One Response to "An Evaluation of TDVP" With Explanations of Fundamental Concepts

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ABSTRACT

Dr. Vernon M. Neppe and I first published an innovative, consciousness-based paradigm in a volume entitled *Reality Begins with Consciousness* in 2012.[1] It was the combination of many years of independent research by us, carried out before we met, and then initially about 3 years of direct collaboration, that has now stretched beyond a decade. Hailed by some peer reviewers as the next major paradigm shift, the Triadic Dimensional Vortical Paradigm (TDVP) has been further developed and expanded over the past seven years in a number of papers and articles published outside of mainstream scientific journals because of the unspoken taboo against including consciousness in mathematical physics.

This article is a response to criticisms leveled in the article, "An Evaluation of TDVP," published in *Telicom* XXX, no. 5 (Oct-Dec 2018), by physicists J. E. F. Kaan and Simon Olling Rebsdorf.[2] This article, along with Dr. Neppe's rejoinder (which immediately follows this article), underlines the difficulty that mainstream scientists have had in understanding the basics and implications of TDVP. In addition to replying to the criticisms in Kaan and Rebsdorf's article, this article contains explanations of some of the basic ideas that make TDVP a controversial shift from materialistic physicalism to a comprehensive consciousness-based scientific paradigm.

1.0 INTRODUCTION

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[b] This article is a response to a critique by Kaan and Rebsdorf, that first appeared in *Telicom* 30, 5, 2018 and now in IQNJ. Because the critique is being published here, our responses are also published immediately following but we note that editing of the Telicom version is in process and greatly acknowledge the assistance so far of the Telicom Editor Kathy Kendrick for the forthcoming Telicom 31, 1, 2019. The two versions are likely to be very similar, but not fully identical.

I want to begin by putting this discussion into the proper context: the context of humanity's search for truth. That's what science of any kind should be about. It is certainly what TDVP is about. I think a critical question is, "Where did everything come from?" Was the universe as we know it engineered by a conscious intelligence to have purpose and meaning, or did it just happen by accident? Can this question be answered within the scope of human intelligence? Many answers have been offered over a few thousand years of human history by thinkers of all sorts: philosophers, theologians, scientists, and mystics. But, are any of the answers truly final and definitive? Or do they come with arguments convincing enough to compel you to live your life as if they were true? Apparently, many people have thought so, because during the history of human life on this planet, bloody wars have been fought over some of the answers to this question, and many people have died defending their beliefs in what they considered to be the correct answer.

I think there *is* a definitive answer to this question and that I have found it. TDVP is the truth as I see it, and I make no apologies for that. At my age and stage in life, it makes little difference to me whether anyone listens, agrees, disagrees, or ignores me. I am happy with my answer, and that is enough for me. Everyone is free to accept it, reject it, think about it, or ignore it. It's completely up to each individual.

A Starting Point

I think we can agree that, without question, *there is something real that actually exists, and we are all a part of it*. Without this supposition of an existential reality containing at least you, me, and the universe, we have nothing to talk about. So, given that there *is something*, how did this *something* come to be what it is now? There are three possible answers to this question: 1) Something from nothing, 2) nothing from something, and 3) something from something else.

To believe that number 1 or 2 is true, you have to discount nearly all the evidence at hand. No one has ever seen something arising from nothing or something disappearing into nothing. Even when it appears that way, a thorough investigation always reveals that one of the most basic laws of physics holds: the law of the conservation of mass and energy. In all of the experiments ever conducted into the physical, chemical, and biological processes of our universe, we see only change, never creation from nothing, nor total annihilation of anything. In even the most violent explosion, the sum total of the equivalence of all matter and energy before

and after the explosion is always the same. In other words, the empirical evidence is all for number 3, not 2 or 1. Something never arises from nothing; something never degrades to nothing; and the something we have now came from something else, because it was different in the past, and, in our dynamic reality, it will be changed from what it is now into something else in the future. But the sum total of the substance of reality will always remain the same.

Despite the evidence, historically, mainstream science and mainstream religions have declared that 1, 2, or a combination of them is the true nature of reality. In the theory of the Big Bang expanding universe, the equations of general relativity predict a mathematical singularity at the "origin event," eventually resulting in mathematical singularities in black holes, with the semi-stable world of our experience existing somewhere in between. The current scientific paradigm sees reality expanding from a mathematical singularity at the beginning of spacetime, with everything eventually falling into the singularities of black holes. This is a process of something from nothing (1) becoming nothing from something (2), unless you assume that the "nothing" is not really nothing, but some other form of the something we have now; but then, you have number 3, don't you? In the current scientific paradigm, quantum field theory (QFT)—with particles defined as quantized states of underlying fields which are more fundamental than the particles—is, in my opinion, the closest theory to the reality. But QFT—using matrices with values subject to the Heisenberg uncertainty principle as perturbations of the underlying fields—is more descriptive than it is explanatory.

In theology, *creatio ex nihilo* (creation out of nothing), is a doctrine invented by early Christian theologians after the original teachings of the pre-Christian Judeans, the teachings of Jesus, and the teachings of the first serious Christian theologian (Origin) were subverted by the Roman Emperor Justinian in his *Anathemas Against Origin* in 553 AD. Justinian realized that the teachings of the Jewish Gnostics and the followers of Jesus constituted a serious threat to his power because, in his interpretation of early Christian teachings, Origen had written things like,
"Each soul enters the world strengthened by the victories or weakened by the defects of its past lives. Its place in this world is determined by past virtues and shortcomings" (from Origin's *De Principalis*).[3]

Such teachings were in direct conflict with what Justinian saw as his divine birthright to rule the world as a Roman Emperor, so he seized on this statement and related ideas in early Christian doctrine, as documented by Origen, that

undermined the exclusivity of the Roman Emperors' claim of divinity. If people were allowed to believe that by being virtuous they could rise to the level of an Emperor (i.e., to the status of a god, or even sons and daughters of God), then the power of the Emperor would be seriously threatened. He decided that he must declare this idea to be heresy and take strong measures to stamp it out.
The *Anathemas*, an edict that he prepared for this purpose, read, in part, "Whosoever teaches the doctrine of a supposed pre-birth existence of the soul, and speaks of a monstrous restoration of this, is cursed. Such heretics will be executed, their writings burned, and their property will become the property of the Emperor."[4]

This was, of course, a powerful incentive for Christians to remove any such references from the scriptures from which they taught. Without the teaching of the eternal nature of the soul, theologians were free to shape the doctrine of the Church in a way that ensured that the masses had to depend upon the Church for salvation. It was a way to control the masses, pure and simple, and perpetuate the power of the Holy Roman Empire. Most other major religions, with the exception of Islam, which, like Judaism and Christianity, is also of Abrahamic origin, are not encumbered by this illogical assumption of *creatio ex nihilo*.

