3S) and one single point in time (1t) together called '3S-1t' that we can directly experience (our 'restricted 3S-1t') or to extensions of this 3S-1t that we have developed, such as X-Rays or Infrared photography. This is our reality that we living humans directly experience every day (our 'sentient reality') and that we amplify indirectly by that applying scientific apparatus to further extend our restricted four dimensions. We recognize that space and time are inseparable such that we speak of 'space-time'. [32] But we seldom recognize that single moment in time that we call the 'present' as an integral, quantized, whole finite moment: That present is like pixels on a screen. Yet all our experiential world is quantized and finite like watching a movie in 'frames' that we don't recognize exists. Thus, the current reductionist SMP uses a materialist paradigm that certainly allows explanations of *almos*t all the physical aspects of our experience, including the overt mass and energy. Yet, certain areas of scientific endeavor still produce contradictions. [3]

And this is the problem: our Standard Model of Physics does not explain everything, and it is these perhaps 0.1% or less of unknown explanations or ostensible frank contradictions that we recognize in this series. It is incumbent upon us to do so as scientists: We need to explain the unexplained. Therefore, we offer further ideas on these, often based on extending our scientific investigation of reality to 9 dimensions, including consciousness, by applying mathematics and re-examining quantum physics to support the 9-D finite spin hypothesis. [7]

We understand the SMP applies the correct experiential and empirical data that is important in our day-to-day living. It has proven a remarkable map to navigate with. But, nevertheless, that data is still incomplete. This is why we present mathematical proofs demonstrating that our finite reality consists of nine spinning dimensions. [6; 18; 33-35] In turn, these 9 dimensions appear to be embedded in a broader infinite reality [35].

A key point here is that we are not refuting the SMP: The SMP is *incomplete* and our research has added to it, not replaced it. The SMP has generated enormously important findings and this *'Triadic Dimensional Distinction Vortical Paradigm'* (TDVP) model, involving 9 dimensions, is an *addition*. TDVP incorporates the SMP, it is not a substitute for it. Therefore, all the laws

and findings in the SMP need not be refuted or contradicted, simply amplified. However, with respect, this is not so for findings that do not fit. [3] We maintain that TDVP does not include explanations based on a so-called 'reductionist materialism' because those do not explain findings such as psi phenomena in Consciousness Research [2; 3; 36] . The SMP also does take into account conundrums such as entanglement in Physics [37-39] even at great distances [40-43], and Wheeler's delayed-choice two slit experiments [19; 21] remain unexplained [2; 3; 36]. Similarly, there had been a conundrum about why the mixing angles in elementary particles empirically reflected specifically the strange numbers that did. [6; 10; 44] This conundrum included the strange 13.04 degree size of the Cabibbo mixing angle. [6; 10; 44]

Because this current conventional world-view of the Standard Model of Physics regards all of reality as only 3S-1t [g] and because our work and a large body of data preceding it in psi research [2; 7; 34; 45; 46; 47] has suggested this is incomplete, we must regard reality as more than this. Fortunately there are now mathematical techniques to prove this [7; 34] and we discuss below how we can explain some exact quantal phenomena by broadening reality beyond our 3S-1t experience and recognizing that existence is far more than that: We *experience* beyond our 3S-1t reality restrictions by indirectly extending it to mechanical visual and auditory apparatus, and we recognize space and time are inseparable such that we speak of 'space-time'.[32] However, *existence* is more than only mere *experience* and in these sections, we maintain that 'space-time' is insufficient as a term, it is actually and has always necessarily been 'space-time-consciousness'. [8]

Motivating an extended model of reality.

There are occasional contradictions or explanatory dilemmas in some of the laws of physics such as the relationships of relativity and quantum mechanics [2; 3; 36]. Many other models such as entanglement [37-39] even at great distances [40-43], and Wheeler's delayed-choice two slit experiments [19; 21] remain unexplained. An important example in this paper is why the so-called mixing angles in elementary particles are the numbers that they are. [6; 7; 10; 34; 44] Applying the SMP this empirically had remained a conundrum [6; 10; 44] This conundrum included the strange 13.04 degree size of the Cabibbo mixing angle. [6; 10; 44]

Therefore, we argue that a new model is needed other than our standard paradigm because there are rare areas in which the standard paradigm is incomplete, for example:

- The contrary quantum experimental evidence (as indicated, the double-slit and delayed choice experiments; plus the relationship of quantum mechanics and gravity and relativity) [6; 40; 42; 43; 48-52]
- the internal inconsistency in physics across quantal, macro- and astronomical levels;
- the contradictions of the standard model of subatomic physics particularly in the context of relativity and data that varies greatly from predictions;

[g] 3S-1t is an important dimensional abbreviation for our living reality experience: 1t refers to the "present" moment as opposed to 1T which refers to a single broader time dimension involving past, present and future; D is non-specific for dimensions; 3D = 3 dimensions; 9 dimensions are abbreviated 9D or 9-D; S refers to Spatial dimensions.

- the applications of special and general relativity theory have facilitated new approaches to the previous Newtonian physical understanding of the world but reduced new challenges.
- Nine remarkably different six sigma meta-analyses in consciousness research [2; 7; 34; 45; 46; 47]

Additionally, there are other, as yet, not fully solved challenges:

- Applied to the standard paradigm, can evolution be adequately demonstrated because it is not falsifiable? Does that make it non-scientific? Furthermore, there is debate as to its feasibility: It is unanswered, for example, whether the so-called 'jumps' in evolution can be explained purely in a Darwinian [53] context. [7 54 55; 56] Does this mean we cannot make any further scientific assumptions?
- A more testing question is the unanswered question is "how does life come about?" We know about DNA and RNA, but we do not know if there is an essential other component of life [7]. We briefly touch on the concept of 'gimmel' and TRUE units in this paper.

These limitations are not surprising because the SMP does not take several key features into account namely, consciousness, extra latent dimensions, the continuous infinity [33; 34; 46]. Order (as opposed to entropy and tendencies to disorder) and life. On the other hand, the SMP recognizes the Quantized, integral nature of reality in Quantum Physics and this plays an enormous role in our TDVP model, recognizing *discrete finite reality* as contrasted with the *continuous infinite.* [7; 34; 35]

A perspective to change: Dimensional Biopsychophysics as a new discipline

In summary, the SMP involves data based on experience. *But physical sensory experience is only part of existence.* There are unsolved areas and ostensible paradoxes that are soluble with a 9-D model.

TDVP does not need to refute 3S-1t as 3S-1t is part of TDVP. We have called the discipline involving multiple dimensions, 'Dimensional Biopsychophysics' (DBP) and DBP is exemplified by any model, such as 9 dimensions, that incorporates physics (here quantum physics and spinning particles including fermions) and examines biology all the context of 'Consciousness Research'. [5; 33; 57; 58] DBP is therefore broader than physics, which focuses on 3S-1t. DBP also involves mathematical proofs, and these derivations such as those deriving the Cabibbo angle, move this from speculative metaphysics (which some would regard 'String Theory' in its many iterations [13-16; 59] as because it remains unproven [60] to demonstrable mathematics. The basis of our 9D work are the theoretical elements of TDVP and the mathematics. [7 8; 9]

A major limitation of the SMP, most commonly involves the ignoring of the area of 'consciousness' [3; 5; 33; 57; 58] The SMP usually is interpreted as a standard paradigm that cannot explain why there is complex structure and complex conscious organisms in the universe or a universe at all because it is a physicalist, materialist paradigm fails. In it, 'consciousness' is nothing more than an emergent feature or epiphenomenal expression of the physical world, and disputably neuroscience itself cannot adequately explain consciousness in terms of the physical

brain alone. [35 58]

Because of this failure alone, besides everything listed above, there is a need for a radical new paradigm of reality which will address the complex controversies that are not explained using our standard model.

Metaparadigm

A paradigm shift refers to a fundamental change in approach or modification of our current underlying assumptions. In our main TDVP book [7], we motivated the term 'metaparadigm'— a global paradigm shift that includes consciousness and interfaces every known area of scientific endeavor—commonly called a 'Theory of Everything' (TOE), an unfortunate misleading and also ambiguous and misused term, but nevertheless well-known, so we use it here. Applying objective and careful constructed broad validating TOE criteria, [3 7] the SMP scored a creditable 13/39 and 20 other TOEs scored between 3/39 and 19/39. The original Neppe Vortex N-dimensionalism (27/39) and Close Transcendental Physics (23/39) models scored very well, but still had significant limitations. These two researchers have worked together from 2008 to develop a new paradigm. The result has been the TDVP model. When compared with the previous TOEs, the TDVP scores dwarf all the other models, scoring the remarkable and perfect score of 39/39, suggesting it is, at least, the best available TOE candidate. [3 7]

TOEs, Metaparadigm and Paradigm Shift

1. To be true, the key components of any TOE must:
   - allow feasible modifications from the current conceptual, mathematical and scientific models;
   - seamlessly reconcile with the major theoretical models and authoritative sources of all the natural sciences.
   - not contradict fundamental falsifiable data and current knowledge (other than materialist reductionism);
   - be feasible fitting pieces of the 3S-1t jigsaw puzzle without being falsified;
   - recognize that any all-encompassing TOE must conform to all known laws of nature.

2. Scientific areas that must be actively evaluated include not only:
   - the physical sciences including physics, chemistry, meteorology, and astronomy: These areas are obvious and sometimes regarded as the key areas of science;
   - the biological sciences including anatomy, biology, genetics, physiology, pharmacology and medicine; These the life sciences disciplines are incorporated into legitimate scientific endeavors and as relevant for TOEs as the physical sciences;
   - the social sciences, including anthropology, psychology and sociology: Many physicists may somehow perceive these as "not real science". But they are, though the data is softer and often based on inductive reasoning: Their results are critical;
   - the consciousness sciences: These include dimensional biopsychophysics, phenomenology, parapsychology and quantum consciousness. Many physicists may somehow perceive these

as "pseudoscience"—you can't prove them; "they're metaphysical". The truth is that they are as legitimate areas of science as all the others are. Data and information are important methods to understand even in more difficult disciplines.

3. Moreover, a complete TOE should also be specifically compatible (feasible) with the three major disciplines examining concepts outside our 3S-1t conventional reality: Hyperspace, Consciousness research and Philosophy—they should be feasible and not contradicted. However, sometimes what is known as truth today, might be falsified by new logic and/or evidence, in which case that old knowledge is replaced by new theories or axioms. Moreover, we posit that such a TOE should be compatible at all levels of cosmology, from the tiniest subatomic structures, to the macrophysical usual realities to the astrophysical.

- The TOE should also be compatible with the known forces including all energies.
- We posit that a TOE should be able to explain events in all of time. This includes evolution.
- A TOE must not only be empirically scientifically appropriate. It should also be explainable within the confines of Philosophy, Mysticism and Spirituality.
- A TOE should preferably have a demonstrable solid logical and mathematical base.
- We regard the principles of LFAF and falsifiability as key to motivating any scientific models including TOEs.
- Our premise is that the laws of nature should be universally applicable to all finite cosmic and also infinite reality. This includes scientific endeavors. We do not have data on infinite subreality but propose this is also part of the broadest laws of nature, however, we do not know in which way.
- The infinite contains and pervades the finite subreality and therefore there is a bidirectional communication just like there is between and within finite dimensions.
- Data expressed from the infinite is seldom if ever generally directly accessible, but expressed like a mirror in discrete quanta (or *'Qualits'* because these is 'consciousness' in the finite).
- We posit that a TOE should not imply anything supernatural or miraculous. What may be perceived as miraculous in 3S-1t, may not be anomalous in other higher dimensions. However, its occurrence at that moment in that place under that circumstance may be meaningful, possibly reflecting the meaningful, guided finite-infinite interface. [3]

The standard model of physics has its strengths and limitations

Whereas we can just ignore advances and contradictions in science and stick with the 99.9% of data that can be applied to our experience, we propose that we need to apply a metaparadigm that works in 100% of cases. Clearly the Standard Model of Physics does not work in all cases and therefore fails as a so-called Theory of Everything. Whereas this paper is targeted at demonstrating our 9 dimensional studies, it also happens to present TDVP which based on the available data, and more than three years for colleagues to critique most aspects, appears to be the only TOE that actually does not have significant contradictions and profound limitations, as for example, with the SMP. We are not claiming that TDVP is the ultimate TOE, but it does appear the best available alternative at this time to the prevailing Standard Model of Physics. [7]

It is not surprising that mainstream science, focused as it is, on the limiting philosophy of reductionist materialism, has lost touch with its metaphysical roots, and thus cannot explain how it is that a large part of reality is not available to us for direct observation, but makes its existence known only indirectly through quantum phenomena like non-locality and quantum entanglement, as well as the near light-speed vortical spin of fermions and the effects of so-called dark matter and dark energy in the rotation of spiral galaxies [59; 61 8; 9]

And so the answer to the question "*The first conundrum: Can the standard scientific model be used to develop a theory of reality?"* is *"unfortunately not"*. It does not always work when we go beyond the experiences of day-to-day reality, physical or otherwise. It particularly does not work when examining important exceptions in physics or in psi phenomena [h]. It produces difficulties in evolutionary theory and in cosmology. Yet these should be legitimate sciences requiring methods to analyze them. This has necessitated us introducing a new method of validating data namely 'lower dimensional feasibility, absent falsification' (LFAF) and also examining paradigm shifts and theories of everything.

We need more than just the SMP, and we need to apply an approach to examine viable scientific alternatives including analyses of higher dimensions. This is where this proposed new philosophy of science model of LFAF fits in.

[h] "Psi" is a composite term for so-called "psychic phenomena" which traditionally subdivide into "extrasensory perception" and "psychokinesis".

The second conundrum: Falsifiability is insufficient; we need to apply feasibility as well Lower Dimensional Feasibility, Absent Falsification (LFAF) as a scientific method

Vernon M. Neppe MD, PhD, FRSSAf and Edward R. Close PhD

'Let us suppose that an ichthyologist is exploring the life of the ocean. He casts a net into the water and brings up a fishy assortment. Surveying his catch, he proceeds in the usual manner of a scientist to systematize what it reveals. He arrives at two generalizations:

(1) No sea-creature is less than two inches long. (2) All sea-creatures have gills. These are both true of his catch, and he assumes tentatively that they will remain true however often he repeats it.

In applying this analogy, the catch stands for the body of knowledge which constitutes physical science, and the net for the sensory and intellectual equipment which we use in obtaining it. The casting of the net corresponds to observation: for knowledge which has not been or could not be obtained by observation is not admitted into physical science. An onlooker may object that the first generalization is wrong. "There are plenty of sea-creatures under two inches long, only your net is not adapted to catch them." *The ichthyologist dismisses this objection contemptuously.* "Anything uncatchable by my net is *ipso facto* outside the scope of ichthyological knowledge.' *In short,* "What my net can't catch isn't fish." *Or — to translate the analogy —* "If you are not simply guessing, you are claiming a knowledge of the physical universe discovered in some other way than by the methods of physical science, and admittedly unverifiable by such methods. You are a metaphysician. Bah!" ……

The mathematics is not there till we put it there.'

Sir Arthur Eddington, 1938 [62 i]

Sir Arthur Eddington's remarkable insight that obvious experimental data may not locate all of reality is a key to this series of articles. We cannot appreciate all of reality when only applying a small component of reality.

Lower dimensional feasibility, absent falsification (LFAF) [5; 33; 63]

Because there are areas with evidence and even proof in science that cannot be replicated, we need to consider adding to this approach to proof in special circumstances. The special circumstances in which the classical approach of Karl Popper in the Philosophy of Science [64] requiring falsifiability cannot be applied include evolution, cosmology, certain new models (for example, Einsteinian General Relativity took some years), dimensions beyond 3S-1t, models of

[i] Sir Arthur Eddington (1882 - 1944), the great British Astrophysicist and Philosopher of Science, quoted from Eddington's book *The Philosophy of Physical Science* in 1938 [62]. Eddington became world-famous when his observations on 29 May 1919 of the bending of starlight near the eclipsed sun confirmed predictions made by Albert Einstein in his General Theory of Relativity. http://en.wikiquote.org/wiki/Arthur_Eddington.

indeterminacy, psi, entanglement and alleged survival after bodily death [7]

Because falsifiability is usually limited to only 3S-1t, we propose a new model approach to the philosophy of science. This recognizes that some elements cannot be falsified at this time in 3S-1t, yet there may be ample feasibility evidence in 3S-1t. [7]

We propose the model of LFAF: Lower dimensional feasibility (usually 3S-1t), absent falsification. This is equivalent to using a jigsaw puzzle in 3S-1t and filling in the pieces that fit, but not allowing any contradiction where a piece of that jigsaw does not fit, implying it is falsified or misinformation or contradicted by empirical evidence. [7 3]

Table 2A: Empiricism, induction, deduction and LFAF definitions

Empiricism is based on, concerned with, or verifiable by observation or experience rather than theory or pure logic (Popper)

Induction involves the logic of inference of a general law from particular instances. The extension is the *observation-inductivist* method (opposed by Popper) of indirect testing only, applying theory and understanding implications. The Neppe-Close jigsaw puzzle in LFAF may be an example here, applying the principles of feasibility without being falsified.

Mathematical induction applies a means of proving a theorem by showing that if it is true of any particular case, it is true of the next case in a series, and then showing that it is, indeed, true in another particular case.

Deduction by contrast, involves the inference of particular instances by reference to a general law or principle.

Falsifiability: Empirical or mathematical demonstration of the falseness of a hypothesis. The level of proof is a negation as opposed to a possibility in Feasibility, but it's often limited to aspects of 3S-1t, insufficient for cosmological concepts like evolution.

Feasibility: The empirical or mathematical demonstration of the manifest portion of something that we can experience, perceive or conceive of, that is not falsified. It's applied particularly with extra dimensions, manifesting like a jigsaw puzzle piece in 3S-1t.

LFAF: Neppe and Close in 2012 [2] developed a new theoretical Philosophy of Science approach to scientific proof: This was called 'Lower-Dimensional Feasibility, Absent Falsification'. The basis includes logically feasible concepts in hypotheses that may not be falsified or even falsifiable in our experiential reality of our three dimensions of space embedded in the present moment in time (3S-1t). LFAF is applicable at all dimensional levels and allows a greater versatility of scientific approach. [7]

3S-1t: The abbreviation for 3 dimensions of space (length, breadth, height) in a moment in time(the present). 3S-1t describes our usual waking living experiential reality.

By demonstrating the limitations of Popperian [64-66] demands for the falsifiability of science in metadimensional realities (i.e., beyond 3S-1t), we apply this LFAF (lower dimensional feasibility—absent falsification /falsified) approach where logically indicated. [7]

> Because data at the higher dimensional levels cannot be completely represented in 3S-1t, they present like single puzzle pieces in a whole, multidimensional (i.e., >3S-1t) puzzle. The data are only there in part. Consequently, conclusions may be feasible yet not falsifiable or falsified in the traditional sense as they cannot be directly or completed represented in 3S-1t. [7]

Our current laws of physics and observation can account for maybe 99.9% of the world of reality that we experience. For these, we can usually apply Popperian falsification.

Ironically, and importantly, when we apply the well-accepted principle of Karl Popper's about the validity of our current materialistic 3S-1t paradigm, some of the current conventional laws are falsified (within that tiny 0.1%). Such falsification is sometimes at the quantal level and sometimes unexplained but not contradictory paradoxes occur, such as explaining 'entanglement' and 'non-locality' in physics. At times, these unexplained in 3S-1t elements occur in consciousness studies, for example, involving non-locality and altered states of consciousness. [67] These exemplify contradictions that simply should not exist or unexplained conundrums that defy explanation. *They demand solutions for us to continue scientific progress.*

There are some obvious empirically based prejudicial examples, that were initially unexplained and not falsifiable such as the origins of hypnosis, electricity, X-rays, meteorites, sterilization preventing death, round Earth, Earth revolving round the sun, Einsteinian relativity, warping of reality, splitting the atom, and psi. Only their later *post hoc* justification supported the Popperian view: They simply moved from metaphysics to real science.

LFAF applies simply a much more versatile technique. It keeps Popperian principles, and also applies the Neppe and Close concepts of LFAF, which adds to Popper. In LFAF, we recognize that our life's experience is a relative one and relative to this experiential restricted 3S-1t. If these other 3S-1t features that mankind does not experience are not falsifiable, are they, at least, feasible relative to our 3S-1t experiential reality?

By demonstrating the limitations of Popperian [36] demands for the falsifiability of science in multidimensional realities (i.e., beyond 3S-1t), we therefore apply the LFAF (lower dimensional feasibility—absent falsification /falsified) approach when logically indicated. The challenge is sometimes large because in the multidimensional realities, something may never have been done before. We regard the principles of LFAF and falsifiability as key to motivating any scientific models.

The Neppe-Close Triadic Dimensional-Distinction Vortical Paradigm (TDVP), in our opinion, illustrates the concept of metaparadigm and also applies and, at times, requires the principles of LFAF. Additionally, it provides support for LFAF because it demonstrates the importance of feasibility analyses of those portions of a so-called 'jigsaw puzzle' of little bits of information that are in 3S-1t but reflect just the hidden other dimensions.

The third conundrum: How the core dimensional calculations in the Neppe-Close Triadic Dimensional Distinction Vortical Paradigm (TDVP) contributes to a workable model of reality.

Vernon M. Neppe MD, PhD, FRSSAf and Edward R. Close PhD

TDVP, the Triadic Dimensional-Distinction Vortical Paradigm is a metaparadigmatic model developed equally by Drs. Vernon Neppe and Edward Close. TDVP applies in several major related areas:

- *Triadic* Space, Time and broader 'Consciousness' tethered together
- *Dimensions* of extent involving mathematical *distinctions*
- *Vortices* interfacing across dimensions. This is called 'indivension'.[j]
- *Paradigm* (Metaparadigm /Theory of Everything) across the sciences and mathematics with unification of the infinite and finite resulting in the philosophical model of Unified Monism.

Many detailed features reflecting TDVP are found elsewhere [7, 4] The application of this new paradigm: challenges current thought.

The essential ideas in the Neppe-Close TDVP model:

If a new approach to integrate several different scientific disciplines would propose a new, workable and comprehensive model, this would produce a paradigm shift. But this constitutes a major challenge: It had never before been achieved. One important reason is that previous models have often ignored the fundamental role of an extended consciousness. Even in the about twenty Theories of Everything (TOEs) specifically recognizing consciousness, only a few include multiple extra dimensions, and it is only in our Triadic Dimensional-Distinction Paradigm (TDVP) that infinity, order and life are fundamentally incorporated. [3]

The authors argue that TDVP fills the void for such a paradigm shift and this is supported by three plus years of intensive analysis and review by others. The TDVP model regards the unification of space and time as insufficient, and postulates that space-time and a broader extended 'consciousness' (STC) are fundamentally tethered from their finite origin, such that even when the tethering—the necessary linkage between Space, Time and Consciousness—becomes looser, the fundamental link always still exists, and has from the beginning of *finite time.*

Many terms and ideas are applied and these lead to special use of certain terms amplified in Table 3A.

[j] Indivension and individual units and its links with vortices are explained shortly.

Table 3A: Paradigm related terminology:

Axiom: a statement or proposition that is regarded as being established, accepted, or self-evidently true.

Hypothesis: A supposition or proposed explanation made on the basis of limited evidence as a starting point for further investigation

Lemma: a subsidiary or intermediate theorem in an argument or proof.

Meta-: One of several meanings for this prefix refers to 'broader or higher level of order'. We apply this context below for 'metaparadigm'.

Metaparadigm: Broadest paradigm impacting all sciences, mathematics and philosophy.

Paradigm: A model of reality constituting a specific worldview underlying the theories and methodology of a particular scientific subject.

Paradigm Shift: A paradigm that transforms thinking in a discipline.

Proof: evidence or argument establishing or helping to establish a fact or the truth of a statement.