OK, you may say, so what does it mean if number 3 is the real answer? In my opinion, it changes things very profoundly: With no absolute beginning or end, we must look at human history and science in a completely different light. No longer burdened by the misconception that everything was created out of nothing and that consciousness is something emerging from organic neurology evolving only a short time ago, we begin to see that our simplistic linear view of the evolution of things is very misleading.

Researchers who claim there is evidence that some of the ancient stone structures scattered around the planet are much older than mainstream archeologists believe, may not be as wacky as they sound. When viewed through the lens of belief in answers 1 and/or 2, their claims can't be right. But if you drop the irrational belief in a linear progression from nothing to something, and accept the evidence for the eternal existence of *something*, you have to take their evidence seriously; because civilization, just like everything else, undoubtedly progresses in cycles. Our fixation that we are the epitome of the development of sentient species for all time, due to the illogical belief in answers 1 and 2, is as egocentric and as wrong as the idea widely believed a few hundred years ago that the earth was flat and the center of the universe.

I have proved, at least to myself, that the logical structure of the universe is reflected in the logical structure of pure mathematics, and vice versa. This finding, combined with recognition of the endless process from something to something else, implies that physical reality is a quantized logical structure embedded in the infinitely continuous multi-dimensional field of consciousness, and the illusion of beginnings and ends is only meaningful in relation to the amount to which we are identified with finite physical bodies. Identification with the undifferentiated field of consciousness allows us to see time in the same way we see space: in three dimensions. Once freed from the illusion of being limited to finite three-dimensional objects evolving in one unidirectional dimension of time, we rise into the perception of 3D time, to see that everything exists eternally and only appears to evolve in cycles of finite duration.

So, the answer to the original question, "Where did everything come from?" is "Everything has always existed." There is no absolute beginning or end, only endless cycles of change. This is the basis of TDVP, and it answers a lot of otherwise-unanswerable questions, including Leibniz's question (the first question natural science should answer), i.e., "Why is there something rather than nothing?" There is something because there has always been something, and there will always be something. Nothingness is an illusion. The illusions of absolute beginnings or ends are perpetuated by certain traumatic changes, like the birth and death of the physical body. So, everything that is something came from something else that existed before the beginning of the process or processes that changed it into the something we have now, and the something we have now is already being transformed into the something else that will exist in the future. But awareness expanded into the 3D time and 3D consciousness, as predicted by pure mathematics, becomes awareness of the reality behind the illusions of 3D space and 1D time.

In the beginning of one cycle, we find the end of the previous cycle, but they are not the same. The new cycle is one of greater awareness than the previous one, because we have learned and expanded our awareness; and thus we rise in a progressive spiral from the finite into the infinite.

What is TDVP?

TDVP is an interdisciplinary scientific model developed and published by Dr. Vernon M. Neppe and me between 2008 and the present, that puts consciousness

into the equations of science.[5] The article entitled, "An Evaluation of TDVP" by J. E. F. Kaan, MSPE, and Simon Olling Rebsdorf, MSPE, was published in *Telicom* XXX, no. 5 (Oct-Dec 2018).The following is a response to that article.

2.0 GENERAL COMMENTS

Dr. Neppe and I are eager to engage in meaningful discussions about TDVP concepts with anyone interested in doing so. I am especially interested in evaluations of the mathematical logic and physical concepts of TDVP by people with training and a depth of knowledge in those subjects; and over the past ten years, I have had the good fortune of having many useful discussions about TDVP concepts with dozens of competent scientists, many of whom are PhDs in mathematical physics or related fields. Several of them have endorsed TDVP wholeheartedly.

We are currently corresponding with a number of PhD professionals interested in the applications and implications of TDVP and the natural quantum units of the calculus of dimensional distinctions. I have had a number of informal discussions with Mr. Kaan over a period of several years, but I have had no previous discussions with Mr. Rebsdorf. Similar to their practice of shortening Neppe and Close to N&C, I will refer to them as K&R. We want to be respectful of their work, but understandably, we need to correct any erroneous statements about TDVP.

I am thankful that K&R made the effort to write this critique, and pleased to be able to respond to some of the misunderstandings and errors found in the article. Except for a few general comments, I will confine my responses to K&R's criticisms of the math and physics of TDVP, and leave other topics, including feasibility, falsifiability, and philosophy-of-science questions to Dr. Neppe. However, there will likely be some overlap in our responses, because physics and mathematics, while very important in any scientific paradigm, are only part of the greater question concerning the nature of reality, and Dr. Neppe will still also include some mathematical-physics.

I was inspired by the genius of scientists (such as Newton, Leibniz, and Einstein) and mathematicians (such as Euler, Gödel, and von Neumann) to become a theoretical physicist, but I knew from personal experience that there was something more. Presently, I know a number of scientists, engineers, physicists, and other people, who now believe that consciousness is a fundamental part of

reality but who were mainstream physicalists before paradigm-shattering experiences changed their worldviews and their lives forever. I know several well-educated, intelligent, professional scientists who have experienced unsought out-of-body experiences as the result of horrifying accidents or flat-lining on the operating table, and who later returned to normal bodily awareness, defying all conventional physicalist medical theories. Such experiences awaken us to the existence of a reality much greater than that addressed by the current physicalist scientific paradigm.

3.0 K&R COMMENTS AND CRITICISMS OF TDVP AND MY RESPONSE

K&R state on page 144 of the *Telicom* article that, "TDVP seems to be based on two fallacious assumptions, namely: 1. Physics excludes the paranormal (or 'spiritual'). 2. In order to be able to allow for paranormal events, you can modify the fundamentals of mainstream physics—without checking if the new theories still work for old experiments."[6] TDVP is not based on these assumptions. If I accepted assumption #1, I could not have written *Transcendental Physics* in the early 1990s, which made the point that physics could be expanded to include spiritual reality (without detracting from what had already been discovered) by including consciousness in the equations.[7] Concerning #2: In fact, we have checked a number of specific instances to see if TDVP actually works for prior existing experiments, and it *does*. Perhaps the most important among them is the derivation of the inertial masses of the proton and neutron from TDVP theory and spin dynamics, which are exactly the same as the experimental values of the masses obtained in Large Hadron Collider (LHC) experiments. Obtaining results, consistent with such well-established experimental data, verifies the model and methods of TDVP.

The conclusion of the K&R article seems to be that TDVP simply can't be correct because it doesn't agree with the mainstream model of particle physics. I, like K&R, was trained in mathematical physics, but I have to reject this argument because it makes mainstream physics seem like a religion. If you don't agree with the physicalist doctrine, you are wrong by definition. This is the kind of thinking that stifles real progress in the scientific understanding of the nature of reality.