Theorem: A general proposition not self-evident but proved by a chain of reasoning; a truth established by means of accepted truths; in mathematics, rule in algebra, geometry or other branches of mathematics expressed by symbols or formulae.

'Theory of everything' (TOE): To Neppe and Close, TOE is not conceptualized as an 'all-embracing knowledge' because it does not require omniscience. Instead, TOE is a term reflecting a comprehensive process to understand reality—principles that can be applied to currently soluble and insoluble problems. TOE is an ambiguous term, and differently applied in physics, and though best avoided, still commonly used. Neppe and Close far prefer the terms 'paradigm' and 'metaparadigm'. [7]

Briefly, and as an extra, the TDVP model allows for the interfacing within, across and between multiple dimensions of finite subreality. This is achieved technically by allowing for a mechanism of communication: The communication is integrated. [k] Essentially everyone can experience their own unique reality and yet also have many commonalities with others. [3] This finite reality bridges an all-pervasive infinite subreality essence of all-embracing time, space, and extended consciousness (meaningful information) as well as ordropy [l] (multidimensional order), existence and potential for physical life. [3]

Comparing TDVP with 24 other Theories Of Everything across 39 different parameters, TDVP scores a perfect 39/39: Every criterion is addressed to a significant degree based on parameters

[k] These integrative mechanisms are described in detail in *Reality Begins with Consciousness* [7; 35; 68] including in a series of simplified pictures in a Glimpses e-book [68], and briefly in a previous publication in this journal. [3]. The mechanism involves via a somewhat complex *process* called "indivension" and this indivension involves a multidimensional content of three dimensional "vortices". There is also a systems component, involving not only individuals but any groups (psychological, social, family, culture, ethnic, even species) all handled by "individual units".

[l] Ordropy from "order" was previously called "extropy". But others had used this term and we wanted to ensure that this was understood as not only one dimension of disorder-order but multidimensional.

that were refereed and were sent to numerous of the accessible authors of these TOEs. Remarkably, no other model scores above 20/39 other than the original models of Neppe (Vortex N-dimensionalism and Close (Transcendental Physics). But TDVP is far more than a theoretical model. It is supported empirically, has areas of testability in our 3S-1t (three spatial dimensions with one point of time) domain, has mathematical and logical support including the calculus of distinctions and generates six hundred ideas, speculations, hypotheses and extensions for research. Philosophically, the model of TDVP uniquely involves 'Unified Monism' [7]. Most definitively now, is the data in this paper. We mathematically show how 9 dimensions exist because they can be derived mathematically. And there is not only one derivation, but several demonstrable solutions.

Table 3B lists the fundamental aspects of TDVP.

Table 3B: TDVP fundamentals

- TDVP attempts to explain the vast and complex nature of reality. TDVP, therefore, is vast and complex.
- TDVP is a multidimensional model and therefore requires careful multidisciplinary examination. LFAF is applied to scientifically probe such extra dimensions.
- In TDVP, the triad of *extent* that can be directly measured, namely space, time and extent of consciousness (S, T and C_x) is always tethered together.
- In TDVP, there is also a triad of *content*, that cannot be directly measured as dimensions. This describes what reality contains. This triad consists necessarily of mass and energy but it exists with the content of consciousness (M, E and C_c) meaning that there is consciousness in everything.
- In TDVP, three different major distinctions of consciousness are recognized: C_x reflects the *extent* of consciousness; C_c reflects the *content* of consciousness; C_i reflects the *impact* of consciousness.
- TDVP recognizes that we *experience* only a small portion of reality namely a restricted 3S-1t. This 3S-1t is embedded in higher dimensions including a 9 dimensional finite spinning reality. This discrete, quantized, integral finite reality, in turn, is contained in the continuous, unbroken *Infinite* reality, which allows for a model of life and order.
- Reality is a unit and the finite cannot be separated from the infinite, and they all conform to the laws of nature, though many laws, particularly those involving the infinite reality, are not well understood. These usually are not testable in terms of falsifiability, but we can still conceptualize portions in 3S-1t. These are the jigsaw puzzle pieces of feasibility at our restricted 3S-1t level approached scientifically through LFAF.

Table 3C provides basics applying the mnemonic 'DICTUM' and Table 3D provides some more detail applying 'RESTFUL MEDICINES' including DICTUM (check-marked as √). Importantly there are fundamental areas and these are outlined in our 500 page Fifth Edition of *Reality Begins with Consciousness* [7], and further beyond that in many publications about TDVP. [3 5; 6; 8; 18; 33; 34; 52; 57]

Table 3C: The basic elements of TDVP DICTUM.

DICTUM
Dimensions
Infinity
Consciousness
Triadic tethering of STC, Theory of Everything.
Unification, Unified Monism
Mathematics

In Table 3D, we list the more detailed elements with the mnemonic being RESTFUL MEDICINES. DICTUM from Table 3C is included in this mnemonic (check marked √).

Table 3D: A mnemonic emphasizing the more detailed elements of TDVP

RESTFUL	
R	Reality; Relative to;
E	Entropy- ordropy (ordropy is multidimensional negation of entropy)
S	Subjectivity and objectivity;
√T	Triadic tethering; Time (T-), Space (S-) and Consciousness (C-) are inseparably tethered. Also, Space, Time and Consciousness and Mass-Energy with Information expressed as meaning reflect unified triads. Theory of everything
F	Feasibility - Falsification, framework
√U	Unification: Reality is unified and there is a unification of infinity and the finite, Unification of everything; unified monism
L	Life and order; ordropy

MEDICINES	
√M	Mathematics
E	Energy-Mass-Gimmel
√D	Dimensions. These measurements of extent can be conceptualized because of another important ‘d’ —’distinctions’).
√I	Infinity: The continuous infinity embeds the discrete metafinite [metafinite= finite + transfinite].
√C	Consciousness: This is a broad unitary concept with several elements.
I	Inseparability of all.
N	Nature laws govern all of reality. Most of reality is hidden, beyond our comprehension, finite and infinite is governed by unbreakable laws.
E	Extent, content, impact existential distinctions
S	Space-time-consciousness

In TDVP, all of space, time and "consciousness" (S, T and C) are tethered together. They are fundamentally inseparably attached together at one or more roots.

TDVP is based on the available broader empirical data of all the sciences (physical, biological, consciousness and psychological). It is validated partly by mathematical theorems, applying the philosophy of scientific validation method for evaluating scientific findings namely LFAF (lower dimensional feasibility—the jigsaw puzzle pieces in 3S-1t that fit —are feasible with the absence of refutation applying (Popperian falsification). [2; 35; 52] TDVP can also be applied to a philosophical model (as 'Unified Monism') [69], but secondarily following the mathematical logic and empirical scientific findings. [7] After three plus years, and hundreds of scientists in several countries examining it, the TDVP model has not been refuted. Instead, there continues to be further growing support for hypotheses that are proven applying the LFAF model—lower dimensional feasibility, absent falsification is necessary, because the postulations are outside our 3S-1t experience and therefore require feasibility evaluations as well, just as the practice of Medicine and the study of evolution and much of cosmology does. Moreover, the proofs and ideas discovered, demonstrated and theorized on by Neppe and Close are currently growing by the month: Most of this paper, for example, is the product of our work from the past two years. This growth is likely because Drs. Close and Neppe are amongst the only scientists examining a Nine-Dimensional-finite-spin model for reality, [7, 4] and it's hoped that others will now follow suit because the area is remarkably fertile.

The key features of TDVP are STC tethering, 9 finite quantized dimensions (9D) with 10^{th} plus transfinite dimensions embedded within a continuous Infinity. Depending upon the frame of reference, some or all of these dimensions are spinning relative to the conscious observer—they are vortices as there is always movement and curvature [mathematically relative to a specific dimensional clustering —domains— there may be no movement (=0 transiently)].

TDVP also answers the real need to explain why we sometimes catch glimpses of a broader reality in rare extra-corporeal (out-of-body) experiences and other documented *psi* phenomena. The current mainstream scientific paradigm cannot explain so-called anomalous phenomena and the 'missing' portions of reality because there is no place in its formulation for phenomena that may involve more than matter and energy interacting in three-dimensions of space and one dimension of time. TDVP, on the other hand, reveals a multi-dimensional reality and the need to recognize a third form of reality, not measurable as mass or energy, in the equations of science. As we shall see, TDVP provides a theoretical basis for a much deeper understanding of reality, as well as providing the appropriate tools for exploring it.

The roles of indivension, individual-units, vortices and communication across dimensions

Indivension is an important, complex new term in the TDVP model. Indivension describes the process that occurs through the interaction of vortices of moving across, between and within dimensions, and interfacing across different levels of individual-units. It also describes the limited, relative and fragmented views of reality afforded by the physical senses of different sentient beings. This means that it allows levels of communication that are a 'metalevel' higher than any field theory models and are individualized. Indivension is the process involving fluctuating space, time and particularly consciousness substrate domains. It is all individualized and there are innumerable individual-units that can move across dimensions, portraying unique

or common transdimensional (often transfinite) relative experiential realities. *Individual-units* refer to distinct 'conscious' finite biological units including not only dimensions but also the infinite. Multiple levels manifest together, most overtly in individuals, the individual-unit but can be familial, group, ethnic, cultural, social, and species linked (acronym: GIFECSs). Why is this important? Because this way we are all communicating uniquely across dimensions and the infinite, yet interacting all the time with our environment. But most of these interactions are hidden from us, yet we can imagine intersecting points where literally all individuals and individual-units are almost continuously interacting at these points or within spinning moving vortices that involve the content of consciousness, mass and energy that interface across the many dimensions. This is why 'indivension' is derived from individual-units plus dimensions.

TDVP includes consciousness as an objective reality, recognizes that dimensions exist beyond our simplistic 3S-1t experiential reality, and embeds the finite into the infinite. TDVP is generating testable results and explaining observations that the current materialistic paradigm cannot explain. Several of these are listed in our publications. [7; 35; 46; 68] The model of TDVP simply allows a serious effort to upgrade the mathematics of the physical sciences to include the direct and indirect involvement of consciousness. If successful, and there is now cogent evidence for this, there is then a reason to believe that this new paradigm will provide a comprehensive framework within which all the branches of science can be expanded to include phenomena heretofore excluded from scientific investigation.

TDVP is important here because it provides a proposed theoretical basis explaining the postulated 9-Dimensional finite spin model (9 D finite spin). The TDVP model provides the broad brushstrokes of the many multidimensional conundrums allowing a logical basis for comprehending them. [6; 7] A fundamental aspect of TDVP involves vortical rotation through nine finite dimensions [7; 35; 68] The justification works reciprocally because by the Cabibbo demonstration and by explaining the intrinsic spin of fermions in a 9D spin context, we have been able to validate this finite component of TDVP. However, our Cabibbo derivation does *not* elaborate the nature of any of the specific dimensional substrates involved, namely those of Space, Time and a postulated 'Consciousness'. [7]

Effectively, within the confidence limits of experimental measurement error, the exact angle derivation supports both the fermion mixing angle hypothesis for electrons and the feasibility of our nine-dimensional finite model. [3] These results could have been falsified, but they were not, being confirmed instead, and the calculation appears accurate. This methodology has also been justified by the LFAF philosophy of science method [2; 7] because the hypothesis has also proven feasible being explained like the missing pieces on a 3S-1t jigsaw puzzle [70].The likelihood of such findings occurring by chance should be very low because applying mathematical physics, no one in fifty years had shown such a calculation to be effective. [4] TDVP allows for a broad theory of reality that appears to work. It is therefore critical in modeling both finite and infinite reality. It is complex because the nature of reality is complex and most do not have the English scientific vocabularies to describe new phenomena.

Put in more technical terms related to our finite derivations of dimensions:
The authors have applied well-defined physics including well substantiated empirical data [4; 7]. We utilize well-defined and accepted constants such as the Bohr radius (radius of the hydrogen atom) [71], speed of light, Planck's constant, rest mass of the electron, its radius and charge, the Coulomb constant and pi (π). We have also added well-defined equations and principles. These include the Lorentz correction [25], the principle of conservation of angular momentum, kinetic energy equation, De Broglie's wave equation, Coulomb's equation, the centrifugal force equation, the wavelength of a rotating body, and calculations of magnetic moment. We have also applied new mathematical techniques that we've developed such as Dimensional Extrapolation and the Calculus of Distinctions. Particularly pertinent are extended applications of known theorems, particularly Fermat's Last Theorem [72; 73] and extensions of the Pythagorean Theorem. Importantly, we have applied Pythagorean principles in diophantine equations to develop a new 'dimensional conveyance equation' to derive and demonstrate a nine-dimensional vortical model of finite reality. This model is applicable to particle physics and provides new approaches for the current conundrums in experimental physics. [4; 7]

Particularly pertinent has been the application of electron rotation and its inherent spin [2; 3; 7; 35; 68] utilizing the basic concepts of a unified space-time-consciousness theory of finite reality from the Neppe-Close 'metaparadigmatic' —theory of everything—model called Triadic Dimensional—Distinction Vortical Paradigm (TDVP) [2; 3; 7; 35; 68]. These applications allow us to produce a detailed mathematical derivation of the mixing angle of elementary particle fermions. This is exemplified by the Cabibbo angle in quarks: Empirically this angle had already been found to be 13.04 degrees ±0.05 [10], but the challenge was why it was specifically that particular angle was not explained within the framework of the Standard Model. [4; 7] We have now demonstrated two related hypotheses first by deriving the Cabibbo mixing angle mathematically [4; 7], and furthermore even replicated our findings with a thought experiment. [4; 7] Importantly:

- The derivation can be obtained only from a nine-dimensional mathematical spin model.
- The derivation supports a pre-postulated hypothesis of the broader TDVP model, namely that finite reality can be effectively described as a 9-dimensional vortical (spinning) model. [9]

In this paper, we unify these findings, *briefly* discussing each component. There are several critically important parts to this paper given that the finding of a nine-dimensional spin model of reality has been mathematically derived, and the empirical support reflects a major breakthrough in physics. [60]

Specific challenges involving the Close and Neppe research
The fourth conundrum: applying the Triadic Dimensional Distinction Vortical Paradigm (TDVP) constructs in our dimensional calculations

Edward R. Close PhD and Vernon M. Neppe MD, PhD, FRSSAf

We now apply TDVP constructs: Relevant to apply are new mathematical techniques like the calculus of distinctions. We follow with *dimensionometry and 'dimensional extrapolation'* [8] plus the concepts of *orthogonality at higher dimensions* and the application of the calculus of distinctions. [8]

These results are relative to specific dimensional domains [m]. Our conventional scientific reality of 3S-1t is what, we, as living sentient beings experience)—3 dimensions of space (length, breadth, height) (3S) and 1 moment in time. 3S-1t reflects our perceived physical reality, open to extensive conventional scientific study. We therefore always discuss 9 *dimensions relative to* our own 3S-1t experience. No experience is absolute: There is a framework of observation, and experiences are relatively conceptualized. This is an important distinction, mathematically justifiable through the *Calculus of Distinctions*. It allows us to discuss real integers of dimensions, and half-spin based on our real number experiences, as opposed to applying a number system of real (spatial), imaginary (time) and complex numbers (consciousness). [3]

The Pertinence of the Calculus of Distinctions and Dimensional Distinctions [8]
TDVP is a consciousness-based model that applies a well-defined system of logic based on an application and extension of George Spencer Brown's Calculus of Indications [74]. This is called the Calculus of Distinctions [8] because it draws distinctions as and in so doing formalizes the most basic elements of mathematical logic. It was first developed by Close in 1986, published in1990, expanded to include dimensional notation by Close and Brandin in 2002 [75], and has been further amplified by Close and Neppe since 2009. [8]

CoD is a 'Calculus' because it involves a system of operations, governed by a set of logical rules. The Calculus of Distinctions allows fundamental processes of calculation at a level of logic prior to applying any other operational rules [3]: The CoD applies symbolic representation of a distinction or distinctions and extends into geometry and into multiple dimensions ('dimensionometry'), algebra, arithmetic and even includes, a limited application of the calculus of Newton and Leibniz. It can be applied to any size of system, from the quantal to the astronomical, and recognizes the fundamental role of 'consciousness', namely the drawing of distinctions. For the purpose of calculation, CoD expressions are changed by one or more

[m] Dimensional Domain: (also called "Domain"): A contiguous collection of perceived or conceptualized distinctions of extent; in our living sentient reality it usually is 3S-1t(-1c). When conceptualizing a 9-dimensional finite reality it could be any set or subset of dimensions, for example, 3S-3T-3C or even, theoretically, 2S-1T-6C. (See, too, "domain").

logical operations, consisting of one or more steps, to another form. It differs from Set Theory because it involves multiple dimensions, consciousness, is triadic (not binary), incorporates imaginary, complex and negative numbers, and involves distinctions not similarities. CoD fundamentally mathematically conceptualizes reality. [3] This new mathematical technique is critical in TDVP as part of its mathematical feasibility because although analyses occur across the frameworks of multiple dimensions, CoD applies mathematical feasibility relative to specific domains like our common 3S-1t reality. [8]

Distinctions are actually the basis of all conceptualizations, perceptions, observations, measurements, and knowledge, and the Calculus of Distinctions (CoD) is logically prior to enumeration and equivalence, the basis of all conventional mathematics. Because of this, the calculus of dimensional distinctions is a powerful tool used to evaluate and extend all mathematical procedures.

Distinctions may be drawn in any number of dimensions, but dimensions are only those elements of perception that can be measured using these variables of *extent*. This is often an error made in conceptualization by speakers or writers when the term 'dimension' is used loosely. This makes an enormous difference mathematically and in scientific conceptualization. Dimensions are conceptually and physically different from parameters of *content* and also of the *impacts* that influences of consciousness, mass or energy may have.

Distinctions are drawn in all dimensions, and therefore, we define an n-dimensional distinction as anything distinguished from its surroundings and measured in units of content. Because distinctions such as physical objects of the same size (dimensional extent) may vary in mass and energy content, units of content per unit of extent are used to express the strength or density of the distinction.

Why we apply the calculus of distinctions in these calculations:
Ultimately, the CoD translates into a new method for quantifying and representing multidimensional variables mathematically either intervally or ordinally. The CoD is particularly relevant to the Neppe-Close Triadic Dimensional Distinction Vortical Paradigm (TDVP) model. Additionally, the CoD is particularly important in this paper because even though we are, *inter alia*, demonstrating the derivation of a 9 dimensional spin finite reality, this still has to be relative to our current subjective experience, which is our Standard 3 dimensions of space and a moment in time. This 3S-1t can be portrayed in the context of Euclidean mathematics applying 'real numbers' for dimensions, as opposed to the extended model of TDVP, that can be proposed along non-Euclidean bases where Time would be portrayed by imaginary numbers, and 'Consciousness' by a combination of imaginary and complex numbers. Therefore, the mathematics below is Euclidean and involves real numbers.

Moreover, this is further justified by using specifically the 3S-1t basis for calculations in that empirically the calculations of the Cabibbo angle were based on real number derivations. There

the vortical motion of the elementary particles through nine-dimensional reality would still be based on calculations relative to 3S-1t.

Initial Dimensional extrapolations

Dimensional extrapolation is a mathematical technique allowing us to combine what is normally thought of as a geometric procedure with the mathematical logic of the calculus of distinctions to determine the mathematical nature of multi-dimensional domains. A unitary vector, defined in a one-dimensional domain is rotated about its origin and projected into the two-dimensional domain and can be continued onward through multiple dimensions such as 9 because the application of DE involves executing multiple rotations and projections from dimension to dimension. However, when we examine our 9 dimensional spin model, we take into account that there is no rotation in the first dimensional extrapolation, only a projection from 0-D to 1-D: This is different from DE from all other dimensions as 0 is a point where DE only involves projection. [8]

Relevance of dimensional extrapolation in these calculations

Once the derivation of figures for spinning dimensions is obtained, it actually involves a simple final stage multiplication to obtain 9 dimensions, and this can be compared with the previously empirically derived reality of the Cabibbo angle, and with spinning through other dimensions. There had to be a mathematical technique to spin across such dimensions and dimensional extrapolation is a logical mathematical technique to use.

Whereas the calculus of distinctions, and more specifically the part applied to dimensions namely the calculus of dimensional distinctions' [8] and 'dimensional extrapolation' [8] are key mathematical techniques for taming the new extended geometry of multiple dimensions namely *dimensionometry*, we also apply several other major mathematical principles such as 3S-1t reality being relative and not absolute [5 4], the concepts of orthogonality of all dimensions, including higher dimensions as a key way to understanding the stability of elementary distinctions in mathematical models of reality [4; 6; 7], and, as indicated, evaluating scientific findings through LFAF (lower dimensional feasibility, absent falsification). The importance of these new techniques integrating mathematics, dimensional geometry, and logic cannot be overstated. [7; 9]

The fifth conundrum: applying mathematical dimensional extrapolation non-specifically in our dimensional calculations to demonstrate multidimensionality

Edward R. Close PhD and Vernon M. Neppe MD, PhD, FRSSAf

Dimensional extrapolation as a mathematically feasible technique

We published this demonstration of the initial application of mathematical dimensional extrapolation upwards and downwards showing multidimensionality and feasibility of 9D but not specifically demonstrating 9D. [9] This result is still remarkable, in itself, and appears to be a major contribution because *extrapolation upwards to and downwards from 9 dimensions produces the same asymmetry.*

It is very unlikely that the mathematical technique of dimensional extrapolation had been applied before: Indeed, the concept is new, as it was only developed conceptually in late 2011, and mentioned briefly for the first time in the First Edition of our book, *Reality Begins with Consciousness* [2]

Based on the results of applying the calculus of distinctions and dimensional extrapolation [7], the most basic distinctions drawn from the space, time consciousness substrates by observation and measurement, known as fermions, are nine-dimensional objects. Their intrinsic spin of '1/2' is explained by dimensional extrapolation; and their mixing angle depends upon their orientation to the magnetic acceleration field in the particle accelerator.

Dimensional Extrapolation (DE) is the logical extension of a known parameter or parameters describing extent and facilitating the process of moving to and from higher dimensions. It involves an iterative logical operation based on the natural correlation between number fields and multi-dimensional domains of extent. DE is most easily calculated bottom-up, starting at lower dimensions, using geometrical and mathematical invariances and extrapolating to the higher ones, but can also be reversed. *Dimensionometry* is the term we use to describe the extension of the logic and mathematics of geometry to include dimensional domains of at least nine dimensions. The technique of Dimensional Extrapolation mathematically facilitates movement across dimensions and is therefore highly pertinent in the application of TDVP to physics, and to particle physics in particular.

Dimensional extrapolation: Applying the 9D model

Our most important finding has been demonstrating the mathematico-physical feasibility of our nine-dimensional finite rotational spin model: However, prior to this discovery, there was a large clue as to its success with our demonstration of reversibility of Dimensional Extrapolation and Reverse DE across multiple dimensions. Dimensional Extrapolation (DE) is a mathematical dimensionometric process for defining the dynamic relationship of dimensional domains and

number theory through rotation and projection; a process used to identify the number fields characterizing projected multi-dimensional domains. We apply *Reverse Dimensional Extrapolation* as a conceptual aid for visualizing the dynamic relationship of dimensional domains from the top down; i.e., from the 10^{th} plus dimensions (transfinite domain), through rotation and projection. Bottom-up calculations from lower to higher dimensions involve 'dimensional extrapolation' and top-down downward extrapolation is 'reverse dimensional extrapolation' (RDE).

Dimensional Extrapolation in Euclidean and Non-Euclidean space

Dimensional Extrapolation can be conceptualized by applying non-Euclidean mathematical thinking to indivension, where one is moving up and down and across dimensions. However, if one theoretically is moving from the top downwards ('top-down'), our conceptions then could be conceptualized in a Euclidean way [n]. Consequently, any reality below the 9-D domain would be embedded in conscious substrate, but this would not require space and time to be noticeably different than our conventional perceptions. In essence, when we speak about extra dimensions, this involves non-Euclidean thinking and we cannot at this point have pre-conceived concepts of so-called non-Euclidean space (which might involve time, space and consciousness). Non-Euclidean geometry does not describe an objective reality outside of perception or conceptualization [76]. In brief, we argue that the top-down approach may yield different information than the 'bottom-up' approach: What has been approached bottom-up using non-Euclidean geometry, is relative to the point of view of the observer, and may be projected as Euclidean, if approached from the top down.

Dimensional extrapolation is a critically important mathematical technique as it allows us to combine what is normally thought of as a geometric procedure with the mathematical logic of the calculus of distinctions to determine the mathematical nature of multi-dimensional domains. Our initial demonstration involved a unitary vector, defined in a one-dimensional domain that is rotated about its origin and projected into the two-dimensional domain. Maintaining the same origin, this process is repeated until the fourth dimension is reached, where the unitary projection domain, in order to reach a point outside of the 3-S domain must be represented by an imaginary number, consistent with Minkowski's representation of time as the fourth dimension [32]. All points located in the 4-D, 5-D and 6-D domains are found to be congruent with the field of real and imaginary numbers. Continuing in this way, we find that the number field of domains 7, 8 and 9 require complex number representation.

Applying DE, we therefore use an iterative logical operation based on the natural correlation between number fields and multi-dimensional domains of extent. Dimensionometric mathematical invariances existing between dimensional domains are identified, first in one-,

[n] Euclidean geometry is the most typical expression of general mathematical thinking that we are taught: It's the study of plane and solid figures on the basis of axioms and theorems employed by the Greek mathematician Euclid 2300 years ago. In its rough outline, Euclidean geometry involves what is commonly taught in secondary schools. It was only in the second half of the 19th century, that non-Euclidean geometry even when become pertinent. Operationally, in the Euclidean framework, for convenience, we define dimensions as orthogonal to each other and characterized in degrees of freedom. Because we can conceptualize three spatial dimensions and we're referring to 9 or more dimensions, non-Euclidean thinking is important here.

two- and three-dimensional domains; and then, using these invariances, the natural correlations between number fields and spatial domains are extrapolated into domains of more and more dimensions. The 4-D domain is the most fundamental where the points are either real or imaginary in time. DE requires that the complex numbers of variables of 3C extrapolate elements of both space and time with the consciousness as, mathematically, complex numbers include both real numbers (Space) and imaginary numbers (Time). The application of DE involves executing multiple rotations and projections from dimension to dimension. However, when we examine our 9 dimensional spin model, we take into account that there is no rotation to the first dimension, only a projection from 0-D to 1-D: This is different from all other dimensions as 0 is a point and just projecting. [8]

Linkages to space, time and consciousness beyond 4 dimensions

Contemplating a potentially infinite number of 3D co-existing realities, through extra-dimensional extrapolation, if you have n dimensions, you must have an n+1 dimension in order to observe the warping of the n-dimensional reality. However, n+1 in terms of our Pythagorean time, or our Euclidean time, would stop at 3. But there is no reason why we cannot get to 3 by using this kind of logic, and yet we could go beyond Pythagorean time into Euclidean and/or non-Euclidean realities, which may be reflected potentially and very speculatively in the infinite.

Theoretically, we might suppose that we can go to as many dimensions of time as we want, into a transfinite time. But we have to stop at 3 dimensions of time however, *if* time is represented by imaginary numbers, which we postulate is correct. This is a revolutionary idea, but we argue that we can't go beyond three dimensions of time by dimensional extrapolation, as going beyond that redefines the entity of time: This is so as it can no longer be represented by imaginary numbers and it also cannot be represented by real numbers because dimensionometrically that would return the entity to 3S. Whether Euclidean or non-Euclidean, this new entity must contain both space and time characteristics. Algebraic number theory supplies us with the appropriate type of number: the complex number a+b*i.* This space-time entity is more than the sum of its parts.

Dimensional extrapolation

The basis of the mathematics is Dimensional Extrapolation. There are three sets of three dimensions in the lower 9 dimensions, another example of triadic because everything breaks down in terms of triads. The third set of the three is 'Consciousness', possibly reflected by basic mental status features like cognition, affect and volition.

The model of dimensional extrapolation impacting a fourth dimension and involving imaginary numbers compared with Minkowski's 1D imaginary time is relevant to a 3D model. Moreover, mathematically, Pythagorean and Gaussian co-ordinates would put the projected ostensible fourth dimensional point back into 3 dimensional time somewhere unless imaginary numbers are used to measure time. [3]

The Theorem of Dimensional Extrapolation

An important application of the extension of this idea is through a process of what we call 'the Theorem of Dimensional Extrapolation'. This leads to the hypothesis that all forces that act over distance in three-dimensional space (3S) are the results of the interaction of additional dimensions with 3S-1t. Applying this concept to the other fundamental forces of nature, we discover the existence of additional dimensions.

Additional fundamental forces, such as the strong and weak atomic forces and electromagnetic forces producing the phenomenon of light, and likely the postulated expansion of the universe force with gravitation, all are involved with resulting dimensional warping and attendant extra dimensions, and are seen as the natural results of distortions in the space time continuum. Each force is integrated into the picture as the result of the progressive bending or warping of the continuum. This provides a clear and straightforward demonstration of the metadimensionality of reality in space-time and is amplified further in our in press companion book, *Space Time and Consciousness.* [76]

In modeling the dimensional extrapolation beyond N= 9 in STC, we speculate, but have not yet mathematically proved, that the hyper-complex unitary projections of dimensional extrapolation beyond N = 9 could be transcendental numbers. In this regard, vortices involve curvature and movement, and we speculate that functional relationships (equations) with hyper-complex variables like those discovered in dimensional extrapolation beyond N = 9 could exist for transcendental numbers like, for example, pi (π) and *e*. [o]

When the infinite number of points on a 1-D line, corresponding to the infinite set of real numbers, is multiplied by the infinite number of lines that exist in a plane when you go to 2-D, a higher order of infinity is obtained. Applying this concept of relative hierarchical countable infinity, as one increases dimensions, the infinity is obviously 'larger' than the first infinity because every number in the first infinity can be matched with an infinity of real numbers in the second, and could thus, be called infinity squared, or an infinity of the second order. The infinity of planes in the third dimension contains the two lesser infinities, and could therefore, be called infinity cubed, or a third-order infinity. The infinite number of points in each dimensional domain constitutes the basic concept of a field. The points on a line constitute a field in which each point corresponds to a unique real number (integer or decimal fraction). The points in a plane constitute a field in which each point corresponds to a unique pair of real numbers, and the each point in a 3-D space corresponds to a unique triplet of real numbers. This relative increase continues literally ad infinitum! The top-down dimensionometric approach is relevant and one can conceptualize x dimensions more easily from x+1 or x+n dimensions. Dimensional extrapolation is relevant and consciousness operates, we believe, in a Euclidean model, as this is how we conceive of it. [76] The

[o] *e* refers to Euler's number, an important mathematical constant, approximately 2.71828, as the base of the natural logarithms. It is the limit of $(1 + 1/n)^n$ as n approaches infinity.

field concept implies a functional modulator upon the "points" in a given dimensional domain, exerting its effect from a higher dimensional instance. [77].

Essentially, though demonstrating the initial application of mathematical dimensional extrapolation upwards and downwards shows multidimensionality and feasibility of 9D, it does not specifically demonstrate 9D as opposed to other dimensions. [7; 9] We can, theoretically, extend our model and even apply it to infinity.

Recognition of infinities within infinities is a fundamental invariant in dimensional extrapolation**.** Thus, Cantor's work[78] is strongly supportive of TDVP, but infinity need not be 'located' at N-dimensions plus or beyond N-dimensions because mathematically (e.g., parallel infinities in N-1 dimensions) infinity can be *contiguous* with any number of dimensions (e.g., 3D would imply a 3 dimensional infinite component). This is a key to understanding the unitary component of infinity at any level of the infinite.

The sixth conundrum: theoretical knowledge on deriving the Cabibbo angle.

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Background prior knowledge

The Cabibbo mixing angle of elementary particle fermions (electrons and quarks) is an empirically derived angle in Theoretical Physics. [79] The literature on the Cabibbo angle is limited. Of about 200 articles with attempts at derivation [6; 9-12; 28-31; 44; 80-88], there are none that derive the already empirically demonstrated angle of 13.04±0.05 degrees. Most of the literature is indirect discussing the CP [p] contradictions [82], or how to justify the 2*2 and the 3*3 matrices , or the links with the broader CKM [q] matrices[86]; or applying other particles: None deal with dimensions, per se, though there are clues. For example, another Dr. Close (FE Close) [30] points out the discrepancies in the Standard Model of the vector model that links other angles like the Weinberg. [85]

There are few books of theoretical physics that even discuss this. One such is Martin's and even then only briefly. [91] Martin points out how the Cabibbo mixing calculations can incorporate suppressed delays participating in the weak interactions via linear combinations applying the lepton quark asymmetry to doublets allowing new vertices to be generated. Applying the 13.04 value allows the previously forbidden decays with a suppressed sine squared (theta C) factor of about 0.05. [91]

Why the Cabibbo angle size had not been derived

Because the Cabibbo angle of 13.04 degrees cannot be derived from the prevalent current Standard Model of Particle Physics, it appears that the derivation problem may have been neglected as there was lack of progress made by applying the Standard Model with its actual empirically derived value perplexed scientists for half a century. [6; 9; 44] But we have found no evidence that anyone has attempted to explain the Cabibbo mixing angle using a 9-D spin hypothesis before. This value is not obtained using any other dimensional model including the Standard Model of Particle Physics that applies 3S-1t.

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[p] CP is "change parity": CP-violation: This area of Particle Physics is complex. Pertinently here, is the (3*3) matrix that involves the Standard Model case ($N = 3$), where there are three mixing angles and one CP-violating complex phase. [31; 44; 84; 87] The CP violation has been observed in experimental data, but is puzzling: It might possibly imply a time reversal and/ or the effects of the extra dimensions that are being ignored in the Standard Model. This is part of a broader "Maki–Nakagawa–Sakata" matrix and actually affects the behavior of all leptons, not just neutrinos. [89]

[q] CKM: In 1964, experimental data implied that in certain cases, asymmetric weak-force transitions could occur and conservation of Charge times parity, previously thought to be required as part of the law of conservation of mass and energy, was not conserved. Observing that the CP-violation could not be explained in a four-quark model, Kobayashi and Maskawa generalized the Cabibbo matrix into the Cabibbo–Kobayashi–Maskawa matrix (or CKM matrix) to keep track of the weak decays of the three generations of quarks. [31; 90]

String Theory does not have spin

Nor can it be derived from the various String Theory models, which are different from TDVP: The 'strings' in the various String Theories generally involve the 'curling' or 'folding' into extra dimensions, and do not usually regard 'spin' as the major requirement for more dimensions. It's an irony, too, that the String Theories apparently remain unproven mathematically: Some would say that's why they are still 'theories'. In addition, no String Theories apparently have a total of 9 dimensions.

The various String Theories usually postulate 10, 11, 26 or other folded or unfolded dimensions, yet there is no empirical support for any. But, perhaps most pertinent of all, String Theories do not allow for any kind of consciousness, nor do they generally specifically postulate Multidimensional Time, often speaking of poorly defined space-like or time-like 'spaces'. By contrast, the TDVP model is based on sound logic, scientific evidence and mathematics with empirical justifications of the Cabibbo angle allowing mathematical support in 9 spin dimensions. It produces strong empirical evidence for more than one dimension of time, and argues for the profound need for consciousness to be included in any equation describing reality. [7] Yet, this Cabibbo derivation result can be derived easily by applying the relatively simple mathematics of the conservation of angular momentum with appropriate relativistic adjustments to the dynamic rotation of elementary particles as nine-dimensional objects. [6; 7]

The 9-dimensional hypothesis and the Cabibbo angle

We hypothesized that the objects of reality are, or can under certain conditions be, nine-dimensional. Specifically, this general hypothesis was linked with the specific Cabibbo one:

- the calculation using the 9 dimensional spin model will produce the 13.04 ± 0.05 degree figure;
- this figure is falsified applying a model with any other number of dimensions.

We provide what we believe to be a definitive mathematical derivation: We demonstrate how the fermion mixing angle (such as the Cabibbo angle) can be derived from a 9-dimensional spin model preliminarily strongly demonstrating the feasibility of TDVP [70].

The seventh conundrum: the mathematical derivation of the Cabibbo mixing angle in fermions [9]

Edward R. Close PhD and Vernon M. Neppe MD, PhD, FRSSAf

We show how only a 9-dimensional vortical (spin) model allows a mathematical derivation consistent with experimental data. [79] Hence both the Standard Model of Particle Physics involving 4-dimensions and the various String Theories (none of which involve 9-dimensional spin) fail. We derive the mixing angle at 13.032 degrees. [6; 7; 9; 35] This finding can only be derived by applying the dynamic rotation of elementary particles as nine-dimensional objects (applied to 5 significant figures). [6; 7; 9; 35]

We provide what we believe to be a remarkable mathematical derivation: We demonstrate how the fermion mixing angle (such as the Cabibbo angle) can be derived from a 9-dimensional spin model preliminarily strongly demonstrating the feasibility of TDVP [70]. The reason for this 13.04 degree value of the mixing angle has mystified scientists for 50 years and cannot be derived from the Standard Model of Particle Physics that applies 3S-1t and is falsified using any other dimensional model.

The constants we have utilized in our calculation are well-known. They are accurately determined historically to five or more significant figures. They are logically justified as appropriate for utilization in the derivation of the fluctuating mixing angles that ultimately achieve stability at approximately 13.04 degrees, i.e. the Cabibbo mixing angle. What is new, however, is that we derive the Cabibbo mixing type angle by applying dimensional extrapolation to our 9-dimensional TDVP spin model. Briefly, Close [9] had applied our mathematical technique of dimensional extrapolation to our 9 dimensional (vortical) model of finite reality taking into account key, pertinent well-recognized measures, calculated to at least five significant figures.

The principle of the conservation of angular momentum allowed calculation of the spinning velocity of a free electron stripped from a Hydrogen atom. With this approach, the velocity, v_e, calculated as 2.9974 x10^8 m/sec is a large fraction of the speed of light, requiring applying the relativistic correction by of the Lorentz contraction, ϒ. We, therefore applied the Lorentz contraction equation formula, $\ell = \ell_O \sqrt{1 - v^2/c^2}$, as the relativistic adjustment to observation and measurement in the mathematical dimensionometry (the geometry of multidimensionality) of 3S-1t. Application of the Lorentz contraction equation factor accounts for the shortening of the rotational circumference difference for each 90 degree rotation as seen from 3S-1t. From N=0 to N=1, there is nothing to rotate because there are no degrees of freedom in zero dimensions. Consequently, in 9-D spin realities, there are only 8 rotations not 9. Applying the Lorentz contraction equation, the contraction for each dimensional rotation is calculated to be a factor of 0.0181006 for each 90-degree rotation, or 1.629 degrees.[r] Consequently, this is multiplied by 8,

[r] 0.0181006 x 90 = 1. 6290.

yielding 13.032 degrees, in agreement with what was originally derived experimentally for the Cabibbo angle (13.04±0.05 degrees). Importantly, calculations using any other number of dimensions fail to produce the correct mixing angle: When the calculations are done for other dimensional models the results do not approximate the Cabibbo angle. They are far outside the range of measurement error. This motivates acceptance of our nine dimensional model. *This demonstration is not post-hoc*: We've indicated we postulated a nine dimensional and vortical model well prior to this calculation (in *RBC 1st Edition* in November 2011). [16] Thereafter, the results of the hypothesis were validated—this is a groundbreaking finding because of its implications. [6, 8]

Other principles that are important

- The angle for each rotation is required to be 90 degrees. This is because, while rotation *of any angle* out of a spinning plane results in a projection into another plane, when content is involved (e.g., a spinning elementary particle), rotation of any less or any more than 90 degrees leads to destructive instability— the rotation becomes disruptive and wobbly relative to the particle's intrinsic spin. Thus, for an n-dimensional elementary particle to exist as a stable physical object in 3S-1t, say an electron, each of the n dimensions must be orthogonal to all of the other dimensions. Applying variants of the Quantum Mechanical theories such as Copenhagen interpretation of physics [14; 16-18; 26], the plane involved becomes pertinent only when observed and measured. Importantly, with substantial content, each dimension must become orthogonal to every other dimension because, as soon as there is *content*, there must be conservation of angular momentum in 3S- 1t. This, necessarily, requires orthogonal rotation to avoid instability. Any other orientation prevents particle combination and/or leads to dissolution of the vortical form in 3S-1t.
- The use of the Bohr radius (of the Hydrogen atom) is justified because we are using the *measured* value not the expected value. The Bohr radius is a finite value brought out of the range of possible values by actual observation and measurement.[s] The Bohr radius is justified because we are using the *measured* value not the expected value. The Bohr radius is a finite value derived out of the range of possible values by actual observation and measurement. The 'Bohr atom' is non-relativistic. The calculation ultimately reflects the *observation* of electrons from the *relative* standpoint of 3S-1t even though existing in 9 dimensions.
- We have used radians as a measure of angles where appropriate, to facilitate the calculation of the Cabibbo / Fermion mixing angles. The 'radian' is the natural standard unit of angular measure, used in many areas of mathematics, and logical here. [92 t]
- We applied the conservation of the angular momentum of an electron stripped from a Hydrogen atom. The conservation of the angular momentum of an electron stripped from a Hydrogen atom is represented mathematically by $r_e m_o v_e = r_o m_o v_o = h/2\pi$, where r_e is the

[s] r_o = the "Bohr radius" of the Hydrogen atom = 5.2917×10^{-11}meter.

[t] The radian is the angle of an arc created by wrapping the radius of a circle around its circumference.
The radian describes the plane angle subtended by a circular arc as the length of the arc divided by the radius of the arc: it, therefore, represents the ratio of a subtended arc, divided by the radius of a circle. 2π radians is equal to 360 degrees, meaning that one radian is equal to $180/\pi$ degrees equal to 57.29577 degrees reflecting a semi-circle and a right angle (90 degrees) is $90/\pi$ is 28.648.

Lorentz radius of the electron, r_o is the radius of the Bohr atom, m_e is the mass of the free electron, m_o is the mass of the electron in orbit around the H atom, v_e is the spin velocity of the free electron, v_{ow} is the velocity of the electron in orbit around the H atom, $h/2\pi$ is the constant converting the angular momentum of the electron to a quantized unit of angular momentum, and $m_e = m_o/ \alpha$ (where α is the fine-structure constant). We assume that the force stripping the electron from the H atom is exactly equal to the kinetic energy of the electron, calculated to be $E = ½ m_o v_o^2 = 2.18$ joules or 13.6 Ev, also called the energy of ionization of Hydrogen.

- We account for a charged particle spin creating a magnetic moment.
- Mathematically, this model continues to obey the interval-ratio scale, the orthogonality rules, and the real number rules as the calculation is relative to the 3S-1t domain. This is even though at the higher finite dimensionalities, imaginary and complex numbers are involved. There is an interval connection of dimensionality extent, but not of the ordinal elements of substance content. Where applicable, the Lorentz contraction is applied. Moreover, whereas we have proposed that ordinal elements are conceptually pertinent going beyond the fourth dimension (time) [2; 4], these only exist as measures of substance of essence. It is appropriate to analyze this data based on interval measures as this data is relative to our current dimensional domain of our experience, namely 3S-1t.)

The covert reality

The finding of 9D spin with our result supporting the hypothesis that the Cabibbo angle could be the result of the fields, waves and particles as hypothesized in the current paradigm of modern physics. However, we, as sentient beings, may be able to distinguish only part of this finite reality, reflecting only our four-dimensional subjective experience. [46] These, nevertheless, could reflect part of the feasibility of the larger 9-dimensional spin (vortical) unified finite reality of the essential substrates. [6; 7; 9; 35]

Implications

Our results support the hypothesis that the Cabibbo angle could be the result of the fields, waves and particles of modern physics. However, we, as sentient beings, may be able to distinguish only part of this finite reality, reflecting only our four-dimensional subjective 3S-1t experience. 3S-1t nevertheless, could be reflecting the covert aspects of the effects of nine-dimensional spinning particles. This would allow for the feasibility of the larger 9-dimensional spin (vortical) unified finite reality of the essential substrates. [6; 7; 9]

The eighth conundrum: angular momentum and intrinsic electron spin

Edward R. Close PhD and Vernon M. Neppe MD, PhD, FRSSAf

The principles of 9 dimensional spin can be applied to a new concept of intrinsic electron spin and intrinsic angular momentum. [79] This becomes a very important component affecting future thinking in particle physics because intrinsic spin has not been recognized as rotational in the current paradigm, even though it contributes to angular momentum. [46]

Spin in 3S-1t and 9 dimensions

Based on the solid justifications of the TDVP model [2, 3] thus far, we have hypothesized that the objects of reality are, or can be under certain *finite* conditions, nine-dimensional: We postulate that elementary particles should be regarded as nine-dimensional objects and that a nine-dimensional object will require an additional 180 degrees of rotation, in effect, an additional ½ unit of angular momentum to return to the same quantum state with respect to the 3S-1t reference frame of observation. Certain elementary particles are said to have an intrinsic 'spin' of ½. [93] Transitions from one spin ½ particle to another in a particle accelerator may result in changes in size, mass and spin velocity but, in keeping with the universal law of conservation of mass and energy, angular momentum will always be conserved. [94] Because of the limitations of our physical senses, and their physical extensions (such as microscopes, telescopes and infrared cameras) we are normally only aware of restricted 3S-1t portions of the vortical forms originating in the space, time and consciousness (STC) substrates. The dimensions of reality can be explored mathematically by dimensional extrapolation.

Our finite nine-dimensional TDVP model is pertinent and has mathematico-physical justification.[u] When a charged particle spins it creates a magnetic moment. The electron has an electrical charge, but the magnetic moment does not affect the calculations of the mixing angle and this is explained in our detailed mathematics.[v] The situation is far more complex

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[u] The preliminary calculations yielding 13.032 degrees have been based on the conservation of angular momentum adjusted for relativistic effects and dimensional extrapolation. Given that it is the spin angular momentum coupled with the intrinsic spin of the free electron that produces the mixing angle called the "Cabibbo angle", there are more elements to consider:

- Quantum uncertainty must be considered (the Heisenberg Uncertainty Principle [HUP]) [95] The rotation matrix of experimental data from which the Cabibbo angle is calculated is a probability matrix: The values of the individual numbers of the array are averages of many observations. This is, of course, something that must be accounted for in any calculation in Quantum Physics.
- The angular momentum of the electron in orbit around the nucleus of the Hydrogen atom reflects the magnetic moment resulting from the intrinsic spin of the electron in orbit. This is insignificant relative to the orbital angular momentum, i. e., it is so small that it doesn't show up in five significant figures. Consequently, it should not impact our data.

[v] When translated to spin angular momentum in the free electron, the magnetic moment of the electron spinning away from the Hydrogen atom reduces the total angular momentum manifested as spin angular momentum. However this impact, based on our detailed calculations, has been shown not be significant because the Cabibbo and other mixing angles have achieved a relative stability, and if magnetic moment and spin away from the atom were highly significant, it would logically destabilize this quantum system.

as Quantum Uncertainty (as in all Quantum Mechanics) must be accounted for, as well as, inter alia, extrinsic and intrinsic electron spin with magnetic moment. [7]

Quantum uncertainty

Quantum uncertainty must always be considered (the Heisenberg Uncertainty Principle [HUP]) [95] The rotation matrix of experimental data from which the Cabibbo angle or other mixing angles or other aspects involving spin are calculated, is a probability matrix: The values of the individual numbers of the array are averages of many observations. This is, of course, something that must be accounted for in any calculation in Quantum Physics. The angular momentum of the electron in orbit around the nucleus of the Hydrogen atom reflects the magnetic moment resulting from the intrinsic spin of the electron in orbit. This is insignificant relative to the orbital angular momentum, i.e., it is so small that it doesn't show up in five significant figures. Consequently, it should not impact our data.