In my opinion, *academic specialization* and the division of natural science into separate academic fields, each with their own specialized assumptions, theories, and arcane jargon, is the greatest single barrier to an integrated understanding of

the nature of reality. Science and spirituality are both part of reality and should not be incompatible. I understand why Georges Lemaître[8] (mentioned by K&R on page 144 of their article in *Telicom*) and other thinkers like him in the past, whose interests included both science and theology, avoided integrating their research; doing so could have literally resulted in them losing their heads. Governments and religions organized in the Middle Ages had no compunction about physically enforcing their authority with torture and murder when they were challenged. The time has finally come to reconnect natural science with its metaphysical roots. It is time to expand science to include more than just the tip of the iceberg of reality represented by physical theory.

Most of K&R's criticisms of the math and physics of TDVP are presented in their article in Section 3, which is titled, "Critical Results and Analysis." This section takes bits and pieces of some TDVP derivations out of context and out of the logical order in which they were developed. Because of this, the importance of the need for a quantum calculus is missed.

K&R's arguments contain several misunderstandings and some errors. In the article, we find the claim that "spin, related to quantum phenomena is not mechanical spin; *quantum* spin is a *quantum* property"[9] without any explanation of what is meant by that. This is one of several statements mainstream physicists put forth as if they were self-evident facts, including the statement, "Quantum mechanics does not require any conscious observer."[10] K&R do not offer any proof of this, but simply state that, "This fact is undisputed and well established, comprehensively described and empirically demonstrated in any graduate-level theoretical physics textbook."[11]

K&R are correct that the mainstream physicalist position is that quantum mechanics does not require a conscious observer. But they grossly overstate the case when they say that this belief is undisputed and empirically demonstrated. If one reads the literature on the measurement problem arising from the interaction of the observer with quantum phenomena, and not just the mainstream physicalist opinion, one finds that avoidance of interpretation of empirical evidence suggesting the involvement of the observer is the unstated bias of mainstream physicalists.[12] The result is that the measurement problem is treated totally within the mathematical formulation of the physicalist interpretation of quantum theory. If the problem is approached in a theory-neutral manner, one has to conclude that no interpretation of quantum phenomena can completely avoid the existence of a measurement problem involving the observer.[13] A few mainstream physicists, such

as David Bohm, John Wheeler, Amit Goswami, Fred Alan Wolf, Menas Kafatos, and Henry Stapp have been bold enough to think outside the box of strict physicalist interpretations of the data from quantum experiments like the double-slit and delayed-choice experiments.

The biased position of most mainstream scientists is that the laws governing quantum phenomena are so different from the laws of "classical" physics that we should not bother to think about the possibility that there might be mathematical relationships between them. A common refrain is, "Quantum physics is *weird*. We must just accept that there is no explaining it and go on with practical application of what we know about quantum-scale phenomena, even though it conflicts the laws of macro-scale physics."[14] *In fact, reality is never in conflict with itself; the conflict is between theories*.

Before addressing K&R's analysis of the TDVP derivation of gimmel and the Cabibbo angle, some history of the origin of the party line used by physicalists to avoid dealing with consciousness is in order.[15] The basic dodge is the intellectual smokescreen provided by the belief that some of the physical processes of quantum phenomena are so *strange* that they cannot be compared with, or explained in terms of, "classical" physical concepts. This artificial barrier prevents mainstream scientists from asking why the standard model has massless and mathematical singularity "particles." We can see why and how this wizard-of-Oz curtain was fabricated by examining the thinking of some leading physicists.

3.1 The Einstein-Bohr Debate

In the publicized version of the *Einstein-Bohr debate*,[16] Albert Einstein and Niels Bohr argued about the nature of reality at the quantum scale, which is also what we are talking about here. The argument was over whether reality at the quantum scale is inherently probabilistic, to the degree specified by Heisenberg's uncertainty principle, or completely deterministic. Einstein argued for determinism, and Bohr for probabilism.

The argument centered around what became known as the Einstein-Podolsky-Rosen (EPR) Paradox. Using a well-known quantum phenomenon and applying classical dynamics, the EPR paper produced a clear contradiction of the uncertainty principle. Einstein argued that this implied that quantum theory, as formalized by Bohr, Heisenberg, and Schrödinger, must be *incomplete*. Bohr countered with what became known as the Copenhagen interpretation of quantum

mechanics, which stated that quantum phenomena are not localized until observed or measured, and implied that elementary particles could not be described in classical terms. The exact location and momentum of an elementary particle cannot be known simultaneously, as is the case with macro-scale objects like baseballs or missiles. This interpretation was unacceptable to most mainstream physicists because it implied that, as theoretical physicist John Wheeler put it, *"No phenomenon is a real phenomenon until it is an observed phenomenon."*[17] Most quantum physicists believe that the only way the EPR paradox is avoided is by concluding that quantum phenomena obey rules that have no relationship to the classical laws of physics.

The eventual resolution of the Einstein-Bohr debate, made possible by Bell's Inequality (also known as Bell's Theorem) applied to the EPR experiment, resulted in a consistent demonstration of quantum uncertainty. This result is well known and has been discussed and written about *ad nauseam*; but the point to be made here is that it raises profound questions about the nature of reality and establishes quantum entanglement, a concept that helps to explain the results of quantum experiments like the double-slit and delayed-choice experiments, dealing with electrons, photons, and other elementary particles.

Niels Bohr had some interesting things to say about quantum mechanics that I think may have influenced mainstream physicists regarding quantum weirdness:

- If quantum mechanics hasn't profoundly shocked you, you haven't yet understood it.
- Everything we call real is made of things that cannot be regarded as real.
- It is wrong to think that the task of physics is to find out how Nature is. Physics is only concerned with what we can say about our experience of Nature.[18]

I think these statements unnecessarily limit scientific investigation; but I agree with Bohr when he said:

- Nothing exists until it is measured.
- A physicist is just an atom's way of looking at itself.
- Every description of natural processes must be based on ideas which have been introduced and defined by classical theory.[19]

This last quote tells us that even though some of Bohr's statements may have inspired the attitude that quantum weirdness cannot be explained in terms of classical physical theory, he himself did not believe that!

Richard Feynman, and most experimental particle physicists since, have perpetuated the idea that quantum physics is counter-intuitive and cannot be reconciled with classical physics. The following Feynman quotes are revealing:

- One does not, by knowing all the physical laws as we know them today, immediately obtain an understanding of anything much… The more you see how strangely Nature behaves, the harder it is to make a model that explains how even the simplest phenomena actually work. So theoretical physics has given up on that.[20]
- What I am going to tell you about is what we teach our physics students in the third or fourth year of graduate school... It is my task to convince you not to turn away because you don't understand it. You see, my physics students don't understand it.... That is because I don't understand it. Nobody does.[21]

Niels Bohr was a great physicist; and, in my opinion, Richard Feynman was a great teacher of physics. I choose to call him a *teacher* rather than a professor, *as a compliment*, because there are many professional scientists who haven't the foggiest notion how to teach as well as he did. And I admire his honesty. He never pretended to know more than he did.