The probability matrix calculated relates to the influence of one angle to another under the influence of subatomic forces. [96; 97]

In essence, as demonstrated, these same principles can be applied to a new concept of intrinsic electron spin and intrinsic angular momentum incorporating relativity. [6; 7; 9] This becomes a very important component to future thinking in particle physics. This has not been recognized before and requires further exploration. [6; 7; 9]

The ninth conundrum: two different solutions to electron rotation

Edward R. Close PhD and Vernon M. Neppe MD, PhD, FRSSAf

We show there are two solutions to the electron rotation implying it is not a perfect sphere or that there may need to be a modification to light speed relative to other dimensions. The ideas on time of both Wheeler [19-21] and Aharonov [22] may support this. If the electron shape is uniformly spherical, the calculated rotational velocity of the free electron would exceed the velocity of light, violating the most basic principle of relativity. [79]

This finding is exciting because it pioneers new thinking with regard to particle rotation in multiple dimensions, angular momentum and spin. [6; 7; 9; 35]

Certain elementary particles like electrons and quarks exhibit an intrinsic spin of ½. We apply two principles:

- Max Planck's discovery [98; 99] that matter and energy occur only in multiples of basic units or quanta, and
- elementary phenomena do not exhibit specific physical characteristics like mass, size and spin until they register as observed or measured phenomena [1; 42; 100].

What follows below are some important but complex mathematical calculations which may be skipped by the non-mathematically inclined. [w] These derivations and concepts are also very linked with the previous section. [6, 8]

Angular momentum

Upon being brought into manifestation as an object in 3S-1t by observation and measurement, an elementary particle will be spinning in one plane, where it will have a specific angular momentum, depending upon its mass, radius and spin velocity. The plane of rotation is determined by the experimental set-up for observation. In particle accelerators, it will always be perpendicular to the direction of the magnetic field that accelerates the particle [94; 101]; and the quantum state of the particle with respect to the reference frame of measurement will be the same after one complete rotation, or after any integral number of complete rotations. [93]

In this discussion, we focus on this simplest atom, the Hydrogen atom. This consists of four elementary particles: An electron circling a nucleus which contains two up quarks and a down quark. There are, therefore, four distinctions drawn in the Hydrogen atom from the substrate of reality: three quarks and an electron. Per the Copenhagen interpretation, [14; 16-18; 26] they have no separate discrete existence until observed and measured. [102; 103] Based on the current knowledge of quantum mechanics at this time, fermions should have the same mixing angle calculation

[w] This analysis is mentioned here so mathematical physicists have available the already published data and background.

because they exhibit the same half-spin properties. The electron, like the quark, is a fermion.

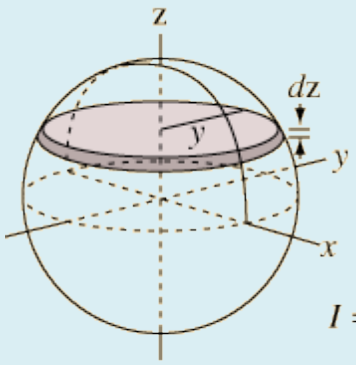
Conservation of angular momentum requires that $\omega_e I_e = m_o r_o v_o$ where ω_e is the spin velocity in radians per second and, if electrons are symmetrical with no internal structure, I_e is the moment of inertia of a solid spherical body with uniform mass m_e and radius r_e.
The moment of inertia of a solid sphere[x] is described briefly below. [104]

The formula for the moment of inertia of a sphere can be derived by summing the moments of infinitesimal disks about the z axis. So, with assumption that electrons are symmetrical spheres with no internal structure, the angular momentum of the free electron is given by:

$$\mathbf{L} = \omega_e I_e = \omega_e \, x \, 2/5 \, m_e r_e^{\,2} = h/2\pi = \mathbf{1.0546x10^{-34}\ J{\cdot}s}. \qquad (1.)$$

But conservation of the angular momentum of the orbiting electron as it transitions to a free electron according to equation (1.) and the fact that $v_0 = 2.1875 \times 10^6$ m/sec, a large fraction of the speed of light, means that the mass of the electron must be adjusted for the relativistic increase due to relative velocity. So we have:

$$\mathbf{L} = \omega_e I_e = \omega_e \, x \, 2/5 \, m_{re} \gamma r_e^{\,2} = h/2\pi. \qquad (2.)$$



$$dI = \frac{1}{2}y^2 dm = \frac{1}{2}y^2 \rho dV = \frac{1}{2}y^2 \rho \pi y^2 dz$$

and the integral becomes

$$I = \frac{1}{2}\rho\pi \int_{-R}^{R} y^4 dz = \frac{1}{2}\rho\pi \int_{-R}^{R} (R^2 - z^2)^2 dz = \frac{8}{15}\rho\pi R^5$$

Radius = R
Mass = M
Density $= \rho = \dfrac{M}{V} = \dfrac{M}{\frac{4}{3}\pi R^3}$

Substituting the density expression gives

$$I = \frac{8}{15}\left[\frac{M}{\frac{4}{3}\pi R^3}\right]\pi R^5 = \frac{2}{5}MR^2$$

Where $\gamma = [1 - (v_e/c)^2]^{-1/2}$. Converting ω_e from radians per second to spin velocity in meters per second, we have: $v_e = \omega_e r_e \rightarrow \omega_e = v_e/r_e$
Thus obtaining an equation in only one unknown: v_e.
Simplifying (2):

$$v_e \, x \, 2/5 \, m_{re} \gamma r_e = h/2\pi \rightarrow v_e = h/2\pi \, x \, 0.4 m_{re} \gamma r_e \qquad (3.)$$

[x] See http://hyperphysics.phy-astr.gsu.edu/%E2%80%8Chbase/isph.html for a detailed derivation.

Substituting the known values of $\boldsymbol{h}$, $\boldsymbol{m_{re}}$ and $\boldsymbol{r_e}$,
$\boldsymbol{v_e} = 6.6261 \times 10^{-34} / \boldsymbol{2\pi}\ 0.4 \times 9.1094 \times 10^{-31} \gamma \times 2.8179 \times 10^{-15} = 6.6261 \times 10^{-34} / 6.4514 \times 10^{-45}\ \gamma$

Noting that $\gamma = \boldsymbol{[1 - (v_e/c)^2]^{-1/2} = [(c^2 - v_e^2)/ c^2]^{-1/2}}$ and squaring both sides:
$\boldsymbol{v_e^2} = (6.6261 \times 10^{-34})^2 / (6.4514 \times 10^{-45})^2\ \gamma^2 = 1.0549 \times 10^{22}\ \boldsymbol{c^2/(c^2 - v_e^2)} \rightarrow$
$\boldsymbol{c^2 v_e^2 - v_e^4} = 1.0549 \times 10^{22}\ \boldsymbol{c^2}$, which simplifies to a quadratic equation in $\boldsymbol{v_e^2}$**:**

$$\boldsymbol{v_e^4 - c^2 v_e^2} + 1.0549 \times 10^{22}\ \boldsymbol{c^2} = 0 \qquad (4.)$$

Which we can solve using the quadratic formula as follows:
$\boldsymbol{v_e^2} = [\boldsymbol{c^2} \pm [(\boldsymbol{c^4} - 4 \times 1.0549 \times 10^{22}\ \boldsymbol{c^2})]^{1/2}]/2 =$
$[\boldsymbol{c^2} \pm [(8.0776 \times 10^{33} - 3.79239 \times 10^{39})]^{1/2}]/2 =$
$[\boldsymbol{c^2} \pm [(-3.7924 \times 10^{39})]^{1/2}]/2 = \boldsymbol{c^2/2} \pm [(6.1582 \times 10^{19})/2]\,\mathbf{i}$
$\boldsymbol{v_e} = [4.4938 \times 10^{16} \pm 3.0791 \times 10^{19}\,\mathbf{i}]^{1/2} \qquad (5)$

For readers who are professional mathematicians or physicists, demonstrating that the square root of a complex number is also a complex number should be unnecessary, but because the roots of polynomial equations of degree two or greater involve square roots of complex numbers, the form of the complex numbers in the solution of equation (5) must be defined. We obtain the appropriate form by deriving the general form of the square root of a complex number. This derivation is placed in the footer[y] to avoid disrupting the logical flow of the discussion. Using the derived form as a formula, we can convert $\boldsymbol{v_e}$ in equation (5) to a simple complex number: If a and b are real and $b \neq 0$, then the square root of a complex number, $\sqrt{(a + bi)}$, is equal to $p + qi$, *another complex number,* and p and q are real numbers given by $p = (1/\sqrt{2})\sqrt{[\sqrt{(a^2 + b^2)} + a]}$ and $q = \pm (1/\sqrt{2})\sqrt{[\sqrt{(a^2 + b^2)} - a]}$ (Where q has the same sign as b.)

Using this formula, the two simple complex values for $\boldsymbol{v_e}$ are derived as follows:
From (4.), $\boldsymbol{a} = 4.4938 \times 10^{16}$ and $\boldsymbol{b} = 3.0791 \times 10^{19}$
Substituting into the formulas for $\boldsymbol{p}$ and $\boldsymbol{q}$, we have:
$\boldsymbol{v_e = p + qi} = 1/\sqrt{2}\sqrt{[\sqrt{(2.0194 \times 10^{33} + 9.4809 \times 10^{38})} + 4.4938 \times 10^{16}]}$

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[y] Consider the general expression for a complex number: a + bi, where a and b are real and (b ≠ 0). Assume that the positive square root of a + bi = $\sqrt{(a + bi)} = p + qi$ where p and q are real numbers.
Then $(p + qi)^2 = a + bi \rightarrow p^2 + 2pqi - q2 = a + bi$
Equating the real and imaginary parts produces two equations:
(1) $p^2 - q^2 = a$ and
(2) $2pq = b$.
Note that $pq \neq 0$ since $b \neq 0$. Solving equation (2) for q gives
(3) $q = b/2p$
$p^2 - (b/2p)^2 = a \rightarrow 4p^4 - 4ap^2 - b^2 = 0$.
This is a quadratic equation in p^2, which we can solve for p^2 using the quadratic formula:
$p^2 = [4a \pm \sqrt{(16a^2 + 16b^2)}]/8 \rightarrow \boldsymbol{p = 1/\sqrt{2}}\ \sqrt{[a + \sqrt{(a^2 + b^2)}]}$
Using equation (3), and substitution from the quadratic solution, we have:
$q = b/2p \rightarrow q = b/\boldsymbol{[}\sqrt{2}\sqrt{[a + \sqrt{(a^2 + b^2)}]}\boldsymbol{]} \cdot \boldsymbol{[}\sqrt{[\sqrt{(a^2 + b^2)} - a]}/\sqrt{[\sqrt{(a^2 + b^2)} - a]}\boldsymbol{]}$
$= (b/\sqrt{2})\sqrt{[\sqrt{(a^2 + b^2)} - a]}/\sqrt{(a^2 + b^2 - a^2)} = (b/\sqrt{2})\sqrt{[\sqrt{(a^2 + b^2)} - a]}/\sqrt{b^2}$
$= \pm (1/\sqrt{2})\sqrt{[\sqrt{(a^2 + b^2)} - a]}$
Note that $\sqrt{b^2} = |b|$, so that $b/|b| = \pm b$, the sign of b is plus if $b > 0$ and minus if $b < 0$).
Thus we have proved the following Theorem:
If a and b are real and $b \neq 0$, then the square root of a complex number, $\sqrt{(a + bi)}$, is equal to $p + qi$, *another complex number,* and p and q are real numbers given by the formula:
$p = (1/\sqrt{2})\sqrt{[\sqrt{(a^2 + b^2)} + a]}$ and $q = \pm (1/\sqrt{2})\sqrt{[\sqrt{(a^2 + b^2)} - a]}$ (Where q has the same sign as b.).

$+ 1/\sqrt{2}\sqrt{[\sqrt{(2.0194 \times 10^{33} + 9.4809 \times 10^{38})} - 4.4938 \times 10^{16}]}\boldsymbol{i}$
Which simplifies to: $\boldsymbol{v_e} = 3.924 \times 10^{9} \pm 3.923 \times 10^{9}\boldsymbol{i}$
Note that the units used throughout are SI units, so that the results are in meters per second (m/s).

These are the two legitimate solutions of the quadratic equation derived from conservation of angular momentum and relativistic adjustment of mass. Both solutions are complex numbers, indicating that the spin velocity of the free electron has one real component in 3S and one imaginary component in 1T, existing at right angles to 3S. Note that the real part of the solution is greater than the speed of light, ($c = 2.9979 \times 10^{8}$ m/sec) violating the most basic assumption of relativity. This problem is resolved by postulating that, at the quantum level, the spinning electron has a specific symmetric form: However, unless this violation of the most basic principle of relativity [23-27] is accepted, the electron must be non-spherical, at least slightly, even though it may remain symmetrical. This finding is very exciting because it pioneers new thinking that also has not been fully recognized. [6; 9]

The tenth conundrum: weak universality based on the 9D findings.

Edward R. Close PhD and Vernon M. Neppe MD, PhD, FRSSAf

Cabibbo and weak universality

'Weak universality' is not a new concept. Cabibbo noticed patterns in the way elementary particles decayed from one type to another and postulated *'weak universality'* to explain the similarity in the weak interaction between different elementary particles. Weak universality means that all elementary particles, including electrons and quarks, transition from one to another under certain conditions. The identification of three generations of quarks [105] (up/down, charmed/strange and top/bottom) has been said to explain two related observations:
First, the transitions between up and down quarks ($u \leftrightarrow d$), between electrons and electron neutrinos ($e \leftrightarrow \nu_e$), and between muons and muon neutrinos ($\mu \leftrightarrow \nu_\mu$) have similar probabilities of occurrence.
And second, the transitions with change in strangeness ($\Delta S = 1$) have occurrence probabilities equal to 1/4 of those with no change in strangeness ($\Delta S = 0$).
This proposes a similarity between different generations of particles in the weak interaction coupling strength of any of the up-type quarks to all the down-type quarks [z, 31 aa]
In 1964, experimental data implied that in certain cases, asymmetric weak-force transitions could occur and conservation of Charge times parity, previously thought to be required as part of the law of conservation of mass and energy, was not conserved. Observing that the CP-violation could not be explained in a four-quark model, Kobayashi and Maskawa generalized the Cabibbo matrix into the Cabibbo–Kobayashi–Maskawa matrix (or CKM matrix) to keep track of the weak decays of the three generations of quarks.

Extending weak universality

We extend the concept of weak universality based on our findings. This is a lesser issue in the context of the Cabibbo angle derivation but is theoretically important. Nevertheless, based on our data, we have hypothesized that all discrete phenomena result from specific dimensional extensions of the same elementary pattern inherent in the multi-dimensional substrate of reality. We also have broadened the concept of weak universality to hypothesize that all discrete phenomena result from specific dimensional extensions of the same elementary pattern inherent in the multi-dimensional substrate of reality. We have extended the concept of weak universality based on the 9D findings. [9; 28-31]. This appears to be a lesser issue in the context of the Cabibbo angle derivation, but is theoretically important.

Effectively, we went searching for an alligator and we found it (13.032 degrees).
But this led to some dinosaurs, too —not necessarily spherical electrons; extending weak universality; and most importantly the proof of a finite 9 dimensional spin reality.

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[z] 3 quarks coupled: Is that linked with $3^2 = 9$. Is that coincidental or logical for a 9-dimensional spin model that seems to work?
[aa] Quark *mixing angles* are represented by rotation angles = $N(N-1)/2$.

The eleventh conundrum: The double Bell normal curve and its applications to electron cloud distribution

Edward R. Close PhD and Vernon M. Neppe MD, PhD, FRSSAf

We briefly discuss another remarkable extension of our findings. [79] To resolve the problem of super-luminal electron spin, we postulate that at the sub quantum level, electrons are clouds of charge distributed in a double Bell normal curve, as indicated. [6]

Electron clouds: What are they?

Theoretical physics recognizes:

- the half-spin components of the electron as a fundamental property of elementary particles such as electrons;
- an unexplained property that, at times, the electron is not detectable. [106; 107]

This property is called the 'electron cloud'. Sometimes, it is detectable; and other times, it is not. The question is why? Clearly it must still exist, but why is it hidden? And how and where?

Applying these principles, further scientific statements follow relating to what we refer to as the 'electron cloud':

1. Not only would there be the rotation of the electron around the H atom nucleus, but there is also spin rotation around the electron's axis.
2. There must be a mechanism for the electron in rotational orbit around the Hydrogen atom to transition to or link with the spin of the free electron.

Rotation of electrons

If the electron cloud rotates on its axis, the findings might support the fundamental basis of the TDVP vortical spin concept, even at the subatomic half-spin level (fermions like leptons and quarks, as well as possibly baryons). This hypothesis is mathematically still tentative at this point and being tested. If the hypothesis of vortical spin camouflaging the electron cloud turns out to be true, irrespective of findings of how this occurs (whether or not it is the Normal Bell curve or other specific mechanism), we speculate that this hypothesis might a be relevant in other areas:

- with other spins as in bosons like mesons (spins 0, 1, 2); and
- be particularly applicable to the Dimensional Extrapolation model: In lower dimensions, we observe only incomplete data from higher dimensions (e. g., when transposing planar oblique slices on an MRI onto non-oblique ones, some data is not observed in each 2D picture.)

In the context of the mixing angle analysis, the possibility exists that the exact angle calculated from the probability matrix is a reflection of the actual mixing angle produced by the combination of intrinsic spin and conservation of total angular momentum in the free electron. It could be possible, but the hypothesis is still unproven, that electron spin rotation on its own

axis might explain the probabilistic variations in this mixing angle linked with intrinsic and extrinsic electron spin and the magnetic moment. It should be noted that negation of this hypothesis does not destroy the findings on the fermion mixing angle—this hypothesis is an aside, adding information to a related, but another element in quantum mechanics that has not been solved. Consequently, whether or not this hypothesis is proven, our calculations for a fermion mixing angle like the Cabibbo angle still remain solid—this would just be icing on the cake.

Whereas these are simple preliminary analyses, these proposals apparently solve this dilemma, and with it, we have also postulated some remarkable and novel implications. We cannot 'prove' this using conventional Quantum Mechanics because some calculations generate 'impossible' velocities above the speed of light, though it may be balanced by symmetrically equivalent negative velocities below the light speed. But physics does not allow this theoretical construct.

The dilemma of light speed

The difficulty encountered is briefly the following: There must theoretically be an equilibrium because there are 'electron clouds' with rotational forces counterbalancing. We would expect counterbalancing positive and negative forces otherwise there would be utter chaos in the universe. This is what we find, however there is a problem: in one of the calculations the speed of light is exceeded, balanced by a velocity slightly lower than that of light. So it works out except, of course, that our conventional thinking in physics says this is impossible. Whereas we do not want to change conventional physics thinking, it is possible that if indeed there is a 9-dimensional reality, that we should be saying *"the velocity of light is the highest velocity possible relative to 3S-1t reality"*. If indeed, there is more than one dimension of time, then there might need to be an adjustment relative to other dimensional domains. But this is not necessarily required here and not the most parsimonious explanation by any means. Instead, we have proposed a solution to this conundrum which involves *changing the electron shape:* This would not require modifying the velocity of light [6; 8.] We have derived a specific complex mathematical equation so that this is not only theoretical and we report it elsewhere. [76]

As a related tautological comment: Because free electrons are spinning, this illustrates how vortical spin components are fundamental to even such elementary particles. A key basic element of the TDVP model is vortical rotation. Therefore, the postulate of vortices in TDVP is validated at this elementary particle level.

- Logically, this should also be applicable to multiple electron atoms, where the probability distribution of the electrons in shells around the atomic nuclei might be likened to an *electron cloud*.
- Clearly, there have to be counterbalancing forces to stabilize the electron cloud.
- There should be a logical mechanism to understand the spin of electrons.
- This can be done by recognizing conservation of angular momentum to the electron spin.
- We also need to explain why the electrons are not always detectable.

- Finally and most importantly, we must provide a way to explain the overall velocity calculations because the electron velocity calculations would otherwise exceed the speed of light. Applying the basic relativistic physics premise of supraliminal velocity being impossible, we must find a logical solution to this dilemma. Such a solution involves a separate hypothesis from the Cabibbo calculation in this paper, and even if incorrect would not invalidate our 9D spin hypothesis. But demonstrating a mechanism, would elucidate our understanding of elementary particles considerably.

We propose that:

a. the vortical electron cannot be spherical: as we have shown in our inertia and velocity calculations, it is clear that the spin velocity of a purely spherical vortical electron stripped from an atom would become superluminal.

b. the disappearing electron cloud can be explained by a double Bell distribution curve of the electron cloud.

A new theory of electron rotation: The Double Bell distribution curve

We propose that the double Bell Distribution curve rotation associated with vortical spin of elementary particles and Dimensional Extrapolation explains why electrons are not spinning at supraliminal velocities, and might also explain why subatomic particles such as fermions only sometimes appear. We argue that the Bell distribution curve generates probabilistic results that also reflect rotation perpendicular to a plane.

This theory is an unproven postulate reflecting another unsolved conundrum: Why do empirical observations find that electrons seem to not be detected and then reappear? These involve transitions states between 'on' and 'off'. [107] Because the electron clouds rotate around the nucleus, they appear to have achieved a stability in which the balance of electrons moving away is the same as the electrons moving inward. But why do careful measures at times not locate this cloud? Experimental data demonstrate both 'first order' phase transitions and also 'second order' transitions. Simulations show behavior that conforms to the 'generic power law' fitting the data [106; 107]. We postulate that the 'conundrum' of the observation about why electrons in 3S-1t appear to disappear and reappear is because of vortical rotation on the electron axes. Consequently, we cannot always register such events in 3S-1t because we propose that vortical rotation camouflages them.

Applying mathematical calculations, we first examined a torus and then a sphere. But both calculations were falsified: The effect is therefore neither a direct torus-like nor a spherical effect. However, mathematically, and also linked possibly with quantum uncertainty such as in Heisenberg's Uncertainty principle [95], and given the 'normal distribution' expected in fundamentally subatomic data, we postulated a rotation on an axis based on the 'Bell' normal distribution curve. Importantly, this postulate, in itself, suggests a solution to an ostensibly unsolved quantum mechanics problem: The new model proposed, namely *Bell curve rotation associated with vortical spin,* would have important implications in explaining the conundrum in quantum chromodynamics of particles only sometimes appearing. When we account for

angular momentum and mass inertia, our hypothesis was that the 'normally distributed' Bell curve generates probabilistic results: Specifically, the electron cloud appears to have the shape and mass distribution of two three-dimensional Bell curves on opposite sides of the plane of rotation, the 'second' symmetrically mirroring the reflection of the 'first'. These conceptually would be like Mexican sombreros with the axes of rotation through their apices. The Quantum Split of energy is influenced by inertia with angular velocity and radians changes, the outcome may considerably change with shape of spin.

If angular momentum is conserved, the magnitude of the real component of $\boldsymbol{v_e}$, electron spin velocity, is greater than the speed of light. Relativity tells us that this is *impossible*, since the mass of the free electron, $\boldsymbol{m_e}$ becomes infinitely large as its spin velocity approaches the speed of light. Obviously, something is wrong. But all of the parameters are well defined, empirically determined constants and the only assumptions applied were the assumptions of conservation of angular momentum and the assumption that the electron is a uniform spherical object. Are there other dimensionometric features that could slow the spin resulting from the conservation of angular momentum and prevent the calculated $\boldsymbol{v_e}$ from exceeding light speed? We know that a spinning charged particle produces a magnetic field. Could this field interact with some other ambient field and slow the spin of the electron? We investigated this and found that the conditions needed for magnetic moment to slow the spin velocity of a free electron were external and, even when present the retarding force was too small to bring the rotational spin down to subluminal velocities. Effectively, we find that the limiting conditions of $v_e < c$ and $r_e = 2.8179 \times 10^{-15}$m are met when $a^2 + b^2 = 3.7862 \times 10^3$ and $v_e = 2.9974 \times 10^8$m/sec. By not automatically rejecting a contradictory result, but looking for ways to explain it, we have found a way to logically and mathematically determine the structure of the electron at a scale far below the resolution of our current technology.