4.0 CRITIQUE OF THE CRITICISM

Reading through Sections 3 and 4 of the K&R article, I found that they contain a number of *erroneous statements about TDVP*. I'm not accusing K&R of deliberately misrepresenting TDVP; I think they simply don't understand it. Not everything K&R have said is false, and by weeding out the things that are, we may be able to find some common ground. Most of the erroneous statements are related to a few basic misunderstandings. So, I will try to clarify the basics first, and then address some specific K&R statements.

The basic mathematical physics concepts and principles of TDVP are:

● Energy is quantized in the physical universe. This means that energy only occurs in integer multiples of a minimum unit, an amount that cannot be divided further.

● Mass and energy are equivalent in accordance with the simple equation $E = mc^2$. This means that the mass of physical objects is also quantized, i.e., composed of integer multiples of a minimum amount of mass that cannot be divided further.

● When c is naturalized (as in Planck units) $c^2 = 1$, and $E = mc^2$ becomes $E = m$, which means that both mass and energy can be expressed in integer multiples of a common quantum-equivalence unit.

● Quantized reality *requires* a quantum calculus based on quantum-equivalence units.

● There are three types of variables: variables of extent (dimension), content (substance), and intent (impact and influence including consciousness).

● The quantum-equivalence units of mass and energy (content) become integrated with quantum-equivalence units of spacetime (extent) in dimensional domains of three or more dimensions through the mathematical process of dimensional extrapolation.

● Dimensional extrapolation, the rotation and projection out of an n-dimensional domain into an n+1-dimensional domain, defines all of the integral types of number theory: integers, imaginary numbers, and complex numbers.

● The integrated mass/energy/spacetime quantum-equivalence unit is called the Triadic Rotational Unit of Equivalence (TRUE) and is the basic unit of the quantum calculus, called the Calculus of Dimensional Distinctions.

● Objects composed of elementary particles are also composed of integer multiples of quantum units of mass and energy. This means that, in a quantum calculus, equations describing the combination of two or more elementary particles are Diophantine equations, i.e., equations whose variables are integers. This provides a powerful method for distinguishing between combinations of elementary particles that are stable enough to support organic life and those that

are not.

With these basics in mind, let's address some of K&R's comments. The K&R critique addresses only two aspects of TDVP: (1) The discovery of gimmel, the third form of the substance of reality, and (2) the TDVP derivation of the Cabibbo angle. Most of the errors in the article can be cleared up by addressing the concepts of TDVP in proper order: *First*, the derivation of natural quantum units, *second*, the discovery of gimmel, and *third*, the Cabibbo angle derivation.

4.1 The Need for a Quantum-Equivalence Unit and a Quantum Calculus

We can't solve problems using the same kind of thinking that created them.
– Albert Einstein[22]

This Einstein quote underlines the importance of thinking outside the box of the current paradigm. The problem of paradoxes existing within mainstream science cannot be solved within the current physicalist paradigm. The most important concept that K&R missed is the need for a calculus with measurement units that are derived from the natural quanta of the real world. This failure is clear in their reference to Figure 1, on page 147 of their article: "… the mass values are assumed (by Close and Neppe) to be integers, apparently to be in line with quantum physics. Yet from the data in Figure 1, we can see the quark masses are not integer at all. … The same will, of course, be found in any standard academic textbook on this topic."[23]

The mass values in MeV/c^2 are non-integers with confidence limits, but there are integer values within the ranges of values from the LHC data represented in Figure 1. For example, statistically, the mass of the up quark lies in the range of 2.3 ± 0.7 MeV/c^2, and that includes the integer 2; but the range of quark masses (obtained from statistical evaluations of terabytes of LHC experimental data) do not necessarily suggest integer values nor eliminate them. But these data for quarks, along with the mass of the electron, are actually the raw data I used in the first derivation of natural quantum units for the quantum calculus.

Because we know that mass is quantized, we can naturalize the quark masses to the smallest stable mass (the mass of the electron—the most accurately known quantum mass). The derivation of natural quantum units for TDVP has been published in several papers reviewed by our peers, and on my Transcendental Physics Blog.[24] The derivation involves the conversion of SI units to natural

quantized units. Naturalized units of measurement can be derived in a number of ways, but most physicists are familiar with naturalized Planck units. The process in TDVP is similar, but I think it is important that I include the basics of the derivation here, so anyone can follow the logic and do the math for themselves.

The mass of the electron, 0.511 MeV (note that we can drop the c^2 in natural units, since c = 1), is naturalized to 1, as the base for our quantum calculus units. In the quantized physical world, the actual masses of the quarks and the mass of the electron must be integral multiples of the same minimum quantum-equivalence unit. It only takes a simple calculation to show that 2.044 is the only value in the range of empirical values of the up-quark mass that will produce an integer multiple of the mass of the electron, and 2.044 MeV divided by 0.511MeV equals 4. The same calculation for the down quark yields the naturalized mass of the down quark as 9. Therefore, the true quantum masses of up and down quarks are 4 and 9 electron quantum-equivalence units, respectively.

~~As explained above,~~ Spinning electrons and quarks occupy spherical volumes, so integer quantum-equivalence units must be cubed in any equation representing the combination of elementary particles. If the resulting new object is to be symmetrically stable, it must also be an integral multiple of the quantum-equivalence unit cubed. But Fermat's Last Theorem tells us that the Diophantine equation, $X^3 + Y^3 = Z^3$, has no integer solutions. So, if X and Y represent integer numbers of quantum-equivalence units, then Z cannot be an integer, and therefore Z^3 cannot represent a symmetrically stable combination. But $W^3 + X^3 + Y^3 = Z^3$ does have integer solutions, e.g., $3^3 + 4^3 + 5^3 = 6^3$, explaining why quarks must combine in triples.

4.2 The Discovery of Gimmel: A Simpler Approach to Explaining Subatomic Phenomena

When the solution is simple, God is answering.
—Albert Einstein[25]

Nature follows the rule of parsimony: the *simplest* theory that explains the *most* is *best*. The Ptolemaic geocentric model of the universe, e.g., with cycles and epicycles, explained the observed movements of the known planets at the time of Ptolemy (second century AD); but it was very complex, and it became even more complex every time a new astronomical body was discovered. The heliocentric

solar system model that eventually replaced it was much simpler and explained more.

We are, again, at the same kind of flex point. The clues have been piling up after relativity and quantum mechanics revolutionized our understanding of reality and experiments began to show that something was wrong. Science was becoming more and more complicated. Particle-wave duality was introduced by de Broglie; Planck declared, *"There is no matter as such"*;[26] and Einstein concluded that space has no existence of its own and that reality is a field phenomenon. Resolution of the EPR paradox revealed strange new phenomena like non-locality and quantum entanglement.[27] In addition, particle physics does not work without the existence of objects that are not particles. Some have no mass, and some are dimensionless, violating the very definition of a physical particle.

The standard model holds that *gluons*, defined as vector bosons, with little or no mass, mediate the strong force that holds protons together; but just how they do this is unknown. It is wrapped up in the quantum weirdness of abstract terms called "quantum properties" like spin numbers, "flavors," and "colors."[28] On the other hand, our 2011 discovery that something without mass or energy, i.e., something *non-physical*, has to be present in up quarks and down quarks for stable protons to exist, tells us that there is much more to reality than matter and energy interacting in time and space.[29]

Continuing with the TDVP derivations: As physicists know, there are two up quarks and one down quark in the proton, the most stable combination of elementary particles known. But using the quantum-equivalence unit values of up and down quarks derived above, we see that the combination of two up quarks and one down quark in quantum-equivalence units ($4^3 + 4^3 + 9^3 = Z^3$) does not yield a symmetrically stable combination, because Z^3 equals 64 + 64 + 729, which equals 857; and Z is the cube root of 857, or 9.4986…., which is not an integer. At this point, it took an intuitive leap to realize that the proton would be stable if there were quantum-equivalence units of something, other than mass or energy, that would fill in the structure of the combination of spinning particles to make it stable. The table below shows the solution that was found by a process of iterative computations to satisfy the first solution of the Diophantine equation describing the combination of quarks that make up the proton.

THE PROTON

Particle*	Charge	Mass/Energy	ג	Total TRUE	Total TRUE Cubed
$\mathbf{u}_1$	+ 2	4	2	6	216
$\mathbf{u}_2$	+ 2	4	4	8	512
$\mathbf{d}_1$	- 1	9	1	10	1,000
Total	**+ 3**	**17**	**7**	**24**	**$1728=12^3$**

***** $\mathbf{u}_1$ and $\mathbf{u}_2$ have the same number of TRUE of mass and energy and, therefore, will register as up quarks in the collider data but have different numbers of TRUE units of equivalent volume participating as ג (gimmel) to produce the volumetrically symmetric and, therefore, stable proton.

Continuing with the assessment of K&R's article, note that on page 148, they state, "N&C's detailed calculation method can be found in a blog by Close (but not in any peer-reviewed physics journal articles). In his calculation, the use of a cubic equation ($charge^3 + mass^3 + gimmel^3)^{1/3}$ is really obscure physics…"[30]

However, *no such expression exists in TDVP quantum-equivalence derivations*. As shown above, the equations used in the derivation are Diophantine equations, such as, $W^3 + X^3 + Y^3 = Z^3$, where W, X, Y, and Z are each in integer quantum-equivalence units of mass, energy and gimmel.

As K&R state, "dimension analysis" *is* an excellent tool to help assure that there are no errors in the formulation of an equation.[31] In a dimensional unit analysis, both sides of the equation should reduce to the same basic units. Of course, adding coulombs, kilograms, and quantum-equivalence units of gimmel would make no sense at all, *but that is never done in TDVP derivations*. All of the terms in TDVP equations are in quantum-equivalence units. **Note:** When scalar quantum-equivalence units are raised to any multiple of the third power, they become volumetric and are called Triadic Rotational Units of Equivalence (TRUE).[32]

K&R appear to have missed the most basic and critical step of TDVP analysis, i.e., the conversion of SI units to quantum-equivalence units. For example, the article stated, "Close calculated negative numbers for gimmel, but then continued with some number juggling (with some arbitrary integers for gimmel), until the whole

thing seemed to work again, which is not an established, sound method in physics."[33] This shows, to their credit, that they did read some of the TDVP mathematical derivations; but, unfortunately, they didn't understand them. The negative calculated values were simply part of the iterative computation used to establish the minimum possible *integral* solution. None of the values used in determining the amount of gimmel in naturalized quantum-equivalence units in each quark were "arbitrary." And physicists should be familiar with the method of using best estimates as the starting point to iteratively zero in on the values that actually satisfy an equation. This method, called *iterative computation*, is routinely and extensively used in applied physics and engineering.

The discovery that the greater part of reality—the part that assures that the atomic structures supporting organic life forms are the most stable *are non-physical*—is revolutionary.[34] When the LHC masses of up and down quarks are converted to integer multiples of natural quantum units, we find that protons (composed of two up quarks of four quantum-equivalence units each and one down quark of nine quantum-equivalence units) would be asymmetric and rotationally unstable without a specific number of quantum-equivalence units of something nonphysical that cannot be measured as mass or energy.[35]

The existence of this third form of content, which we call *gimmel*, makes the physical structure of the proton larger and symmetrically stable, so that classical relativistic dynamics explains the weak and strong forces, and the exact amount of mass measured experimentally for the proton is determined mathematically from theory.[36] TDVP may even be able to explain how and why fermions spin. Clearly, with gimmel, TDVP explains more, and in simpler terms, than the Standard Model. It also explains why quarks only combine in triples, why fermions have ½ intrinsic spin, and even why there is something, rather than nothing.[37] Quite independently, Saul-Paul Sirag also showed, prior to N&C, that fermion groups come in three.[38]

TDVP is simple, but it is hard for scientists trained in the physicalist philosophy of the mainstream educational system to comprehend, because it expands scientific investigation beyond the limited range of energies revealed by the physical senses and physical extensions, by including consciousness in the equations and describing the combination of quarks to form stable protons and other stable structures.[39]

4.3 The TDVP Derivation of the Cabibbo Angle

One of the earliest challenges to the TDVP model came from a Johns Hopkins astronomer. He said that if we could explain the Cabibbo angle, he would take TDVP seriously. The value of the angle is about 13.04 degrees (by statistical analysis of quark decay data in high-energy LHC experiments), but it cannot be derived from standard particle physics theory. Our response, at the time, was that TDVP was a metaparadigm; but it might be something we could investigate later. But, because of the Johns Hopkins astronomer's challenge, I began to think about it and came to believe that the value of the Cabibbo angle *could* be derived by applying the math of TDVP to the dynamics of the rotation of quarks and electrons. The basis of my optimism was the fact that I had already explained the ½ intrinsic spin of fermions by simulating an electron spinning in 3, 6, or 9 planes, which suggested that this odd angle might also be the result of vortical rotation, i.e., spin in multiple dimensions.

In 1964, I began my first graduate program in theoretical physics. This was the same year Murray Gell-Mann introduced the idea that protons and neutrons, thought to be the ultimate building blocks of atomic nuclei, were actually composed of yet smaller components he called *quarks*. The existence of these sub-proton particles was confirmed experimentally in the Stanford linear accelerator in 1968; and in 1969, Gell-Mann received the Nobel Prize in Physics for describing the quark family of elementary particles. Importantly, in 1963, just one year prior to Gell-Mann's introduction of quarks, the Italian physicist Nicola Cabibbo identified what became known as the Cabibbo angle (θC).