With magnetic moment eliminated as a spin retarding factor, we turned to the question of whether a 3S-1t shape other than spherical could create enough inertia to slow the spin below light speed:

We eliminated one ostensibly logical alternative explanation immediately: the torus shape. When we tested this hypothesis, the total inertia of the toroidal electron was insufficient to slow the spin below light speed. Therefore, the toroidal explanation did not succeed mathematically.

Based on our calculations with some fifteen equations [6], a red flag went up when we saw that the magnitude of the real components of v_e, electron spin velocity, was greater than the speed of light. Relativity tells us that this is impossible, since the mass of the free electron, m_e becomes infinitely large as its spin velocity approaches the speed of light. We must realize that the discovery of new methods and technology does not invalidate everything that came before. The discovery of the calculus of Newton and Leibniz, for example, did not invalidate arithmetic. Relativity did not replace Newton's laws: it extended them. We conclude that the inertia of this shape slows the spin of the electron and removes the relativistic contradiction from our calculations.

With this estimate of the shape of the free electron, we rewrote our third equation, v_e *x 2/5* m_{re} $\gamma r_e = h/2\pi \rightarrow v_e = h/2\pi$ x *0.4*m_{re} γr_e as:

v_e x $2(a^2 + b^2)m_{re}$ $\gamma r_e = h/2\pi$ *(6.).*

We explain this below.

Avoiding superluminal v_e

Knowing that the spin velocity cannot exceed the speed of light, we may set v_e at an arbitrary value less than c and work backward to obtain a corresponding value of $a^2 + b^2$. Assuming the spinning electron to be symmetric with an overall expected radius equal to r_e, the values obtained from an arbitrary v_e may not fit the radius r_e. If a and b are too large or too small, we can adjust them and calculate a new value for v_e. Depending upon how near the first estimate of v_e was to the correct value, it may take several iterations to zero in on the target value. Using this method, we find that the limiting conditions of $v_e < c$ and $r_e = 2.8179 \times 10^{-15}$m are met when $a^2 + b^2 = 3.7862 \times 10^3$ and $v_e = 2.9974 \times 10^8$m/sec.

By not automatically rejecting a contradictory result, but looking for ways to explain it, we have found a way to logically and mathematically determine the structure of the electron at a scale far below the resolution of our current technology.

With this new estimate of the shape of the free electron, we can rewrite equation (14) as:

$$\boldsymbol{v_e} \text{ x } 2\boldsymbol{(a^2 + b^2)m_{re}} \gamma \boldsymbol{r_e = h/2\pi} \qquad (7)$$

where the probability distribution of the inertia about the axis of rotation (the z axis) as a function of x and y is given by:

$$P(x,y) = (m_e/2\pi ab)\, e^{-[(x/a)2 + (y/b)2]/2} \quad (8)$$

where e is Euler's number and a and b are parameters indicating the spread of the Bell curve perpendicular to the axis of rotation**.**

Non-spherical electrons or are electrons uniformly spherical objects?

Since all of the assumptions and parameters leading to the superluminal result above are well defined and empirically verified, except the assumption that the electron is a spherical object of uniform density, we were prompted to ask:

Is there anything that we haven't accounted for that might slow the spin resulting from the conservation of angular momentum and prevent it from reaching light speed? Effectively, we find that the limiting conditions of $v_e < c$ and $r_e = 2.8179 \times 10^{-15}$m are met when $a^2 + b^2 = 3.7862 \times 10^3$ and $v_e = 2.9974 \times 10^8$m/sec. By not automatically rejecting a contradictory result, but looking for ways to explain it, we have found a way to logically and mathematically determine the structure of the electron at a scale far below the resolution of our current technology.

Whereas these are simple preliminary analyses, these proposals apparently solve this dilemma, and with it, we have also postulated some remarkable and novel implications. We cannot 'prove' this using conventional Quantum Mechanics because some calculations generate 'impossible' velocities above the speed of light, though it may be balanced by symmetrically

equivalent negative velocities below the light speed. But physics does not allow this theoretical construct.

Key implications

We have demonstrated mathematically that the electron cannot be a perfect sphere. The spin velocity, v_e, of this non-spherical electron does not exceed the velocity of light and, therefore, we conclude that, either electrons are not spherical, or the velocity of light c is exceeded. Although the concept of multidimensional time may suggest that c should be addressed relative to the observer in 3S-1t, and in a 9D finite reality light speed may exceed the 3S-1t constant c, a far more parsimonious hypothesis is that electrons are not uniformly spherical in 3S-1t. Nevertheless, relative to 3S-1t, and knowing the calculations for electron mixing angles are based on 9D and applying possible multidimensional time it may imply that $e=mc^2$ could be reformulated relative to 3S-1t and that it may need modification relative to other dimensional domains.

The twelfth conundrum: The thought experiment replication of 9 dimensional spin

Edward R. Close PhD and Vernon M. Neppe MD, PhD, FRSSAf

The overview of a remarkable thought experiment: Proving 9 dimensions

The goal of scientific investigation is to understand the nature of the reality. A thought experiment allows us a way to understand quantum reality, and in this context, Close has performed a 9 dimensional spin model thought experiment. This is a brief introduction only of the principles. This is not meant to be a proof, as we are supplying far too little details, which would require at minimum 10,000 to 25,000 words. This detail is already available as the experiment has been done and will be published elsewhere. Essentially, we believe have replicated the 9 dimensional spin findings with a thought experiment. [79]

To understand how a particle can have an intrinsic angular momentum equivalent to that caused by one-half of one rotation, we must closely examine the difference between the apparent behavior of a spinning object on the macro-scale, like a top or baseball, and the behavior of a quantum-scale spinning object like an electron or proton.

We began with two assumptions: First, that reality consists of more dimensions than those readily available to our senses, and second, that if an elementary particle is rotating around more than one axis, those axes must be mutually orthogonal.

Assumptions

We apply the following assumptions:

1.) We have postulated that the existence of an intrinsic angular momentum implies that elementary particles must be spinning in more than three dimensions.

2.) While orthogonality was adopted as an arbitrary choice for convenience in our thought experiments, we know that in the real world of particle physics, the forces of electromagnetic fields, created by the motion of charged particles, act at right angles to the direction of the motion of the charged particles that generate them. With fermions, we are dealing with charged particles. We therefore have compelling reasons to believe that these assumptions are correct.

The question then is: How many additional dimensions are needed to produce the observed intrinsic ½ spin?

Method

We start with a rotating object in a given configuration, call it the ‘original’ configuration. One complete rotation has occurred when the object has returned to its original configuration, with every point on and within it, in its original position relative to the reference frame of observation.

Continuing our spinning-object thought experiment, let’s go from a globe spinning on one axis, to a globe spinning around two axes (n = 3, m = 2): Imagine a globe with a horizontal axis, its

supporting framework sitting at the center of a merry-go-round, in the center of a room. The globe is centered on the platform so that the second axis of rotation can be visualized as a vertical extension of the axis of the merry-go-round, passing through the center of the globe. Assume that we can set the rates of rotation, and we set both the globe and the merry-go-round spinning at the same rate, say 90° per second. As an observer, you are sitting in the room looking at the globe as it spins, while the merry-go-round platform is also spinning. So, from your 'stationary' point of view, the globe is spinning around its own horizontal axis, while also spinning around a second vertical axis with the merry-go-round. As before, you start with the X facing you. As a result of the combination of the rotations around two axes, the movement of the X relative to your stationary position may surprise you. You will see that the X returns to your observation point after only two 90° rotations around its axis. While the globe was rotating 180°, the merry-go-round will also have rotated 180°, so the X will be back where it started relative to your point of observation in two seconds (two 90° rotations), but all of the points on the globe will not be back in their original positions until two more 90° rotations are completed. Our purpose here is to test the hypothesis that elementary particles are spinning in more than the dimensions of our limited powers of observation

Empirically, we note that a complete rotation of the globe will take longer if the merry-go-round and the globe are not rotating at exactly the same rate, and the X may return to the original point many times before one complete revolution of the object has occurred. For example, if the merry-go-round is rotating at 1/2 the rate of the globe's rotation around its primary axis, it will take two revolutions of the globe to accomplish one complete rotation as defined above. If the platform is rotating at 1/4 the rate of the globe's rotation around its axis, it will require four revolutions. Fortunately, we will not have to worry about different rates of rotation when we take our thought experiment to the quantum scale, because, thanks to Planck's discovery, we can normalize our measurement units to the standard of a quantum of energy. A quantum of energy will produce a quantum of rotation, and a quantum of rotation of the mass of the particle (also quantized) will produce a quantum of angular momentum.

Now, imagine that you can only observe and make measurements in first one, then two, and finally three planes of observation. Surprisingly, if the globe is rotating in all three dimensions clockwise at the same rate, during one complete rotation of the globe, the X will show up twice in each plane of observation, for a total of six. So you see only two 90° rotations in any one plane of observation. Therefore, if your field of observation is limited to one plane, you will think the globe has gone through a complete rotation with only two 90° rotations, and underestimate the angular momentum as 2/6 = 1/3 its actual value. If your field of observation includes two of the planes of rotation, you will find the angular momentum to be 2/3 the actual value. It is only when you are aware of all three planes of rotation, that you are able to calculate the total angular momentum of the object.

These thought experiments show that although the number of 90° rotations around a given axis of rotation during one complete rotation of an object will always be four, the number observed will depend on how many planes the object is rotating in, and how many planes we are able to

observe. Since our direct observations are limited by the physical nature of our senses to three dimensions of space and one of time, this suggests that the apparent intrinsic spin momentum of a quantum particle may be because the particle is spinning in more than three dimensions. Fortunately, this hypothesis is potentially falsifiable, and we mathematically have shown this to be correct by using of all things, a Rubik's cube!

Essentially of six 90-degree rotations, only two, or 180 degrees, are around any given axis. So, an observer whose domain of observation is limited to one plane, not knowing that the object is actually rotating in two planes, will find that the object has an 'intrinsic' 1/2 of a unit of angular momentum. We have confirmed the results of the thought experiment with n = 3, m = 2, and p = 1. The results of the intrinsic spin of 1/3 and 2/3 in the other thought experiments with n = 3, m = 3 and p = 2, and can be confirmed using the Rubik's cube in the same way.

Why is this relevant?

This finding is important for three reasons:

It replicates the 9-dimensional model with eight rotating dimensions.

It markedly clarifies the concept of what half-spin really is. How can we make sense of it in 3S-1t? We actually cannot. It is another conundrum. This is another reason why the 9-dimensional model is so important.

The visualization of the position of the faces of the Rubik's cube is relative to the position of observation. This is relevant because our views are limited.

This thought experiment has great implications for the understanding of what the 'spin' fermions imply, because they can only be replicated by a 9 dimensional thought experiment where there are 8 complete rotations. From this thought experiment, we can confirm that an elementary particle model composed of three fundamental forms such as inertial mass, energy and 'consciousness', rotates in eight dimensional planes of a nine-dimensional reality.

So what results do we obtain using this technique for the Cabibbo mixing angle?

We derived the mixing angle at 13.038 degrees, even closer to the mean empirical finding of 13.04 (to 4 significant figures) ± 0.05 degrees. This is a lengthy derivation that involves a detailed appreciation of intrinsic spin and angular momentum: That, in turn, requires another lengthy preamble.

These findings can be easily mathematically replicated.

The thirteenth conundrum: introducing an important new concept, TRUE units—Triadic Rotational Units of Equivalence.

Edward R. Close PhD and Vernon M. Neppe MD, PhD, FRSSAf

Even though we're presenting only a very brief introduction for non-mathematicians on the new concepts of 'gimmel' and TRUE units, this work is of such importance that we're putting it in its own section. Importantly, it is an extension of the 'Triadic Dimensional-Distinction Vortical Paradigm' (TDVP) model, as well as part of the nine dimensional triadic concept. [108] However, the results appear to be startling and, with respect, like TDVP itself, reflect their own paradigm shift.

The missing link

Many physicists, including Einstein, Pauli and Hawking have dreamt of a 'theory of everything', but to this point their dreams have never been fulfilled. The reason is simple. You can't have a theory of everything if you doggedly exclude a major part of 'Reality' from your theory. That major part of Reality excluded by contemporary reductionist science is consciousness. For many years, Close and Neppe have both separately insisted that the dream of a theory of everything is never going to be realized until we find a way to put *consciousness into the equations of science*. However, Ed Close found the way to introduce consciousness equations. But such a technique is only accessible because it involves learning the whole new mathematical system of applying the Calculus of Distinctions (CoD). The inspiration came to Close in a dream in 1986, and he published it in 1989 in a book entitled *"Infinite Continuity"* [27].

But in 1989, and even today, most people have not been willing to invest the time and considerable effort it takes to learn a whole new system of mathematical logic. Thereafter, Close wrote about it in Transcendental Physics [1] and later Neppe and Close have published books and articles on this topic, but still we do not find many who are educated in the fundamental and basic, but critically important, mathematical logic system of the CoD. [8] This has allowed an approach to many areas including the subject of this section, '*Triadic Rotational Units of Equivalence' (TRUE or TRUE Units).*

We maintain that scientists will never truly understand the Nature of Reality until our searches for scientific and spiritual knowledge are merged into one serious, combined effort. Once this happens on a global scale, humanity will experience an explosion of new knowledge and understanding far beyond anything experienced so far in the current era of recorded history.

The TRUE implications

With the concepts of Triadic Rotational Units of Equivalence (TRUE or TRUE Units) we are able to demonstrate how consciousness is describable in the equations of quantum physics and relativity, and indeed, importantly, extend this to the discipline of Dimensional Biopsychophysics with a 9-dimensional spinning model applying three triads of 2 quarks (up and down) plus electrons. These are the most fundamental active parts of atomic structure as the

proton has 2 up quarks and a down quark, and the neutron 2 down and one up, and the atom also has the third stable fermion component, the electron.

Quantization and TRUE

In TDVP, we apply quantized phenomena existing in a multi-dimensional domain. This consists of space and time, embedded in one or more additional dimensional domains. But, in conventional mathematics, there is a fiction: the fiction of dimensionless objects. This has been simply a convenient mathematical expedient prior to discovering that physical phenomena are quantized. But this is no longer appropriate. If the substance of reality is quantized, the quantum necessarily occupies a finite 3-dimensional volume, not a point. This quantum volume defines the lower limit in size, and by setting it equal to 1, we establish a standard of measurement so that all substances are measureable in integer multiples of this unit. This allows us to proceed with our new form of mathematical analysis, the 'calculus of dimensional distinctions' (CoDD), and treat all phenomena as finite, non-zero distinctions. Replacing the dimensionless points of the calculus of conventional mathematical physics with distinctions of finite unitary volume, the elementary particles of the physical universe must be integer multiples of these unitary volumes. We can then relate the integers of quantum reality to the integers of number theory, and explore the deep relationship between mathematics and reality.

Something or nothing?

The German polymath, Gottfried Wilhelm Leibniz stated that the most important question of all is: "*Why is there something rather than nothing?*" [1] Current scientific thinking proceeds from the assumption that there *is something*, a something that we perceive as the physical universe.

In order to investigate this *something* that we appear to be immersed in, we measure the substances that something is made of —mass measured in energy-equivalent Mega electron volts divided by the speed of light squared (MeV/c^2). We then look for consistent structures and patterns in this substance that can be described mathematically. From analyzing particle collider data, it is clear that quarks have to be made up of integer multiples of a basic energy-equivalent quantum unit of mass equal to the smallest possible elementary particle, the free electron. Setting the energy-equivalent mass of the electron (0.051 MeV) equal to unity, we can normalize the energy-equivalent masses of up-quarks and down-quarks to integer values, i.e. integer multiples of the electron mass. Elementary particles are rotating at extremely high rates of angular velocity, but because the spin velocity is limited to light speed (c) in the three dimensions of space in a moment of time (3S–1t) domain of physical observation, the minimum mass unit is also the minimum volumetric unit.

The mathematical and particle physics context

The normalization of up-quarks and down-quarks to multiples of this minimum equivalence unit, based on the electron, is consistent with Planck's discovery that mass and energy only occur in multiples of a basic quantum unit, and Einstein's discovery that mass and energy are two forms of the same thing, interchangeable by the mathematical relationship $E = mc^2$. This means that all physical objects are made up of combinations of these minimum units

and can therefore be represented mathematically and geometrically by combinations of integer multiples of them.

The Conveyance Expression

The combination of two or more particles, e.g. protons and neutrons, made up of these equivalence units is represented mathematically by a summation of n-powers of integer distinctions, where n is the number of dimensions of the distinction. Since all stable spinning particles are shown to be symmetrical, the shape factor cancels out of the equation and the general expression for these combinations becomes $\Sigma^{n}_{i=1} (X_n)^m = Z^m$, which we call the 'Conveyance Expression'. This expression yields an infinite number of equations as **n**, the number of dimensions, and **m**, the number of particles take on different positive integer values. We are primarily interested in the set of equations generated by values of **m** and **n** between 1 and 9. Because the X_n can only take on integer values, these equations are a special type of equations called 'diophantine equations'. [bb]

The power **m** is equal to 3 for observations in 3 dimensions, and Fermat's Last Theorem tells us that there are no integer solutions for the Conveyance Equation when **n** = 2. But there are integer solutions when **n** = 3. So, while two symmetric particles cannot combine to form a third symmetric object, three symmetric particles *can* combine to form a fourth symmetric object. This means that the Conveyance Equation $(X_1)^3 + (X_2)^3 + (X_3)^3 = Z^3$ can represent the combination of three quarks to form protons (2 up and 1 down) and neutrons (2 down and 1 up). This explains why quarks are only found in combinations of three. Other combinations are unstable and decay before they can form material structures. We find, however, that there are no integer solutions for this equation unless units of a third form of reality are included.

Distinctions

All mathematical reasoning and description is based on the conscious drawing of distinctions, as in the Calculus of Distinctions. We have combined Euclidean and hyper-dimensional geometry, requiring a nine-dimensional reality containing three forms of the basic 'substance' of the universe. This provides the framework for describing the elementary particles that appear to be the building blocks of the physical universe. This approach is the logical extension of the very important work started by Hermann Minkowski, Albert Einstein, Georg Cantor, Theodor Kaluza, Oskar Klein, Kurt Gödel, and others, who made significant progress explaining physical phenomena in the framework of multidimensional geometry [6; 34]

What is solid?

It has long been known that the appearance of *solid matter* is an illusion, in the sense that there appears to be far more empty space than substance in an atom. But now we learn that the matter of sub-atomic particles and the 'empty' space around them are also illusory. This is, however, consistent with quantum physics experiments that bear out the conclusion resulting from the resolution of the EPR paradox [48] and John Bell's inequality [49; 50]: Experimental

[bb] We are avoiding the detailed mathematics for the sake of brevity and simplicity. Importantly, all of this is available and published or will be published shortly. This is the first relative detailed non-mathematical description of gimmel and TRUE units. The Conveyance Equation is $(X_1)^3 + (X_2)^3 + (X_3)^3 = Z^3$. Most of the figures generated are unstable. But there *are some* stable structures, when n = m =3.

physicist, Alain Aspect [42] and many others [39; 109] demonstrated 'entanglement phenomena'. Others showed that the particles and/or waves of the objective physical reality perceived through our senses cannot be said to exist as localized objects until they impact irreversibly on a series of receptors—these constitute a distinct observation or measurement by a conscious entity. [19; 21; 110]

Moving through 9 dimensions

In TDVP, we apply Dimensional Extrapolation using dimensional invariants to move beyond three dimensions of space and one of time. Within the multi-dimensional domains defined in this way, mass and energy are measures of distinctions of content. If there are other dimensions beyond the three of space and one of time that are available to our physical senses, how are they different, and do they contain additional distinctions of content? If so, how is such content different from mass and energy? We know that mass and energy are two forms of the same thing. If there are other forms, what is the basic 'substance' that makes up the universe? Is it necessarily a combination of mass and energy, or something else? For the sake of parsimony, let's begin by assuming that the substance of reality, whatever it is, is multi-dimensional and uniform at the quantum level, and that mass and energy are the directly measurable forms of it in the 3S-1t domain. This allows us to relate the unitary measure of inertial mass and its energy equivalent to a unitary volume, and provides a multi-dimensional framework to explore the possibility that the 'substance' of reality may exist in more than two forms.

We have definitively demonstrated that finite reality is multidimensional (9 spinning dimensions ± exponents or multiples of the 9) which means that we are required to examine this extended data. [8 18 33]

Consciousness and TRUE units

From the TDVP model, we argue cogently that *Consciousness is truly the missing link in the current scientific paradigm*. If this is so, even the smallest subatomic particles must in some way be tethered to consciousness. We tested this by our TRUE unit work, and our data will be published in some detail at a later time. *We simply now provide brush-strokes.*

Within the framework of the current Standard Model of particle physics, the basic concepts of quantum physics and relativity are applied to the particle collider data. These then yield numerical values of the physical characteristics of the sub-atomic particles perceived to be the building blocks of the observable universe. These include photons, electrons, neutrons and protons, in units of MeV/c^2 (mega-electron volts/ square of the speed of light).[cc]

Analysis of these data in the framework of the mathematics and geometry of TDVP in 3S-1t provides us with a way to find the true quantum unit of measurement. The empirically measured and statistically determined inertial masses of the three most basic elementary entities believed to make up what we perceive in 3S-1t as matter, i.e. electrons, up-quarks and down-quarks, are approximately 0.51, 2.0 and 4.8 MeV/c^2, respectively. The values for up and down

[cc] 1 eVx is a unit of energy equivalent to $1.602176565(35)\times10^{-19}$ J (joules), and in quantum physics is the amount of *energy* gained (or lost) by the charge of a single electron moved across an electric potential difference of one volt. The measure eV/c^2 is one of *mass where 1* eV/c^2 $=1.782662\times10^{-36}$ kg. 1 MeV= 1 million eV.

quarks are derived statistically from millions of terabytes of data obtained from high-energy particle collisions engineered in specially built colliders.

When we analyze the elements, importantly, we have found the equations of mass and energy of the *stable fermion particles* (electrons and quarks) (e.g. neutrinos are not stable) to be incomplete without a third component. We have called that component 'gimmel', the third letter of the Hebrew alphabet written ג: It is a necessary new term. We hypothesize that mass-energy and this gimmel 'consciousness' are unitary major components for the stability of atoms [dd], elements, molecules, and, indeed, all of our stable world and our cosmos. Gimmel is necessarily linked together to form a whole. In fact, it is part of that whole: We argue that we cannot have mass without energy because they are interconvertible, so much so that in our TRUE scoring they are together scored as a single measure. But we cannot have mass-energy without gimmel. Using this concept, nothing can exist without this third component: Like a hand without a shoulder they are more than linked; they're entirely tethered together. Without gimmel, mathematically, the elements of the Periodic Table, including those that are crucial to life, are unstable. Because of this requirement of a third form (gimmel) for stability, i.e., in effect for there to be *something rather than nothing,* and because the minimal equivalence units are defined by applying basic relativity and quantum principles to multi-dimensional spinning elementary particles, we call them Triadic Rotational Units of Equivalence, or TRUE units.

As discussed above, to represent the elementary particles as multiples of the minimum mass/energy/volume units, we convert the collider data into integers, a process called normalization. We can then apply the Conveyance Equation. This can be applied not only for atoms, but also for the whole Periodic Table of the Elements. We can extend such research to molecules and even to DNA and RNA as the fundamental elements of life.