Gell-Mann's quark theory was unknown to Nicola Cabibbo in 1963, but later, θC became known as the quark-mixing angle, a feature reflecting the probability of strange quarks and down quarks decaying to become up quarks. The Cabibbo angle is now recognized as part of the Standard Model of particle physics, the Cabibbo–Kobayashi–Maskawa matrix, or CKM matrix. The CKM matrix is a unitary matrix containing information about the strength of the flavor-changing, weak-interaction force among quarks. It specifies the asymmetry of the quantum states of quarks and is relevant to the understanding of CP violation in the three generations of quarks. So, what, actually, is θC? It is the angle of rotation of the *eigenvector* of the matrix describing the inertial mass of a strange or down quark decaying to become an up quark under the influence of the weak interaction force between electrons and protons.

What are eigenvectors? Over 200 years ago, the Swiss mathematician/physicist Leonhard Euler noted the importance of the principal axis of rotation in rotating

rigid bodies; and one of his contemporaries, the French mathematician Joseph-Luis Lagrange, identified the principal axes of rotation as the characteristic vector of the matrix describing the moments of inertia of a rotating object. But the term *eigenvector* may be traced back even farther, to the German physicist Hermann von Helmholtz. "Eigen" is the verb "to own" in German, and is also used to mean something's "own characteristic," or something specific or peculiar to a person or object. It was natural to call the characteristic vector of a matrix the *eigenvector* of the matrix.

Now, let's look at another passage from the K&R article: "In his derivation, Close took a *classical* spinning object (which is incorrect for fermions because spin is quantified) and let it spin/rotate with the speed of light (which is incorrect) to generate the magnetic influence it should 'spin' faster than the speed of light. However, it is not mechanical spin; *quantum* spin is a *quantum* property. Close then calculates a 'Lorentz contraction,' which may look impressive to non-physicists because it happens to be about 1/9 of the experimental value of the Cabibbo angle…"[40]

In fact, the spinning object was an electron, the result *is* the same whether spin is "classical" or a "quantum property," and the quantification of spin results from the quantification of energy. Furthermore, the factor 1/9 does not enter into the derivation. In the derivation of quantum-equivalence units, I determined that the angular velocity of a spinning elementary object would reach light speed before its diameter could shrink to zero. That means that the angular velocity at the minimum quantum volume can be calculated, and it is calculated to be 2.9974×10^8 m/sec, a large fraction of the speed of light. Applying the Lorentz contraction equation, the contraction for each of eight dimensional rotations is calculated to be a factor of 0.01810, or 1.629 degrees.[41] For an observer, one axis of rotation is stationary as the reference frame, so only 8 of the 9 dimensions in a 9D reality are rotating with respect to the observer's inertial frame of reference. Consequently, for each rotation from one dimension to the next, 1.629 is multiplied by 8, *not 9 as implied by K&R*, yielding 13.032 degrees, in agreement with θC derived from experimental data for the Cabibbo angle (13.04±0.01 degrees).[42]

While working on a 6D model, Nobel Prize-winning physicist Wolfgang Pauli, who was held in high regard by many other physicists (including Albert Einstein), also discovered that the angular velocity of a spinning electron would reach light speed before its diameter shrinks to zero; but he didn't publish it because, as he said, it "leads to some rather unphysical shadow particles."[43] It is also noteworthy

that Pauli thought quantum physics would eventually lead to the explanation of spiritual phenomena.[44]

Reading K&R's discussion of the Cabibbo angle reveals another deep misunderstanding: They appear to think that TDVP contradicts and seeks to replace quantum field theory (QFT). *It does not*. QFT describes the structure of the family of quarks revealed by LHC experiments; TDVP explains *why* there *is* a family of quarks. QCD, QED, and QFT are primarily descriptive; TDVP is both descriptive and explanatory.

One of the things K&R got right was the statement that "… because N&C include consciousness in particle physics, we expect the academic community at large will likely not give much attention to TDVP."[45] Achieving publication of TDVP derivations in mainstream math and physics journals proved to be very difficult because of the interdisciplinary nature of TDVP. We have had ~~negative~~ responses from editors of mainstream journals, such as citing reluctance to publish material outside the journal discipline and the unavailability of peer reviewers with the appropriate interdisciplinary expertise.

How does a concept outside the mainstream paradigm get published in mainstream journals dominated by editors who share the physicalist philosophical belief? We thought explaining phenomena *not* explained by the mainstream paradigm might get their attention; but apparently that does not work if the taboo word "consciousness" is mentioned. The idea that consciousness is fundamental is rejected as pseudoscience by physicalists. The sad part is that they don't seem to realize that their position is unscientific.

K&R state on page 151 of their article that both of the following statements are unscientific and unfalsifiable: "A) The Universe cannot exist without consciousness (spiritualist)," and "B) The Universe could exist without consciousness (materialist)."[46] TDVP actually falsifies B and proves that A is true. It does this simply by showing that the most stable structure in the universe, the proton, cannot be stable without the existence of gimmel, enforcing the logic of consciousness.[47] This makes "physicalism" pseudoscience and TDVP a real paradigm shift.

5.0 CONCLUSION

The article by K&R is primarily a defense of physicalist theory. It appears that the authors believe TDVP can't be correct because it includes consciousness as an integral part of reality, conflicting with the dogma of mainstream physics. They misconstrue TDVP as dismissing QFT, QCD, and QED, which are *descriptions* of subatomic structure, while, in fact, TDVP *explains* the phenomena that they describe.

The K&R article contains a number of errors not addressed above because *Telicom*'s limitation on article size prohibits analyzing them all here. The most important have been addressed, but to be effectively more complete, I will briefly address a couple more.

On page 147, K&R state, "… our critical evaluation, as described above, of their derivation of nine dimensions is a strong refutation, which, in fact, was published already in a brief form, years ago, on the ISPE Ning forum."[48] *Refutation* requires a rigorous mathematical or logical disproof, not just comparison with the standard model. K&R have presented no convincing mathematical or logical argument, just the opinion that our demonstration that reality has nine dimensions "is unsubstantiated because the derivation with a Lorentz contraction of a classical spinning fermion has nothing to do with the real 'Cabibbo angle,' which deals with electro-weak interaction."[49] But, in TDVP, the electro-weak interaction is shown to be a result of the dynamics of spinning quarks and electrons. Spin, whether classical or non-classical, results in angular momentum, the real indicator of rotation. QFT tells us that fermions have quantified angular momentum, but it does not tell us why. TDVP *does*.

Finally, K&R express the opinion that "religion and science cannot mix. And they probably will never be reconciled."[50] Religion is not addressed in TDVP, but spiritual phenomena are, because they are part of the real world; and we are not alone in thinking that science should investigate them.