Revisiting hydrogen

Already our applications of these concepts are producing remarkable results. This is meant to be effectively an abstract of our research, which we will be presenting later in more detail. But in summary, Hydrogen (H) (Hydrogen 1, also called protium) is the most prevalent element in the universe and also fundamental to life. Hydrogen has the highest proportion of gimmel at 0.893 [ee] This common, stable non-isotopic hydrogen is unique in not having a neutron, This would make it completely unstable without a stability component, but that extra 'gimmel' contribution compensates for the lacking neutron as it provides symmetry and indeed stability in its spin. We have called the extra 'gimmel' in hydrogen 'daled' ד, because instead of calculating it based on the amount of gimmel in an electron or proton, daled compensates for the lack of a neutron in hydrogen and provides stability that way. This produces the highest gimmel to TRUE score ratio of any element, not surprising because hydrogen is the most prevalent element in the universe. It may be that 'daled' is just another way that 'gimmel'

[dd] We're limited in English terminology: We could refer to the life sustaining elements as "stable" but that is *relative* only to the ephemeral unstable elements or isotopes of Hadron Collider particles. Clearly, these elements can be demonstrated by applying 3S-1t measures, but we postulate it's only because of gimmel, as well. Perhaps we should call all including TRUE units "super-stable".

[ee] This is covered in greater detail in our forthcoming paper, but because hydrogen does not have a neutron, we have hypothesized it to be unstable without gimmel not only in the calculations of mass and energy. Even then the ratio of gimmel to TRUE is higher than any other element. However, we also needed to add gimmel instead of the neutron into our calculations. We do not know if that gimmel is the same so have used the term daled when substituting for the neutron.

expresses itself, but we need to score this extra substance because of the complete absence of a neutron: Consequently, we cannot justify it being definitely 'gimmel', hence we call it 'daled'.

The key properties of life?

The elements of life

Based on our empirical knowledge of the stable elements known to support life, namely carbon, oxygen, nitrogen, sulfur, phosphorus, calcium and magnesium, we find these elements all uniquely and very strongly exhibit two properties: First, the *same* high ratio proportion of gimmel to the total TRUE unit analysis, namely 0.762.[ff] This gimmel ratio is higher than any of the other less essential elements for life. And second, these life stable elements can easily react with other elements forming compounds: They are not inert as their valence is not zero. Additionally, it turns out that they all have the same number of protons, neutrons and electrons.

Silicon

Surprisingly, there is one more element that fits this stable, symmetrical profile, namely silicon. As a predictive hypothesis, theoretically and in practice, in perhaps other worlds, silicon should be a component and sustain life. Because its valence is the same as carbon, namely 4, and carbon is the key to all organic chemistry, silicon may provide alternative to carbon as a fundamental part of life. After this hypothesis was proposed, we were told by a marine biologist that it may already have been tested: certain aquatic life forms utilize silicon, yet we cannot definitively find that data. Silicon is an abundant element (eighth in cosmic abundance rank).

Inert compounds

This valence issue is important as the gimmel content, namely 0.762, is the same for two inert elements (helium and neon) (not others such as argon) as the life elements. Interestingly, in terms of the cosmos, Helium is the second most abundant element in the cosmos, and neon is fifth, with argon also very abundant (see Table 13A). But inert elements have valences of zero and therefore, though very stable are non-reactive, and therefore they do not participate in reactions requiring physical life on Earth, certainly. The inactivity of helium and neon is not pertinent for life forms, although helium is pertinent in the cosmos, as a major component.

Stability

These elements of life and the two inert elements, plus hydrogen, are far more stable than the other elements, none of which have the same numbers of neutrons, protons and electrons in their elemental properties. Consequently, we can even predict which elements with gimmel are more stable and therefore likely to maintain life. Table 13A below identifies symmetrical molecular entities that complete the Periodic Table of Building Blocks: All the life elements are components of n $(108)^3$, none are inert and all score 76.2%. The gimmel delivers stability and symmetry. There are no other elements with the same numbers of neutrons, protons and electrons others than the He, Ne, C, O, N, S, P, Ca, Mg and Si (silicon). All these calculations of TRUE volumes of the 'life elements' are 108^3 times the multiples of the atomic number.

[ff] Interestingly, two inert elements that have completed outer electron shells, helium and neon, also yield this figure of 0.762. However, we analyze valence as well in our calculations so that these would not be "elements of life."

Table 13A: TRUE Units Analyses. The elements and symmetric compounds in gaps.

Compound	ג Units	Total TRUE	Valence [gg]	% ג [hh] Units	TRUE Volume	Comments and [ii] Abundance rank #
Hydrogen [jj]	150	168	**-2+1=-1**	89.3%	$(1x108)^3$	***Critical Element*** [kk] **#1**
Helium	256	336	-2+2=0	76.2%	$(2x108)^3$	***Inert Element*** [ll] **#2**
Helium Hydride HeH	384	504	+1	76.2%	$(3x108)^3$	***Super acid*** Not found in Nature
Lithium Hydride Li and H2 (Deuterium)	512	672	+2	76.2%	$(4x108)^3$	Rare in Nature Very Reactive
$(He)_2H$ and HeH_3	640	826	+3	76.2%	$(5x108)^3$	Produced in Nuclear Fusion
Carbon	768	1008	-2+6=4	76.2%	$(6x108)^3$	Organic element[mm] #4
Nitrogen	896	1176	-2+7=5	76.2%	$(7x108)^3$	Life element #7
Oxygen	1024	1344	-2+8=6	76.2%	$(8x108)^3$	Life element #3
HO or OH [nn] H_2N and CH_3	1,174	1,512	-1	77.6%	$(9x108)^3$	Building Block of Amino Acids
Neon	1280	1680	2 – 8 + 10 = 0	76.2%	$(10x108)^3$	Inert element #5
H_2O	**1,324**	1,680	0	78.8%	$(10x108)^3$	Water
H_4N	1,496	1,848	+1	80.9%	$(11x108)^3$	Ammonium Ion
Magnesium	1536	2016	**– 10 +12 = +2**	76.2%	$(12\ x108)^3$	Life element #9
C_2H	1,686	2,184	+3	77.2%	$(13x108)^3$	component of Cysteine Amino Acid
Silicon	1792	2352	**-10 +14 = +4**	76.2%	$(14x108)^3$	Postulated Life? #8

[gg] Valence relates to position on the Periodic Table of the Elements. E.g. The first shell has 2, then 8 etc. This differs from 'charge'.
[hh] This is the ratio of the gimmel to the TRUE units.
[ii] Abundance rank of the different elements in the cosmos: Iron is #6, Sulfur is #10, Argon is #11, Calcium is #12.
[jj] This analysis is on Hydrogen 1, not isotopes like heavy deuterium H2 or H3 tritium, though these have also been analyzed.
[kk] Hydrogen is unique without a neutron and therefore with 'daled' vertically ד has much more gimmel : 38 for daled (0 MEUs). 150/168 = 89.2%. Volumetrically 108^3 = 1,259,712. Hydrogen is the highest gimmel proportion then the life elements.
[ll] Gimmel : 105 for 1 electron (1 mass/energy unit MEU), 7 for 1 proton (17 MEUs), and neutrons are 16 for gimmel; 22 MEUs).
[mm] The most common elements of life and abundant ones are all at 76.2% = C, O, N, S, P, Ca, Mg; also He, Ne inert. All + H =108^3.
[nn] Hydroxyl / hydroxide is OH is major component of water and building block of amino acids. H_2N is common in amino acids; CH_3 is a common organic compound radical.

Our table goes up to that atomic number of 14 where Silicon's atomic number is 14 and the True Volume is the 14 fold multiple 108^3. Similarly, Calcium (atomic number 20 with $(20*108)^3$, sulfur: #16: $(16*108)^3$ and phosphorus: #15: $(15*108)^3$ as life elements, also exhibit the same properties, though they're not in Table 13A. But there are no other 'life elements'.

Of course, Table 13A also includes molecules whose total TRUE volumes are multiples of the combined atomic numbers of the atoms in the compound. Ultimately, there is even a stability of DNA and RNA and the amino acid sequences, and some of its building blocks, like OH, H_2N and CH_3 are listed in this Table. The first clue to identifying the symmetric entity that fills a given gap in the sequence of TRUE-unit volumetric symmetry is its location relative to the other symmetric forms in the Table. The compound that fills a given gap can only be formed from combinations of symmetric atoms and/or compounds that are smaller than it. For example, the $(3x108)^3$ gap can only be filled by a compound entity composed of Helium [TRUE volume = $(2x108)^3$] and Hydrogen or Deuterium [TRUE volume = $(1x108)^3$].

While filling the gaps in the sequence of $(n•108)^3$ symmetric structures in the Periodic Table, we find that there may be two or more compounds with the exact TRUE volume to fill the gaps, increasing in number as n increases. We also discover that, after n = 9, there are symmetric compounds equal in TRUE volume to some elements. H_2O, for example, has a TRUE volume of $(10•108)^3$, the same TRUE volume as the inert gas Neon. And because it contains 2 Hydrogens in its structure, and a low atomic number life element, the gimmel score of water is the highest of any molecule: This is not surprising, water is fundamental to life. [oo]

The quantum is necessarily integral and volumetric

As a point of interest, the numbers required for stability have to be whole numbers—integers because quantum theory is based on whole numbers, not reduction to nothing. This, as indicated, is a fundamental difference between differential calculus (in which the value of a variable can approach zero) and the calculus of distinctions (which although dealing with very small numbers as well, always recognizes the quantum, the point at which one cannot reduce further because it must remain an integer). The key component is always a volume because of a quantum not being a single point but three-dimensional. That is why we emphasize volumes, and cubic roots must be represented by integers. Existence is volumetric: it has three-dimensional relationships.

In order to calculate molecular equivalents of the TRUE totals, we have applied a mathematical cubic number, and we find that the total TRUE unit scores for these elements and for the molecules of life and even DNA and RNA are all multiples of the integer 108^3.

The existence of gimmel explains the abundance and persistence of physical life in 3S-1t.[pp]

[oo] Equal with hydrogen sulfide, as this contains two Hydrogens and Sulfur is equal in gimmel to Oxygen, though H_2S is a larger compound with a different outer shell and valence to oxygen. Gimmel is likely an important aspect, but not the only property that gives rise to the uniqueness of any compound.

[pp] Effectively, we do not have *mass and energy* as the only *contents*, just as we do not have *space and time as extents* of dimensions alone. *We always have the third component*: Space, Time and 'extent of Consciousness' (C_e); and mass energy and gimmel—which we postulate (and mathematically have provisionally calculated) may have links with the infinite and contain entirely 'consciousness content' (C_c) expressed as *specific meaning*.

But, of course, that implies a combination of mass, energy, and gimmel producing the stable TRUE structure. We postulate that Gimmel reflects a *vortical flow* of the third element. [qq] The ensuing TRUE results involve calculations far beyond just 3S-1t applying the concepts of 9 dimensions to allow stability: Here reality is both *overt* —restricted 3S-1t for the experiences of living beings—and *covert* —beyond that restricted 3S-1t, involving 9 dimensions.

The number 108

The strange result of 108

Remarkably, the number '108' has some 'strange' elements: 108 equals two basic exponents ($3^3 * 2^2$). It also reflects 6 * 18 and eighteen is the mystical number 'Chai' for 'life' in Judaism. 108 is also a very special number in Hinduism, and it's also important in Tantric and Shiva philosophy. [111] Additionally, 108 is relevant in Buddhism, Jainism and Sikhism. [111] There are supposedly 108 energy lines ('nadis'), converging to form the heart 'chakra'; and in Sanskrit, there are 54 letters each of male and female kind so making up 108. [111] Even the Stonehenge monument diameter is 108 feet. [w 111]

In addition, 108 fold approximates the cosmological ratios of:

- the (mean) distance between the Earth and Sun / the Sun's diameter (109.1) [x];
- the sun's diameter / the Earth's diameter (107.8) [y] ; and
- the earth and moon distance / the diameter of the Moon (110.6) [z rr].

Where pertinent the orbits vary and so distances vary. These figures appear based on what are regarded as mean distances.

Diophantine equations

The finding of 108^3 is very likely not a random finding. These remarkable 108^3 figures in Table 13A may reflect the most fundamental minimum math equivalence once calculations of cube roots are done: There are very few diophantine triplet equations like $(X_1)^3 + (X_2)^3 + (X_3)^3 = Z^3$ involving 3 cubic additions that produce a summation where the resulting cube root still remains an integer. The most basic example is $3^3 + 4^3 + 5^3 = 6^3$.

Adding together the mass-energy scores plus the gimmel, the combined result for protons, neutrons and electrons must likewise be cubed because these are quantized, integral (whole number) volumes. Under those circumstances, the lowest number to yield for atomic number of 1 (hydrogen) is 108 cubed. The key elements of life then become multiples of 108 cubed, and they can only be so *given their equal numbers of protons, neutrons and electrons*. However, *without gimmel those equal numbers alone in a materialistic universe would be insufficient to produce stable symmetry as their cube root of the total is never an integer as required in quantum thinking* (see p 70-73 for the simple mathematical proofs).

[qq] We postulate that at the infinite continuous or quantized transfinite levels, mass-energy and space-time are contained entirely within C_c and C_e respectively, but at the 9-D level this is not so. Each is separate. The Gimmel allows for stability and symmetry in atoms and in molecules. If atoms or molecules did not also necessarily contain gimmel, they would (metaphorically) fly apart!

[rr] Stonehenge, 3 II, built about 4500 years ago, is about 33 meters in diameter or 108.3 feet. Is this pure coincidence? Why was that in feet? Approximations in kilometers for these are: 1,392,000/12756 = 109.1 (earth to sun/ sun's diameter) [x]; 150,000,000/1392,000=107.8 (sun/ earth diameter) [y]; 384,400/3474=110.6 [z] (earth to moon/ moon diameter). Clearly distances vary slightly because the orbits vary a little.

Speculations on particle physics

Where does gimmel fit in? If it existed, how come it has not been discovered? Scientists have been truly remarkable in recognizing a whole 'soup' of particles, many of which are unstable and exist temporarily [112] : We have the situation of components of this 'soup' variably being hidden, then detectable for a moment, or measurable. They are ephemeral and usually only detected in nuclear reactors, but even there they might not be easy to detect. For example, the very well-known new particle, the Higgs boson, is one of those ephemeral and not stable particles. Pertinent here, is that the particle soup includes even unstable quarks that therefore are not relevant in our derivations. We have 'strange quarks' and 'charm quarks', and we have 'top' and 'bottom' quarks [113], in a way possibly metaphorically parallel to the disappearing and re-appearing electron clouds we've alluded to. Should we be applying our 9-dimensional perspective instead of 3S-1t to understand these?

Higher dimensions

TDVP postulates that the infinite pervades all of the quantized finite. We would postulate that gimmel, if indeed it is consciousness, would possibly involve higher dimensional levels or /and, this would be the result of the infinitely continuous vortical (spin) flow necessarily pervading the finite and into, in this instance, atoms.

Gluons and gimmel

There are 'stable' particles that always exist: Electrons, and the up and down quarks in protons and neutrons, and photons. But almost all the rest appear to be part of the ephemeral 'particle soup' that we sometimes locate through Hadron Colliders or their equivalents. [112] But is there maybe a particle in that particle soup that could actually be gimmel or reflect some kind of mirror image of gimmel? We speculate that there is. *Gluons* are regarded as mass-less and energy-less particles. [112] They are supposedly the "glue" between the quarks, the way quarks are held together despite gluons having no energy themselves. And gimmel, too, by definition, is mass-less and energy-less too. And the flow of gimmel creates an active way for us to make the atoms containing quarks and electrons stable. Could it be that they're one and the same, and that gluons and the family of gluons are not particles at all but part of this infinite spinning flow that is not detectable except based on mathematical calculations of stability? Could it be that this is where particle physics and that third substance, gimmel, meets? And that the glue provides the stability? And could it be that we don't need to worry about whether or not there is or is not collapse of the quantum receptor *vis-à-vis* the various related quantum Copenhagen related [14; 16-18; 26] interpretations? Perhaps, if gimmel from the infinite is all-pervasive, and has always been present, the so-called observer does not need a source of interaction. He is already part of that experiment! So this might provide a solution to a fundamental quantal question.

Homeopathy and gimmel?

There is more early, but fascinating, research. We can even hypothesize that *homeopathic substances are more potent when diluted more:* This would be so as there would be more gimmel around as the water (H_2O) contains more gimmel than any other common living

compound —the Hydrogen contains the most gimmel and therefore, the combination of H plus OH radicals should contain more gimmel than any other molecule we use in life on our Earth. But why then the other substance? Homeopathy supposedly does not work without tiny amounts of the treating medication. It could be that the dilutions of the tiny amounts of these other compounds or medications may activate the proportionately more gimmel in the water to work. We've said consciousness content is specific: It is meaningful: So the diluted homeopathic 'substance' could be the focus source to absorb, utilize and manifest its own special quality or 'language' of gimmel. Could a similar mechanism be involved in alkalinized ionized water? We postulate this could even involve the other phases of water described by Pollack. [114]

What is gimmel?

What is that third 'substance' besides mass and energy? How should we conceptualize 'gimmel'? The answer may be simple: We need to describe a substance that is 'mass-less' and 'energy-less', and yet can apply specific, possibly directed meaningful, principles for numerous different elements and molecules. This third substance necessarily might allow symmetry and stability for elements and compounds, which as described below, would necessarily be unstable without it if they just contained the elementary non-ephemeral particles in the atom—quarks (in protons and neutrons) with electrons. This third form of everything must have had to exist even from the *finite* beginning of time (the 'Event Horizon' or the 'Big Bang' equivalent) because otherwise there would have been initial untenable instability at that stage. [7] It is very difficult to find another suitable candidate besides consciousness reflecting at least a component of this gimmel substance: The gluon particle has been hypothesized to fill the gap, but gluons may turn out to be gimmel.

Refuting materialism! A dramatic mathematical answer

The life sustaining and most stable elements:

We already know that gimmel can allow the extra integers in the TRUE calculations to consistently provide the unique diophantine solutions relating to multiples of 108^3 for the life elements (Table 13A). [ss] *But why do we even need gimmel?* Surely, the remarkable fact that we have found here that the key life elements, plus He, Ne and Si all have equal numbers of electrons, protons and neutrons, is quite sufficient? The answer is extraordinarily important: No, it is not sufficient! We can demonstrate this by three easy mathematical proofs: The first relates simply to the number of particles, the second relates to measuring integer mass equivalents of electrons, protons and neutrons, after equating the electron as equivalent to 1 because quanta are necessarily integer multiples of the smallest unit. And the third relates to calculations of mass-energy applying TRUE units and therefore includes the stable fermions (quarks in protons and neutrons, plus the electrons).

All three "proofs" adopt the classical perspective of chemistry of the atom only being made up of certain stable particles namely electrons, protons and neutrons: Essentially, the sums of the quantized TRUE volumes of electrons, protons and neutrons form diophantine equations,

[ss] Helium and Neon are inert elements with complete (full) outer energy shells but they also have equal protons, neutrons and electrons. These are common elements in the cosmos, but because of their non-reactivity are not regarded as elements of life.

which, because mass and energy are quantized, must have integer solutions. In Table 13A, we examine the cubes representing the total volumes, not just the number of particles [tt]. The lack of integer solutions in these calculations demonstrates a basic asymmetry of the resulting atomic structures that leads to insufficient stability to sustain organic structure and life.

In chemistry, we apply atomic numbers, based on the numbers of protons and electrons in elements; but we also recognize mass so we should apply equivalents of mass.

The first demonstration: the numbers of particles together don't make an atom.

In the first "proof" just working on atomic numbers, the "life" elements (non-isotopic, non-ionic) empirically, have chemically equal numbers of electrons, protons and neutrons. The first approach would be calculating the cubes of these combined particles based on the numbers alone of protons, electrons and neutrons: For the life elements, where these are equal, the solution would equal $a^3+a^3+a^3=3a^3$ if one was just approaching these particles based on their numbers in each element, effectively in atomic number equivalents. Based on volumetric calculations, the cube root of $3a^3$ is 1.442n. That therefore, is not an integer which would be required, and if applying atomic numbers, such a result could refute that our reality purely is materialistic and there is no third substance.

The second demonstration: mass and mass energy of particles also don't work

But some might argue that it is not clear that the sum of the cubes of the number of the electrons, protons and neutrons making up the atom of an element, should necessarily add up to an integer cubed. Instead, the alternative approach is we should be adding *atomic mass equivalents.* For this alternative, applying the mass of these particles, we calculate volumetric equivalence units, applying 1 for the electron and comparing the mass data equivalence of protons and neutrons, deriving our figures by converting to electron =1 from the Jefferson Lab. Under those circumstances, then a single Neutron represents 1839, and a singe Proton represents 1836. Dividing out the 'a' (atomic number) we have $1+p^3 + n^3 = (X/a)^3$, where X/a represents the mass of the atom. The resultant cube root is 2315.13843… so it is not an integer and cannot be a solution of the diophantine equation representing elements with equal numbers of electrons, protons and neutrons: not being an integer (the only diophantine equation with a solution where 1 is involved is the original conveyance equation $1^3 + 6^3 + 8^3= 9^3$). [uu] These

[tt] (e.g. their atomic numbers for protons and electrons as they're equivalent in the Periodic Table; and the mass numbers [and atomic weights, which also include isotopes of those elements] approximating to neutrons less these protons).

[uu] Neutron = $1.6749286*10^{-27}$ kg Proton = $1.6726231*10^{-27}$ kg Electron = $9.1093897*10^{-31}$ kg Electron = 0.00054386734 so / 0.00054386734 = 1 for electrons. Neutron then are 1838.9113 or 1839 and cubed 6219352719; and Proton = 0.99862349 so 1836.3799 or 1836 cubed 6188965056 = then the total for the atom is 12408831776 so cube root is 2315.138438418182. The figures are similar for Ev measures: Electron = 0.51099906 MeV so when quantized to electrons = 1, then neutron = 939.56563 MeV so when Electron =1 then neutron= 1838,6838 or 1839 again so cubed 6219352719; similarly, Proton = 938.27231 MeV or 1836.1529 or 1836 again so cubed 6188965056 and = then the total for the atom of Helium for example is 12408831776 so cube root is 2315.138438418182. If these have the same numbers of protons and electrons, we can add 2315.138438418182n. If not we can use the same diophantine formula applications and because it is e^3 =1; so the answer is the cube root of $[1 +(p1836)^3 + (n1839)^3]$ is ≠ integer: theoretically, because of the 1, the Diophantine triplet is ostensibly very imbalanced and not an integer.

comments actually involve two different calculations reflecting the mass alone in kilograms (kg) and the mega electron volt (MeV) as a measure of mass energy. [115] However, the figures turn out almost identical.

We can further justify this approach because it involves the missing link, the third substance, 'gimmel'. But this time, based on our data, we must include TRUE here, because we can show how essential gimmel and the consequent calculations are for the existing atomic stability, even of just hydrogen alone. Our calculations therefore incorporate TRUE units because we now know from our theoretical model and the resulting research results that they are necessary.

The third demonstration

In this third demonstration, we note that electrons, protons and neutrons are rapidly spinning elementary particles which, because of quantum and relativistic limitations, have to be multiples of TRUE units. When elementary particles combine to form a new particle, the TRUE 'volumetric equivalence' [vv] of the new particle will be equal to the sum of the TRUE volumes of the elementary particles (quarks and electrons). But for the new particle to be symmetrically stable, it must have a diameter equal to a whole-number multiple of the diameter of a TRUE unit. This relationship allows us to form a diophantine equation, which is only valid for integer solutions.