NOTES

1. Vernon M. Neppe and Edward R. Close, *Reality Begins with Consciousness: A Paradigm Shift that Works* 1st ed. (Seattle, WA: Brainvoyage.com, 2012).

2. Jef Kaan and Simon O. Rebsdorf, "An Evaluation of TDVP," *Telicom* 30, no. 5 (Oct-Dec 2018).

3. Alexander Roberts, James Donaldson, and A. Cleveland Coxe, eds, Origin (230 AD) De Principalis, Frederick Crombie, trans., from *Ante-Nicene Fathers* Vol. 4 (Buffalo, NY: Christian Literature Publishing, 1885).

4. Peter Andreas, "A Tract Against Origen, Proposing Nine Anathemas Against 'On First Principles,' Origen's Chief Theological Work," quoted in *Jenseits von Einstein, die Suche der Schicksalsformel* (Econ Verlag, Ullstein Buchverlag, Germany, 1978).

5. Vernon M. Neppe and Edward R. Close, "Applying Consciousness, Infinity and Dimensionality Creating a Paradigm Shift: Introducing the Triadic Dimensional Distinction Vortical Paradigm (TDVP)," *Neuroquantology* 9, no. 3 (2011): 375-392.

6. Kaan and Rebsdorf, 144.

7. Edward R. Close, *Transcendental Physics* (Bloomington, IN: I-Universe, 2000).

8. Georges Lemaître, "The Beginning of the World from the Point of View of Quantum Theory," *Nature* 127, no. 3210 (1931): 706.

> Georges Lemaître, *The Primeval Atom: An Essay on Cosmogony* (New York: D. Van Nostrand, 1946).

9. Kaan and Rebsdorf, 147.

10. Herman Wimmel, *Quantum Physics and Observed Reality: A Critical Interpretation of Quantum Mechanics* (Singapore: World Scientific, 1992).

11. Kaan and Rebsdorf, 150.

12. Bruce Rosenblum and Fred Kuttner, "The Observer in the Quantum Experiment," *Foundations of Physics* 32, no. 8 (Aug 2002): 1273-1293, https://link.springer.com/article/10.1023/A:1019723420678.

13. Massimiliano Sassoli de Bianchi, "Quantum Measurements are Physical Processes. Comment on 'Consciousness and the Double-Slit Interference Pattern: Six Experiments', by Dean Radin et al.," *Physics Essays* 25, no. 2 (2012), Cornell University Library, *http://arxiv.org/abs/1207.0804*, 2012.

Shan Yu and Danko Nikolic, "Quantum Mechanics Needs No Consciousness," *Annalen der Physik* 523, no. 11 (Nov 2011): 931-938, https://www.researchgate.net/publication/227983252_Quantum_mechanics_needs_no_consciousness.

14. Richard Feynman, *The Feynman Lectures on Physics* (Boston, MA: Addison-Wesley, 1965).

15. Shan Yu and Danko Nikolic.

16. Albert Einstein, Boris Podolsky, and Nathan Rosen, "Can Quantum-Mechanical Description of Physical Reality be Considered Complete?" *Physics Review* 47, no. 10 (May 1935): 777-780.

17. John A. Wheeler, AZ Quotes, https://www.azquote.com/quote/312736.

18. Neils Bohr, BrainyQuote, https://www.brainyquote.com/quotes/niels_bohr_390838.

19. Ibid.

20. Richard Feynman, *QED: The Strange Theory of Light and Matter*, (Princeton, NJ: Princeton University Press, 1985).

21. Ibid.

22. Albert Einstein, BrainyQuote, https://www.brainyquote.com/quotes/albert_einstein_385842.

23. Kaan and Rebsdorf, 147.

24. Edward R. Close and Vernon M. Neppe, "Putting Consciousness into the Equations of Science: The Third Form of Reality (Gimmel) and the 'TRUE' Units (Triadic Rotational Units of Equivalence) of Quantum Measurement," *IQ Nexus Journal* 7, no. 4 (2015): 7-119.

Edward R. Close, Transcendental Physics blog, https://www.erclosetphysics.com/search?q=Quantum+equivalence+unit.

Edward R. Close and Vernon M. Neppe, "Speculations on the 'God Matrix': The Third Form of Reality (Gimmel) and the Refutation of Materialism and on Gluons," *World Institute for Scientific Exploration (WISE) Journal* 4, no. 4 (2015): 3-30.

Edward R. Close and Vernon M. Neppe, "The TRUE Unit: Triadic Rotational Units of Equivalence (TRUE) and the Third Form of Reality: Gimmel; Applying the Conveyance Equation (Part 12)," *IQ Nexus Journal* 7, no. 4 (2015): 55-65.

Edward R. Close and Vernon M. Neppe, "Introductory Summary Perspective on TRUE and Gimmel (Part 1) in Putting Consciousness into the Equations of Science: The Third Form of Reality (Gimmel) and the 'TRUE' Units (Triadic Rotational Units of Equivalence) of Quantum Measurement," *IQ Nexus Journal* 7, no. 4 (2015): 8-15.

25. Albert Einstein, BrainyQuote, https://www.brainyquote.com/quotes/albert_einstein_148826.

26. Max Planck, Web Notepad: Everything noticed and interesting, http://miltmatters.blogspot.com/2008/09/quote-max-planck-there-is-no-matter-as.html.

27. Vernon M. Neppe and Edward R. Close, "Relative Non-Locality—Key Features in Consciousness Research (Seven-Part Series)," *Journal of Consciousness Exploration and Research* 6, no. 2 (2015): 90-139.

Vernon M. Neppe and Edward R. Close, "The Concept of Relative Non-Locality: Theoretical Implications in Consciousness Research," *Explore: The Journal of Science and Healing* 11, no. 2: 102-108, https://www.explorejournal.com/article/S1550-8307(14)00233-X/fulltext.

Andrew Zimmerman Jones, "Quantum Entanglements in Physics..."

Vernon M. Neppe and Edward R. Close, "The Physics of Psi: The Role of Entanglement," *Dynamic International Journal of Exceptional Creative Achievement* 1207 (2012): 2291-2303.

28. X. Zheng, K. Aniol et al., "Precision Measurement of the Neutron Spin Asymmetry A(1)(n) and Spin-Flavor Decomposition in the Valence Quark Region, *Physical Review Letters* 92, no,. 1 (2004).

Vernon M. Neppe and Edward R. Close, "The Triadic Dimensional Distinction Vortical Paradigm (TDVP): The Nine-Dimensional Finite Spin Metaparadigm Embedded in the Infinite," *Dynamic International Journal of Exceptional Creative Achievement* 1401 (2014): 4001-4041.

Vernon M. Neppe and Edward R. Close, "The Eighth Conundrum: Angular Momentum and Intrinsic Electron Spin," *IQ Nexus Journal* 7, no. 2 (2015): 44-45.