Without TRUE units of gimmel, the diophantine equation representing, for example, the Hydrogen atom would be a Fermat's Last Theorem equation, and have no solutions. Even if one electron and one proton were drawn together by electrical charge, such an asymmetric combination would be extremely unstable, and like free quarks, would combine with other unstable particles, or decay almost instantly. Elemental atoms, formed by equal numbers of electrons, protons and neutrons, escape the curse of Fermat's last theorem, but without gimmel, their diophantine equations also have no solutions.

Normalizing the mass/energy of up-quarks and down-quarks to the mass of the electron, and calculating mass/energy volumetric equivalence [vv] for the proton and neutron shows that the proton is 17 times the electron and the neutron is 22 times the electron (without applying gimmel).[ww] For an atom to be symmetric and stable, the *volumetric equivalents* of the particles must add up to a cube. Without gimmel, the diophantine equation would then be of the form $(n*1)^3 + (n*17)^3 + (n*22)^3 = Z^3$. But Z is a non-integer because $Z^3 = 15{,}562n^3$ and 15,562 is not

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[vv] Volumetric equivalence (Close and Neppe) describes the minimal volume occupied by the most elementary of particles. This reflects the finite quantum distinction replacing the infinitesimal of Newton/Leibniz calculus. Volumetric equivalence provides the logical volumetric equivalence unit upon which to base all measurements of the substance of reality. [76; 116] Applying concepts from the calculus of distinctions, the minimal *volume* is the 'unitary volume of extent', and its *content* is the 'unitary quantity of mass and energy'.

[ww] The derivation of these figures is explained in greater detail in two of our forthcoming books [76; 116]. 17 and 22 reflect normalizing statistical data because of quantization of the triad of up and down quarks respectively in protons and neutrons with electrons equaling one in volumetric equivalence. This is an entirely different calculation from the total mass or mass-energy derivations of being 1836 and 1839 times more than the electron in the second calculation as it relates to the 9-dimensional model and the third form, gimmel. The derivation specifically includes the demonstrable fermion half-spin variants—the up-quarks and the down-quarks—but does not include the entire particle 'soup' in the neutrons and protons.

a cube[xx]. This demonstrates that no atom with equal numbers of electrons, protons and neutrons can be stable: Without gimmel, all of the elements necessary for organic life would be very unstable. Since Hydrogen is the most abundant element in the universe, and organic compounds are, in fact, very stable, proof of the existence and effectiveness of gimmel is all around us.

The other elements including Hydrogen

What about the rest of the Periodic Table of the Elements that do not have equal protons and neutrons? Applying the known empirical data for all of the approximately 80 stable elements, even when combining unequal but numerically different numbers of protons (*with balanced electrons*) and neutrons in any atom, no other elements *can* produce the requisite cubic diophantine solution because the cube root of the consequent atom cannot equal an integer. Effectively, where a and b are integers, with a representing both protons and electrons and b representing neutrons, $a^3+a^3+b^3=2a^3+b^3=c^3$. But c, as the cube root of $c^3 \neq$ an integer, yet for stability it must, this algebraically demonstrates that this stability without gimmel is not possible. A special case for this is Hydrogen, the element that contains the most gimmel or daled because of the absence of a neutron. With Hydrogen, c=0, so $a^3+a^3=2a^3$and the cube root is not an integer, in this case 1.26a. Similarly the relative mass kg figures and the relative mass energy EV figures make atoms not equivalent to integrals. In like vein, applying the mass TRUE equivalence calculations as above, the calculation is the same as above, $(n)^3 + (n*17)^3 + (n*22)^3 = Z^3$ implies Z is a non-integer. Effectively, there are very few diophantine triplet equations, and none can work in the Periodic Table to create an integral cube root solution, unless gimmel is accounted for. [yy]

The three scenarios demonstrate that the pure materialistic model must be incorrect

We have shown the three scenarios, based on atomic number cubed, atomic mass energy cubed (and ultimately the same figures for mass-energy cubed) and on volumetric equivalents using TRUE units. Essentially, applying the diophantine solutions *we know that without gimmel there are no solutions for the totality of protons, neutrons and electrons being in the Periodic Table producing an integral atom.* These three results are consistent and have applied all three hypothesized scenarios to make the atom "whole". This consistency amplifies the point that however one attempts to apply the mathematical derivations, *an atom still cannot be derived simply of protons, neutrons and electrons together.* These major stable subatomic particles in combination simply cannot allow the necessary requirement for the atom to exist as an integral whole. But clearly the atom needs to be a whole.[zz] *Therefore, these obvious empirically based mathematical solutions ostensibly refute the hypothesis of pure materialism: There simply must*

[xx] The cube root of 15,562 is 24.966…. The closest integral cube root solution would be 25 from 15625.

[yy] The greater the neutron to proton difference, the less gimmel, because neutrons have less gimmel than protons.

[zz] The major components of the atom are neutrons, electrons and protons. There is no consistent term for the three though sometimes they're included in 'composite elementary particles' or 'composite fermions'. While composite these terms are not exclusive and may be incorrect. For example, there is more than just 'fermions'; and 'composite elementary particles' do not fully reflect this, because components of elementary particles exist such as quarks and a whole "particle zoo' though often ephemeral and unstable within the proton and neutron. Based on the names of the three particles, it's logical for the new name to end in 'trons'. The first letters could then contain each of the three—neutrons, electrons and protons. Neppe and Close are suggesting 'neptrons' despite the ostensible nepotism here! Neptons or pentrons would be alternatives but the 'neptron' could also be the most logical *sounding* option.

be something else besides the stable mass-energy particles of protons and neutrons and electrons, as there must be an integral volumetric solution as quanta are by definition integral and volumetric. This can only be achieved by adding a third substance.

Our fundamental particles contain mass and energy. The third substance (which we've defined as 'gimmel') *must* be mass-less and energy-less because otherwise it would a fundamental particle, too, that stably and always existed, and we could locate it by its mass and energy (which we cannot). This gimmel addition allows for stability because the element now demonstrates an integral solution. Particles in our real world must reflect stability, not ephemerality. In summary, *all* the elements in the Periodic Table *necessarily* need a third substance (gimmel) with a specific measure, besides their mass and energy, to provide the needed stability and symmetry for these elements. However, this substance must be mass-less and energy-less, as otherwise it would revert to the mass or energy of our fundamental particles and it would be so demonstrated, making their mass and energy greater than they are.

Alternatives to gimmel or candidates for gimmel: Other particles

So what about other particles in the atom? Are they not candidates? Photons are stable, but aren't part of the atom. And gluons may reflect an ephemeral solution because we cannot locate them, but they could turn out to be very applicable, because, as indicated, gluons may actually be reflecting, or indeed be, the completely different third substance that we call 'gimmel'. Furthermore, applying the elementary particle components of protons and neutrons, namely quarks, we still cannot produce a diophantine solution adding the cubes of such quarks plus electrons. This is so as calculating the consequent atom is not an integer. The cube root must be quantal—an integer (Table 13A), and it is *only* when adding another derived figure, 'gimmel' as our term for that 'third substance', that the diophantine equations work. Therefore, the gimmel figures linked with each component, namely electrons, up-quarks and down-quarks are not just arbitrary, they are specific. The resultant derivations can then be applied to every element in the Periodic Table providing consistent volumetric solutions. And gimmel is mathematically justified based on the quantal volumetric requirements.

What kind of consciousness could gimmel be?

Gimmel, that third 'substance' may not be a substance in the form we think of it, as particle or wave. Klein and Boyd in their 'Subquantal Model' point out substantial evidence for the SQ location of a kind of 'information'. [117; 118] Neppe and Close *could* also apply the term 'subquantal' ('SQ') to TRUE units of gimmel, but *only if the gimmel alone* existed at the SQ level as the usual particles of Quantum Physics are, by definition, 'quantal'. [aaa] Gimmel is that extra *content*, not limited to SQ or any 3S-1t location [bbb]: Gimmel possibly impacts *any* mass and energy like particles or waves *anywhere* in the finite 9-dimensional domains. We have

[aaa] To Klein and Boyd (2015, as yet unpublished), 'SQ' refers to the infinite divisibility of the Quantum down far beyond the so-called Planck, Kolmogoroff or any other 'limit' [115; 116]: There's still 'something' comprised of mass/energy (matter) and 'information' at that SQ infinitesimal limit. But like 'gimmel' in TDVP [7], for Klein, all 'information' levels exist even through to the cosmological. Like in TDVP, he conceptualizes the infinite expression into the quantized. But to Neppe and Close, gimmel in the finite is expressed through the Calculus of Distinctions [8], not Newtonian infinitesimal calculus, because the finite is quantized, not technically subquantized.

[bbb] Klein uses the term 'information'. In TDVP, we *speculate* on the relationship. It may be that 'information' represents a general consciousness in the infinite and that any specific unique consciousness in individuals represents 'meaningful information'.

calculated values for the gimmel equivalents of the stable elementary particles —the electrons, the up-quarks, and down-quarks—which make up the dynamically spinning and moving, but consistently existing, non-ephemeral, elementary particle components of the protons and neutrons. We can, and have, demonstrated a separate but specific amount for gimmel *linked* with every electron, every up-quark, and every down-quark, and by these simple measures apply diophantine cubic equations and acquire figures for all the life-sustaining elements. And we argue based on exclusion of options that the only candidate for gimmel, at least in part, is the *content of consciousness* (C_c)

Indulgent jumps

Let's now indulge in some purely speculative jumps: Could gimmel be different every time, possibly implying 'meaning' in everything? If so would all the 'meanings' in this gimmel content even be unique? Could gimmel reflect a finite 'relatively non-local' [5] multidimensional content? Could gimmel be conveyed from the infinite substrate? Could it be that gimmel is that pure consciousness that represents an infinite consciousness that envelops and contains the infinite mass-energy components as well? Could gimmel flow from the infinite into space and time in the finite dimensions? Could this be the mechanism of how gimmel is translated as some kind of specific 'meaning'?

Moreover, could gimmel *always have been present* in some way, even in the very most basic quantum structure of finite reality? This question we can answer as it appears that, unless there have been fundamental changes in the nature of reality sometime in the past, gimmel had to be there from the beginning, because no stable particle could be formed without it: These speculations, may be fascinating philosophically, and might involve tiny pieces of a feasible jigsaw puzzle.

The Leibniz question: Something not nothing

We may well have the answer to Leibniz's question. No particle of the physical universe as it now exists could ever have formed without the third form. Thus, *there is always 'something'*, and never pure 'emptiness and nothingness'. Gimmel certainly fills the emptiness void. However, only mass and energy without gimmel cannot be the 'something of materialism' as the problem is that without that extra third substance, *instability necessarily exists,* as is clearly proven mathematically.

If consciousness is an integral part of reality, continually creating meaningful structure at the quantum level, the mathematics of TRUE units and gimmel apparently allows us to include it in our scientific paradigm. Using TRUE units to describe mass, energy and the third form, gimmel, ostensibly puts consciousness into our equations in a mathematically and logically coherent way, supporting a new paradigm as it explains previously unexplained observations and calculations, providing strong logic for continued research requiring everything to be linked with some gimmel. This is why our approach should work at the elemental level —and it does. And it should work at the molecular level—and it certainly does, even involving water, and DNA and RNA. And we can further validate this approach, by examining the cosmos. Could it be that there is a correlation with that previously unexplained component of our cosmos, dark matter and dark energy?

The fourteenth conundrum: Applying the proportions of Gimmel to Triadic Rotational Units of Equivalence compared to the proportions of Dark Matter plus Dark Energy: Speculations in cosmology

Vernon M. Neppe MD, PhD, FRSSAf and Edward R. Close PhD

A separate but extraordinarily important issue arises. This is also directly linked with TRUE units and gimmel, but this time cosmologically. The data we discuss here is very much necessarily preliminary, but exciting given that it confirmed a hypothesis, and extends the ideas of gimmel, from the quantum level through to the cosmological. [108]

In summary, when one calculates 3 dimensionally, we are applying a triad applying volumetric components. We need to apply that to dark matter. There is an almost exact correlation of the proportion of Dark Matter plus Dark Energy in the Cosmos (based on the latest Planck probe data) [119-122] as the proportion of Gimmel to TRUE units. Correlations are not linked causally but could it be that Gimmel is a mass-less, energy-less component of dark matter/ dark energy, just as it and TRUE plays a role in elements?

Effectively, we hypothesized that the ratios of gimmel to TRUE units and dark matter and energy taken together as a proportion of the cosmos should strongly correlate.

Supporting a remarkable hypothesis

This mathematical result is still preliminary based on our best available figures, but the equivalence, which likely has an error we guesstimate of 1-2%, is very striking. We hypothesized this correlation would work out and it does. Our hypothesis was based on the postulation that if indeed TRUE units are appropriate at the atomic level, they should be at the element level, at the molecular level and indeed all the way through to the cosmological levels. This, indeed, might provide the beginnings of a solution to the challenge of what dark matter and dark energy are. It is one that has been regarded as unsolvable.

The cosmic proportions

Very briefly and preliminarily, the calculation is complex and involves some assumptions of ratios in the cosmos. Effectively, ‘dark matter’ and ‘dark energy’ account for most of the matter and energy in the entire universe. The ‘dark’ components cannot be seen directly with telescopes as apparently it does not emits or absorb light or other electromagnetic radiation. Its existence and properties can only be inferred and the Planck Probe mission team, applying the standard model of cosmology, calculated the total mass–energy of the known universe as containing 4.9% ordinary matter, 26.8% dark matter and 68.3% dark energy. Applying mass-energy equivalence together, the ‘dark’ components constitute 95.1% of the total content of the universe. [119-122]. Importantly, the Planck probe data reflecting 95.1% is a linear proportion and should be calculated *volumetrically* as TRUE unit analysis already has cubes as the values. The cube of the 95.1% is *86.1%* , which we would use to compare with the gimmel/ TRUE

proportion. As an aside, it is irrelevant that Dark Matter and Dark Energy may be differently located and distributed. The hypothesized correlation still can be tested.

The cosmos is thought to be made up of about 75.6% hydrogen and 24.5% other substances mainly helium (but all these other substances have a similar gimmel to TRUE ratio of 0.762).

For hydrogen, we needed to introduce another form in the 'horizontal axis' besides gimmel, called 'daled' (which may or may not be the same as gimmel). The necessity for a horizontal axis calculation with hydrogen is because the hydrogen atom lacks a neutron. Without something to compensate, the atom based on the TRUE unit calculations would be symmetrically unstable. There needed to be a further flow of a gimmel type substance to compensate. While we assume it would be the same 'gimmel', we're applying it uniquely and in a different context, hence Daled.[ccc] Daled may or may not be the same as gimmel, and we're referring to both as 'gimmel' here.

Gimmel and TRUE

The figures on Mass-energy and Gimmel in the TRUE unit calculations are already based on volumetric (cubic) units. By applying volumetric equivalents of 75.6% hydrogen abundance in the cosmos with a 0.892 ratio of Gimmel to TRUE, we calculate the hydrogen contribution to be 67.5%.

Similarly, applying the 24.5% of helium (0.762 ratio) and any other life element (also = 0.762) that may be very small in the cosmos, the same figure TRUE unit ratio exists producing 18.6% as the ratio of Gimmel to TRUE. The total volumetric proportion then is 67.5% + 18.6% = *86.1%.*

The similarity of figures (86.1% of volumetric dark matter plus dark energy compared with the proportion of gimmel to TRUE in the cosmos at 86.1% here) is striking and exactly equivalent. However, these figures despite being based on best available current statistics, are, as indicated, still speculative. The range 'guesstimation' for gimmel/ TRUE ratio might have an error of say 2% or even more, based on the proportions of estimated hydrogen and helium / other life sustaining elements in the cosmos.

Nevertheless, particularly, given that it was hypothesized to be so, the correspondences are remarkable based on current figures (gimmel/ TRUE :: volumetric dark matter and energy together/ proportion of the cosmos). So very preliminarily, it appears that we could postulate that gimmel/ daled exists as a third substance besides mass and energy at every level, ranging from the quantal to the cosmological.

[ccc] We don't know exactly what Gimmel is. We *postulate* that gimmel is linked with a unitary 'broader consciousness'. We *speculate that* gimmel might exist as a *continuous infinite* vortical flow of more than just a 'consciousness' content: Embedded within this consciousness 'container' would be other *infinite continuity* properties equivalent to mass and energy content. We postulate that when presenting in the quantized finite reality, gimmel *manifests differently* for every chemical—atoms, molecules, or even components of the cosmos: Everything has their unique 'cosmic fingerprint'. Gimmel therefore applies to *meaningful specific* information (a *targeted* consciousness) as opposed to the general components. Communications occur across all the nine dimensions, as well as in the still quantized transfinite. Those interfaces are across, between and within dimensions, involving indivension translated through intersections of vortices, scalar, vector and tensor components. [7; 35; 68] This implies different levels: Some regard these as 'vibrational', referring to the different frequencies of movements, but then those 'vibrational resonances' would be multidimensional and manifesting relative to a particular framework, like 3S-1t. [5] We speculate that gimmel and daled reflect the same property, but they might turn out to be different (hence, their different names). Further lengthy papers will discuss these complex concepts.

The fifteenth conundrum: Applying the philosophical model of Unified Monism: Returning to general principles

Vernon M. Neppe MD, PhD, FRSSAf and Edward R. Close PhD

Unified Monism involves a philosophical model developed from the scientific and mathematical metaparadigm of TDVP [7] [ddd]. This new philosophical model was developed by Vernon Neppe and Edward Close in 2011 [2] as the logical philosophical consequence of their TDVP model. Therefore, it is likely it is the first major philosophical paradigm that is both based on a scientific model and the logical consequence of science. *Unified Monism* posits a unified reality of Space, Time and Consciousness with the infinite inseparably pervading the finite. [7] *There is no existence without the finite always being embedded in the infinite.* But we living beings can only experience the finite, and a tiny portion of that, namely 3S-1t. The rest of existence is hidden, though other states, such as altered states of consciousness, may involve other dimensions and other experiences. But only our quantized, discrete finite reality can ever be directly experienced, yet the continuous infinite, that cannot be experienced with our senses, always pervades existence in the finite. We don't realize it but everything we do has a finite and an infinite component.

The consequential result of TDVP is a philosophical model that is applicable to the brain and body, as well as to the broader infinite and finite. 'Unified Monism' is, therefore, the necessary philosophical consequence of TDVP, not a primary metaphysical or philosophical conceptual model. TDVP, like some of the Eastern mystical philosophies (e.g., Vedic varieties) and particularly like Kabbalah which it's mystically closest to [7], recognizes the unification of reality, the infinite subreality, the broader role of consciousness and a higher guiding element. But Unified Monism (UM) also is versatile enough to recognize that our physical reality is real, not just our imagination, and that our direct and indirect everyday experiences as living beings reflect our *overt* experience, but there is much *covert* happening all the time. Our experiences are only a tiny part of our existence.

The concept of a *Unified Monism* reflects more than just an inseparable source linkage that has been forever between both finite and infinite subrealities. It is not simply 'between' at all—there's no necessity for interaction. UM is not dualistic, but monistic: We're referring to two components that are essentially expressions of the same phenomenon. The two are inextricably part of each other, like a shoulder and a hand. *The infinite necessarily pervades all of the metafinite.*[eee] Moreover, the inseparable source of space, time and extended consciousness occurs at the most fundamental level of *origin*, and the separations of S, T and C are unified because they're always at least partly tethered. The source unification creates a unified philosophical unit and so does the consequent tethering of realities.

[ddd] TDVP is the more convenient abbreviation for the 'Triadic Dimensional Distinction Vortical Paradigm' of Neppe and Close.

[eee] The 'metafinite' (Neppe and Close 2014) [7] is a combination term for both the finite lower 9 dimensions plus the higher dimensions of a countable infinity which is called the 'transfinite'. Both the finite and transfinite are quantized: They are like pixels on a TV and each part is discrete. The metafinite therefore contains components, like quanta and is not continuous, like the infinite is.

Why Unified Monism is the appropriate term for this new philosophical model

In current philosophical discussions, the term "monism" is only uncommonly used. Instead, the two terms most frequently used terms are "materialism" and "dualism", with the latter often being used to mean "not materialism". The term "monism" is used in two very different ways: A *materialist* usually believes effectively that everything is contained in 3S-1t; another kind of monist is the *idealist*, originating with Berkeley and with many variants. Effectively, monists disregard the material, instead emphasizing a kind of consciousness that is variably conceived in different theories. Yet there is a third option, namely not only mass and energy or pure mind but the tethering of consciousness with space-time or mass-energy. [fff]

We therefore emphasize that 'unified monism' [69] is not dualistic or materialistic or idealistic because in UM, the finite is always embedded in the infinite; and the triads of space, time and consciousness (C_e) are always tethered together from the beginning. This makes it unified. There is no need to link because exists and has always existed together. Similarly, there is not just mass and energy: they necessarily include the third part of that triad, namely *meaningful information*—specific contents of consciousness —C_c. These, too, are always unified. So Consciousness is a separate existing entity that is always tethered, hence a different form of monism. Effectively, UM is very versatile and works in our 3 spatial dimensions in the present experience (3S-1t), in the mathematical and demonstrable 9 finite spinning dimensions (that constitute our real finite reality—covert and overt) [7], in the discrete but countable forever transfinite and in the continuous infinite. Thus, all of reality is a single unit hence the term 'unified monism' [69]. Unified Monism clearly has a Holism element, as everything is unified.

Unified Monism is not dualistic or idealistic or materialistic. It reflects its own philosophy.

The unification of a single reality becomes apparent in TDVP. This is why our equivalent philosophical model is called *Unified Monism*. This is not a tautology. It belongs to the philosophical group of Monism, yet it involves a deeper Unification of everything. Despite the apparent *monist* qualities in Unified Monism, it is neither 'materialist' nor 'idealist' in the modern sense. For the purist, UM involves a monist model, as the infinite and the finite are unified because there is only one reality. If dualism, as it is sometimes contextually used, refers to a consciousness *besides* any material, UM could be argued to have a dualistic element. But UM does not involve 'besides': There is no interaction, there is no complete separation from the other components: That consciousness is part of the necessary triad that always exists and has always existed. Though extent of consciousness is a separate substrate to space and time, with its own separate dimensions, these are always there as part of the whole, separate like a leg, an arm and a head, but necessarily connected, always as a single unit even if we only usually appreciate that we are existing in a moment in time in three dimensional space. This is clearly insufficient: We think, as well and register this. [8]

[fff] 'Tethering' is another TDVP term: It refers to the necessary linkage like a hand to an arm to a shoulder: there is no separation: Space, time, consciousness are all tethered together; so is mass, energy and meaning; and so is the finite and the infinite: they're all one. In TDVP, 'embedding' refers to the TDVP concept of how dimensionally higher levels contain the lower dimensions, e.g. our sentient living reality, is necessarily contained in the higher ones, so that 3S-1t is contained in the 9-D finite. Similarly, the finite is contained in (embedded in) the infinite.

However, the materialist would say that consciousness is purely from our brain: the act of thinking is bioelectrical physical phenomenon. Relative to living humans being experiencing 3S-1 reality, such conscious thinking might well be to a large degree purely brain based; however, it would not be so when an observer is at the framework of what we would regard as 'non-local', where that observer is experiencing other dimensional domain groups of the 9 finite dimensions, and is physically outside any brain; Disputably, an example would be the so-called 'out-of-body experience': We are not here to dispute whether such phenomena are objectively real, but to look at the broad range of a model, and theoretically, UM could explain life after death, for example, very easily. UM does not need a 'mind' in isolation, quite separate from that physical body, because the ostensible disembodiment might just be another level of dimensionality manifesting in a different, disputably higher 'consciousness'.

Similarly, mass and energy have content—they are like containers but in the TDVP model, they simply cannot exist together unless there is also some kind of consciousness. We know this because we've demonstrated in this series that the atoms would be unstable without that third substance 'gimmel'. And we have proposed, rather cogently, that gimmel *must* have at least components of consciousness. [108] We've demonstrated in our 13th conundrum that gimmel exists necessarily in every atom, and that materialism without consciousness fails.

Differences from dualistic approaches

UM therefore applies a top-down approach that includes non-material information as well as the material. In that sense, applying a different definition of dualism, it would appear dualistic, but in no other way is it, because UM does not differentiate 'mind' and 'body' (that 3S-1t physical mass-energy aspect which is experienced and reflects an overt part of existence). Existence is mainly hidden. Consequently, the consciousness and the material of, for example, mass and energy are part of the same container—like an atom that also contains gimmel. Similarly, space and time are just reflected in dimensional differences. [3] We living humans are simply not conceptually recognizing that what we call 'non-material' or 'mind' is simply the same unity. but above our experiential level of 3S-1t: They reflect just higher, hidden dimensions, and we're limited to not perceiving them under usual circumstances.

Moreover, because the finite is embedded within the infinite , there is no area of necessary interaction—the finite and infinite operate as one—they exist as a unit. Hence, again, the philosophical term of Unified Monism: There is no 'mind-body' or 'consciousness-substance' duality; there is just one. [7]

In Table 14A, we contrast UM with some major current philosophical perspectives, though deliberately, we do not amplify the different currently topical kinds of monism and dualism. This table is not meant to be all-embracing, but to give a perspective.

In summary, Table 14 A shows how Unified Monism differs from possibly all the other philosophical models because it is unique in its components—it has an identity. But it is based not *ab initio*, on philosophy. Instead, UM derives from scientific empiricism, logic and mathematics. [69] Therefore, UM is not in that sense 'metaphysical' (unprovable) because it developed out of science and is feasible, even when components are not directly falsifiable. We can therefore apply our Philosophy of Science extension of the Popperian model, 'Lower Dimensional Feasibility, Absent Falsification' [3 7] where we can put pieces of a jigsaw puzzle in

3S-1t and yet observe UM still working. UM is very much a secondary derivation of the metaparadigm that is TDVP [7], and therefore the powerful motivations for TDVP can frequently be applied to UM: The logic of UM developed out of necessity. There is no need for any connection as in dualism. And there is no need to relate mass-energy or space-time or 'consciousness' to be products of the other. They all naturally exist together from the beginning, hence the title *'Reality Begins with Consciousness'* in the Neppe-Close book on TDVP. [7] Even though all of 'space', 'time' and 'consciousness' independently exist, they necessarily are always existing at least to a minimal degree (depending on circumstances) together. On the one hand, there is no difficulty understanding the limitations of our objective physical reality in 3S-1t, but nor does TDVP or its philosophical derivative UM, have a problem with survival after death or with psi or with meaningful evolution. There is no need for philosophical concepts such as 'emergence', 'epiphenomena' or 'derivativeness' from either the material or the mind. Everything seamlessly fits. No other model in this context makes sense under every circumstance. This is why UM was borne out of necessity reflecting again that UM is a logical consequence of the science and the mathematics.

Table 14 A: A Comparison of Some Pertinent Philosophical Models Relative To Unified Monism (Provisional, Neppe and Close, ©)

Philosophy	***Panpsychism***	***Realistic Materialism***	***Dualism***	***Pantheism***	***Unified Monism***
Origin	Thales, Plato, James	Galen Straw son	Descartes	Spinoza	Neppe and Close
Fundamental	Mental aspect in all matter; unified experience	Matter variant explains meaning	Mind-matter separate	God in all	Continuous infinite contains discrete finite; Triad: Space, Time and Consciousness tethered
Basic	Idealism monism	Materialism monism	Separate mind-body dualism	Idealism monism	STC unified monism
Awareness	Fundamental is mind	Fundamental potential to matter	Fundamental is both mind and matter	One being	Yes independence; fundamental is all of STC tethering, infinite, multidimensionality
Derivation and base scientific	No	*No*	No	No	Yes; Empiricism of TDVP necessary; result secondary is the UM philosophy
Mathematical derivation	No	*No*	No	No	PFDCIII ^ ; Yes: fundamental Mathematicologic
Charge and spin	Not direct	Fundamental to matter	No.	No.	Yes
Meaning	Yes	*No*	Yes	Yes	Yes
Life	Yes idealism	*No*	Compatible	Yes idealism	Yes
Micro to macro	Yes	*No*	Unlikely	Yes	Yes
Inanimate aware	Yes idealism	*No*	? variants	? variants	Yes
Space-time independence	No	Yes	Yes	No	Yes but tethered together and with 'broader' consciousness
Virtual reality	Likely, yes	No	*No*	Possibly	No
Fundamental	Do we really exist?	Survival and ?	Chalmers	Extreme:	None

Philosophy	***Panpsychism***	***Realistic Materialism***	***Dualism***	***Pantheism***	***Unified Monism***
Problems		sentient beings unexplained.	unsolved; interaction	Divinity variant	
Physical exists *	Yes and No.	yes	Yes	yes	Yes
Physical life *	Variable models	Yes, key	yes	Not really	Yes
Psi *	Yes	Not independent	Yes	Yes	Yes
Precognition *	Not relevant	No	No?	No	Yes
OBEs; NDEs *	compatible	*? compatible*	Logical	compatible	Logical natural consequence
Survival post mortem; *	Yes	*Unexplained, no*	Compatible	One being= self	Logical and a natural consequence
Free will	Yes	*Denied*	Compatible	One being	Yes, but within constraints
Divinity	Compatible	Yes	Compatible	Required: One being	Compatible and likely
Reincarnation *	Variants yes; broadly not pertinent	*No*	Compatible but not necessary	No	Compatible but not necessary
Subjectivity	Yes	No	Yes	Yes	Yes
Objectivity	No	Yes	Separated	Yes, potential	Yes, together
Consciousness	Yes	No	yes	yes	Yes
Levels of consciousness	No	No	Possibly	No	Yes, fundamental
INDUCTS**	I~~ND~~UC~~TS~~	~~I~~N~~D~~U~~C~~TS	~~INDUC~~TS	~~IND~~UC~~TS~~	INDUCTS all **
DICTUM~	~~D~~IC~~T~~U~~M~~	~~DICT~~UM	~~DIC~~TUM	~~DIC~~T~~U~~M~~	DICTUM all ~
Relative to	No	No	No	No	Yes
Range	Same	Maybe e.g. OBE	Same	Same	Higher levels different (also so in TM); relative; vortical indivension
Fits into it	Non-reductive physicalism	Non-reductive emergent physicalism; Spatiotemporal Emergentism;	Non-physicalism	Monistic Divinity Theology	Divinity *plus* others impact tethering; UM could sometimes contain panentheism; Chassidic Theism part of impact; Transcendent theism first cause primary;
Variants	*Berkeleyian idealism;* phenomenalism; *mental monism; Vedanta Eastern*	Peter Strawson: *Realistic Monism* of Non-reductive physicalism; *epiphenomenalism; functional reductionism, Identity reductionism;*	*Substance Dualism* (Descartes; *Property Dualism* (mind emerges); Promissory dualism	*Panentheism;* Theological monism; *Chassidic theism;* Transcendent Theism; *Spinoza creator results in all infinite dimensions*	*Transcendental materialism* (*Betty,* from Zeno and Chryssipus) (discrete stuff not continuous); *Kabbalah* (triadic STC untethered); *Vortex N-dimensionalism/ pluralism* (earlier Neppe); *Transcendental Physics* (earlier Close)
Different from	*Neutral monism;* Promissory materialism	vs. physicalist monistic reductionist materialism; Panpsychism variant;	Monism	Dualism; reductionist materialism	Classical monism or dualism and all variants; none

The two major mnemonics based on TDVP principles are 'INDUCTS' and 'DICTUM'. These apply the unification of Science and Philosophy using TDVP criteria. [7] The deletions of the letters in Table 14A indicate that specific a philosophical model does not contain that property. The individual letters stand for:

- ****INDUCTS:** Infinity, Natural Law, Dimensions, Unified Monism, Consciousness, Tethering, Subjective-Objective components.
- **~ DICTUM:** Dimensions, Infinity, Consciousness, Triadic Tethering of Space, Time and Consciousness C_e plus theory of everything, Unification, Mathematics. U is also for Unified Monism, a tautology in the UM column only so not applied here.
- **^ PFDCIII** is an abbreviation for the various mathematical techniques that can be applied to these philosophical models: In summary, Unified Monism utilizes *all* of these mathematical models involving multiple dimensions but no other model above even applies mathematics at all. This illustrates that UM is based on plus mathematics. 'PFDCIII' is an abbreviation for several mathematical models developed by the authors: Pythagoras Theorem modified and extended (Close), Fermat's Last Theorem (with Close's applications to vortices and symmetry), Dimensional Extrapolation (Close), Calculus of Distinctions (Close), Modification of Incompleteness of Gödel (Neppe), Impact Distinctions (Neppe), Infinite Continuous—Discrete Metafinite (Neppe, Close).

Unified Monism is also based on two levels of empiricism: Physical life and physical existence; and psi and survival. No other model is so based.

Effectively, therefore, and as a summary here, Unified Monism appears to be the first developed philosophy based on scientific and mathematical principles that is versatile and workable. It is a 'secondary philosophy', in that UM describes the philosophical endpoint of science and mathematics. It, therefore, literally is completely unified because it philosophically portrays the Science and Mathematics of TDVP. [69] More than that, it also unifies science with spirituality and allows a linkage with the mystical philosophies: For example, it's truly remarkable how many components of the very esoteric Kabballic mysticism are congruous with the key concepts of TDVP—this is not surprising because both philosophies do not recognize the mind and body as one or dualistically, but instead they recognize triads of space, time and consciousness. However, in UM these are all tethered together necessarily. And UM recognizes too, that mass and energy alone is insufficient—that we must have mass, energy and meaning. Kabbalah is a mystical philosophy that is not grounded in science: This grounding belongs uniquely to UM.

UM even contains certain other philosophies depending on the level: When approaching the transfinite level, variants of panpsychism are almost contained in UM; but, though panpsychism comes close in some components, UM can also be applied in our physical earthly existence, too, reflecting a real, not virtual or mystical, existence. Also UM is the only philosophy that can in a completely versatile manner recognize both the physical aspect and its dimensional extensions (hence so-called mind is just an extension of our dimensions) [79] as well as the consciousness components and infinity, and yet not adopt a dualistic stance. In UM, all is one, everything is unified, the infinite embeds the finite necessarily, and the higher dimensions embed the lower ones even in the finite reality. This allows great versatility.

It is remarkable that both Drs. Neppe [2, 95] and Close [26] quite independently developed this same philosophical concept, effectively referring to Unified Monism, even though it did not exist and we are only now defining this new philosophical model!

The sixteenth conundrum: The general immediate implications of a nine dimensional reality

Vernon M. Neppe MD, PhD, FRSSAf and Edward R. Close PhD

We have recognized that some dimensions may be hidden from us in our restricted 3S-1t subjective reality. Moreover, we propose that the essential substance of finite reality manifests as various dimensionally related mixtures of matter, energy and consciousness in 9 finite dimensions, even though we may only be directly physically experiencing just three of space in the present. [108] We discuss the immediate implications of these findings. [6; 7]

The presence of a nine-dimensional vortical finite reality radically changes our worldview. More formally, these results confirm the following hypotheses:

a. We demonstrate a mathematical justification for the fermion mixing angle, like the Cabibbo angle.
b. We demonstrate this is not purely a curiosity because it works only with 9 dimensions (and no others) and only by considering the vortical nature of reality.
c. We demonstrate that our proposed 9 dimensional finite reality is a 9 vortical model in TDVP is feasible.
d. Critically, this calculation would be falsified if any other number of finite dimensions were used because the fundamental figure is calculated per spin rotational dimension and only the pre-stipulated hypothesis of 9 dimensions works out.
e. Further support is provided by the lack of any other dimensional model (e.g., 8 or 10 or 11 or 4 or 3) not working with these calculations. This provides support for the hypothesis that this model works exclusively by applying a 9 dimensional model.
f. This conclusion provides critical evidence supporting the validity of the TDVP finite 9 dimensional spin model.
g. Most importantly, the application of the fermion mixing angles has been demonstrated to be applicable in a 9-D spin model.

If the calculation holds, and it does mathematically, *because this is a simple mathematical derivation which can be, and has been checked,* it also has implications for not only finite 9 dimensional rotational realities as in TDVP, but other key concepts in this paradigm including:

- why and how dimensional extrapolation works: DE is directly demonstrated by the feasibility of these calculations requiring extra dimensions.
- vortical spin (with a stimulating proposal) including vortical indivension: This, of itself, provokes another important theoretical model relating to electron shape.
- orthogonality,
- dimensionometry,
- Calculus of Distinctions (CoD) and
- relativity and
- the Fine Structure Constant α [ggg] : In this instance, α indirectly comes out in ratios like

[ggg] Arnold Sommerfeld's 1916 Fine Structure constant, $\alpha = 7.2973525698(24)\times10^{-3}$ = the famous 1/137, or more correctly 1/137.035999074(44): It's a fundamental physical coupling constant characterizing the strength of the electromagnetic interaction. It's a dimensionless quantity, a constant numerical value in all unit systems expressed in terms of other fundamental constants [97].

velocity of the electron round the hydrogen atom, and the calculated spin velocity of the electron. The unwritten assumption is that fermions relative to 3S-1t are regarded as having an intrinsic spin of one half. The probability matrix calculated relates to the influence of one angle to another under the influence of subatomic forces. [96; 97]

Our proposal is that the essential substance of finite reality manifests as various dimensionally related mixtures of the contents of matter, energy and gimmel (as an infinite 'consciousness' component) in 9 finite dimensions. This is so even though we may only generally be *experiencing* three spatial dimensions in the present moment. This hypothesis is feasibly supported by our data, but clearly this is a remarkably unexplored, but critically important area for scientific exploration: Later work by other investigators can further focus on this.

9 dimensional spin is real, not just mathematical operations

Some would argue that: "*Yes, Close and Neppe have definitively demonstrated the mathematics linked with the Cabibbo mixing angle and other nine-dimensional derivations. But we regard these extra dimensions as just 'operators': For example, 'the square root of minus one' is purely a virtual concept, not something that is real. Moreover, 3S-1t as in the reductionist Standard Model of Physics (SMP) is quite sufficient: The mathematics of higher dimensions is divorced from reality. How come higher dimensions are not regarded by scientists if they exist? We all know that String Theory, for example, is just a 'theory' without empirical proofs."*

With great respect, a strong axiom of the TDVP model is that mathematics is integrated into reality. [7] Math is not just an isolated, separate concept: It necessarily expresses reality. [7] Indeed, the presence of the remarkable and very precise constants may support this view too. [7 54 55; 56]. And we (Neppe and Close) also regard the *"relegation of extra dimensions to just being mathematical operators, irrelevant to reality"* as incorrect: We've motivated the limitations of the SMP; and 9D spin proof correlates with the empirical data—it's part of reality: *If the dimensional mathematics were purely 'operators', then the physics findings that follow and are linked, would also be unreal and virtual reality*—and they are not. There are many concrete, real ideas in this paper, including the demonstration of that 'third mass-less, energy-less substance' ('gimmel') with the consequent 'symmetry'[hhh] and 'super-stability' of TRUE derivations, suggesting even that math is possibly fundamental to life: There are remarkable findings on molecules such as water, and genetically in RNA and DNA. Math involves actual proofs, and not just empirical or inductivist reasoning. Further support is our hypothesizing and then demonstrating the TRUE correlation with the cosmological data.

But even without the mathematics there is a very, very strong case for the TDVP hypotheses to be correct: TDVP has never been refuted and it's different from String *Theory* [7]. Yet, when TDVP is closely examined over time, it has yielded even more supportive data, more strongly supported now than at its very powerfully motivated start 3 years ago. [2] The math is the TDVP fabric, molding everything together: The further correlations with the empirical findings in our reality make extra-dimensional hypotheses simply undeniable and demonstrable.

[hhh] Symmetry, too, is relative to the domain. Essentially, triadic cubes in 9D may appear symmetric in one context, but asymmetric in another. [5] This, we propose, is dependent on rotation and even direction: levorotatory may be more stable than dextrorotatory pharmacologically [123] and we're finding this in simulation even applying the thought experiment models of 9D.

The seventeenth conundrum: other significant implications for the future of appreciating and understanding our reality based on the 9D spin findings.

Vernon M. Neppe MD, PhD, FRSSAf and Edward R. Close PhD

Can the finite 9-dimensional spin findings be applied to other models? [108]
Possibly, but only:

a. if they are 9 finite dimensional models (most String Theory models are not 9 dimensional)
b. and if they involve rotation and intrinsic spin of fermions (so that, for example, any 'folding' multidimensional String Theory models should not apply). No other well-developed proposed models seem to fit these parameters. The closest alternative model appears to be the provocative Subquantal Model modified in Adrian Klein's 2012 version. This recognizes the logic of a 9 dimensional model, but only briefly. However, the vortical spin elements and dimensional extrapolation applied to this calculation are not an essential part of the Klein model. [117]
c. Importantly, this calculation cannot be derived by using the conventional Standard Model of Physics involving 3 dimensions of space and one dimension of time. Nor can a Cabibbo angle like figure be calculated applying anything but a 9-dimensional model suggesting that models with <9 or >9 finite dimensions are incorrect. Moreover, the requirement of spin rotation suggests that models involving folding dimensions are also falsified.
d. Moreover, the theoretical background to this calculation applies Dimensional Extrapolation in the TDVP model allowing calculations based on the multi-dimensional nature of reality.
e. We show that the idea of our 3S-1t reality being relative and not absolute, and that there are legitimate concepts of orthogonality at higher dimensions.
f. Our calculations support the finding of electron shape not being uniformly spherical: This is a strong conclusion because otherwise the calculated spin velocity v_e would exceed the velocity of light (which multidimensional time may suggest but which is less parsimonious than the non-spherical electron).

Implications for Space-Time-'Consciousness' (STC) dimensions

The demonstration, specifically of the actual calculation of the fermion mixing angle (as exemplified by the equivalent Cabibbo angle), strongly motivates that our *finite* reality is 9 dimensional and these dimensions are differentiated through spin. However, this finite reality 9-dimensional matrix does not specifically differentiate any configuration of dimensional substrates such as (S3, T3, C3) from say (S5, T4). The TDVP model also includes finite and transfinite elements (the 10^{th} plus dimension) plus the continuity of the infinite reality elements, but our derivation here, examines purely the finite 9-dimensional spin TDVP reality component.

Future implications of the nine dimensional spin model.

We find that the mathematical derivation supports other significant implications for the future of appreciating our reality:

- We confirm the derivation of the same approximate angle of 13.032 degrees for mixing angles for electrons.
- We recognize the potential to apply higher dimensional realities for future particle physics research.
- We amplify the pertinence of spin, the application of relativity corrections in electrons, and the conservation of angular momentum.
- We apply derivation of the same approximate Cabibbo mixing angle linked with electron spin (as well as quarks), and the broadening of Cabibbo's concept of 'weak universality' by hypothesizing that all discrete phenomena result from specific dimensional extensions of the same elementary pattern inherent in the multi-dimensional substrate of reality.
- We introduce concepts pertaining to intrinsic electron spin and the pertinence of angular momentum in that regard.

Implications for the broader future

This Cabibbo angle 9D spin finding could have *significant speculative implications* for the future of appreciating our reality. Effectively, these findings because of their breadth could generate several novel ideas for testing and application. These findings potentially change our world-view to a 9D spin finite reality. If justified, and the data below appear cogent, we no longer can claim that reality is purely 3S-1t.

These have already been outlined above in various forms but are delineated here to consolidate into a single place.

- They imply that most of our finite reality is hidden because we are limited to what we experience in 3S-1t.
- The potential to apply higher dimensional realities for future research becomes non-trivial. The most obvious relate to what was previously 'science fiction' including space and time travel and communications that appear immediate.
- It provokes serious questions about the concept of finite reality, and about why some dimensions may be hidden from us in our restricted 3S-1t sentient experience.
- It suggests that some of the other conundrums or ostensible contradictions in physics may be solved or better understood by applying a 9-dimensional spin paradigm.
- The extension to other science besides physics such as biology and application of concepts even to the consciousness and psychological sciences becomes an important consideration.
- The availability of a mathematical technique to demonstrate that the elements of life are more stable and to study TRUE and gimmel is a potentially major advance.
- There has been great debate which one of some 20 explanations relating to the observer in particle physics is correct. This has often been called the Copenhagen interpretation though it could be any of the other different interpretations. [14; 16-18; 26] *The fact that there are, in reality, 9 dimensions makes such interpretations potentially redundant. Just as an elephant has a trunk as part of it, existence includes 9 finite dimensions.* And one substrate is consciousness, and this explains the observer. We don't need an interaction or a collapse of a

quantal wave. We already have the trunk and the body of the elephant all together. Consciousness is a fundamental part of the equation.

Let's now look at just the example of 'gimmel' and its proportions of 'TRUE' so as to appreciate the potentials of further research:

- Given the presence of gimmel and the highest proportion being in the atom of Hydrogen, with the highest proportion of gimmel being in the common chemical liquid of water, a homeopathic hypothesis to test would be that "the greater the dilution of a compound in water, the more potent the chemical reactivity."
- Even more so, if indeed there is a linkage of greater dilutions with higher potency of these chemicals, are the chemicals serving as a focus for the gimmel? Does this allow for proportionately more 'activated' gimmel? In other words, are the examinations of atoms and their gimmel by using specific scores for neutrons and protons (and their component up and down quarks) and electrons, just reflecting a cross section of the broader gimmel potential?
- Furthermore, does the presence of gimmel as a necessary component for symmetry and stability mean that we simply cannot just have a materialistic universe with atoms fundamentally only, without having that third substance? One future direction here is to demonstrate that third substance 'gimmel' contains a consciousness? Additionally, where does that consciousness comes from (is it from the infinite continuity?)
- But there remains much that is unknown: Analysis of gimmel in the elements might be easier than molecules as the results are clearer. What else is relevant for molecules? For example, water as hydrogen-hydroxide (H_2O) is a logical vehicle to use to transmit gimmel. But then so might be the unpleasant hydrogen sulfide (H_2S) and even the poison, hydrogen cyanide (HCN). Do these chemicals reflect differences, for example, in bonding, special deeper gimmel attributes or specific meanings, or in ordering fundamental arithmetical operations?
- But there are also already recognized differences in pharmacological rotation in potency of compounds. Levorotatory chemicals are dissimilar to dextrorotatory ones. [123] This is also logical based on the L-rotatory thought experiment rotations we've found in 9-D spin.
- Examining the Periodic Table of the Elements, we can easily calculate the atoms that contain the least proportion of gimmel to TRUE units. Do these have a unique identity?

We have alluded to the complexity of this newly hypothesized concept. All these findings, because of their breadth of implications, could generate several novel ideas for testing and application.

But let's prioritize. Gimmel and TRUE units, while important, might reflect just one approach to the whole new discipline of Dimensional Biopsychophysics. We know that the 3S-1t model, based on three spatial dimensions in a moment of time, involves a large part of what we recognize as our common experience. But we know, too, now that there is more to reality than 3S-1t, and that this is just an important part for us of a 9-D spin model. We propose that we should be researching *what exists, not just what we experience*. This leads to re-examining these 17 conundrums within our 9-dimensional finite spinning existence. Furthermore, and barely examined in this specific paper, we need to examine 9-D spin as part of the broader unified reality involving the finite being embedded in the infinite, as well as the roles of the transfinite.

Translating some conundrums of the universe by applying a 9 dimensional spinning model of finite reality: References.[iii]

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Disciplines involved in this series:
Biology,
Consciousness research,
Cosmology,
Dimensional biopsychophysics,
Life sciences,
Mathematics, Mathematical physics,
Philosophy, Philosophy of science, Epistemology,
Phenomenology
Particle physics, Physics, Theoretical physics.

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