29. Neppe and Close, *Reality Begins with Consciousness*.

Vernon M. Neppe and Edward R. Close, "Applying Consciousness."

Vernon M. Neppe and Edward R. Close, "Putting Consciousness into the Equations of Science."

Edward R. Close and Vernon M. Neppe, "Speculations on the "God matrix": The third form of reality (gimmel) and the refutation of materialism and on gluons. *World Institute for Scientific Exploration (WISE) Journal (*2015). **4** no. 4: p. 3-30."

Vernon M. Neppe and Edward R. Close, "Why TRUE Units Have To Be Correct: The Mass in the Proton: Re-Affirming the Truth of Triadic Rotational Units of Equivalence, Chapter 6," *IQ Nexus Journal* 8, no. 4 (2016): 70-96.

Edward R. Close and Vernon M. Neppe, "Derivation and Application of TRUE Quantum Calculus for the Analysis of Quantized Reality, Including Empirically Verifiable New Approaches to Mass, Neutrons, Protons, Law of Conservation of Gimmel and TRUE, TDVP and Deuterium," unpublished manuscript, 2018.

30. Kaan and Rebsdorf, 148.

31. Ibid.

32. Edward R. Close and Vernon M. Neppe, "Putting Consciousness into the Equations of Science."

33. Kaan and Rebsdorf, 148.

34. Neppe and Close, "Applying Consciousness."

35. Edward R. Close and Vernon M. Neppe, "Putting Consciousness into the Equations of Science."

> Edward R. Close and Vernon M. Neppe, "Introductory Summary Perspective on TRUE and Gimmel (Part 1)."

36. Edward R. Close and Vernon M. Neppe, "Putting Consciousness into the Equations of Science."

Edward R. Close and Vernon M. Neppe, "The TRUE unit: triadic rotational units of equivalence (TRUE) and the third form of reality: gimmel; applying the conveyance equation (Part 12). *IQNexus Journal*, (2015) 7, no. 4, p. 55-65."

> Edward R. Close and Vernon M. Neppe, "Introductory summary perspective on TRUE and gimmel (Part 1) in Putting consciousness into the equations of science: the third form of reality (gimmel) and the "TRUE" units (Triadic Rotational Units of Equivalence) of quantum measurement *IQNexus Journal (*2015). 7, no 4: p. 8-15."

> Edward R. Close and Vernon M. Neppe, "Derivation and application of TRUE quantum calculus for the analysis of quantized reality, including empirically verifiable new approaches to mass, neutrons, protons, law of conservation of gimmel and TRUE, TDVP and Deuterium. (2018) Unpublished manuscript.

> Edward R. Close and Vernon M. Neppe, "Understanding TRUE Units and Gimmel as Part of TDVP: Chapter 7," *IQ Nexus Journal* 8, no. 4 (2016): 97-106.

Vernon M. Neppe, "Understanding Gimmel with Vernon Neppe," YouTube, New Thinking Allowed Foundation, June 8, 2018, https://www.youtube.com/watch?v=RhV96ShslU4.

Vernon M. Neppe and Edward R. Close, "Wondrous Gimmel: Section 8 in Integrating Spirituality into Science: Applying the Neppe-Close Triadic Dimensional Vortical Paradigm (TDVP)," *IQ Nexus Journal* 10, no. 2 (2018): 42-47.

37. Edward R. Close and Vernon M. Neppe, "Translating Fifteen Mysteries of the Universe by Applying a Nine Dimensional Spinning Model of Finite Reality: A Perspective, The Standard Model and TDVP, Part 1," *Neuroquantology* 13, no. 2 (2015): 205-217.

Edward R. Close and Vernon M. Neppe, "The Nine-Dimensional Finite Spin Model (Part 14)," *IQ Nexus Journal* 7, no. 4 (2015): 70.

Vernon M. Neppe and Edward R. Close, "The Cabibbo Mixing Angle (CMA) Derivation: Is our Mathematical Derivation of the Cabibbo Spin Mixing Angle (CSMA) Equivalent?" *IQ Nexus Journal* 7, no. 4 (2015): 120-128.

38. Saul-Paul Sirag, "Why There Are Three Fermion Families," *Bulletin of the American Physics Society* 27, no. 1 (1982): 31.

39. Edward R. Close and Vernon M. Neppe, "EPIC Consciousness: A Pertinent New Unification of an Important Concept," *Journal of Psychology and Clinical Psychiatry* 1, no. 6 (2014): 1-14.

Edward R. Close and Vernon M. Neppe, "*Space, Time, and Consciousness: The Tethered Triad* (Seattle: Brainvoyage.com, 2018) unpublished manuscript.

40. Kaan and Rebsdorf, 147.

41. Hendrik A. Lorentz, "The Relative Motion of the Earth and the Aether," *Zittingsverlag Akad. V. Wet* 1 (1892): 74-79.

A. Minkowski, H. Lorentz, A. Einstein, and H. Weyl, *The Principle of Relativity: A Collection of Original Memoirs* (Mineola, NY: Dover, 1952).

42. Edward R. Close and Vernon M. Neppe, "The Cabibbo Mixing Angle and Other Particle Physics Paradoxes Solved by Applying the TDVP Multidimensional Spin Model," *IQ Nexus Journal* 14, no. 1 (2014), 13-50.

Edward R. Close and Vernon M. Neppe, "The Sixth Conundrum: Theoretical Knowledge on Deriving the Cabibbo Angle," *IQ Nexus Journal* 7, no. 2 (2015): 39-40.

Edward R. Close and Vernon M. Neppe, "The Seventh Conundrum: The Mathematical Derivation of the Cabibbo Mixing Angle in Fermions," *IQ Nexus Journal* 7, no. 2 (2015): 41-43.

H. Fritzsch, "Calculating the Cabibbo Angle," *Physics Letters B* 70, no. 4 (Oct 1977): 436-440.

I. S. Hughes, "Cabibbo Mixing," in *Elementary Particles* 3rd ed. (Cambridge, England: Cambridge University Press, 1991), 242-243.

William F. Palmer, "Cabibbo Angle and Rotation Projection," *Physical Review D* 8, no. 4 (1973): 1156-1159.

Frank Reifler and Randall Morris, "Prediction of the Cabibbo Angle in the Vector Model for Electroweak Interactions," *Journal of Mathematical Physics* 26, no. 8 (1985): 2059-2066.

G. C. Yang, H. C. Liu, and L. F. Luo, "A Derivation of the Cabibbo Angle and Quark-Lepton Masses from a Composite Model," *Lettere Al Nuovo Cimento* 37, no. 3 (May 1983): 111-115.

43. N. Straumann, "On Pauli's Invention of Non-Abelian Kaluza-Klein Theory in 1953," Cornell University Library (Dec 2000), arXiv:gr-qc/0012054.

44. Charles P. Enz, *No Time to be Brief: A Scientific Biography of Wolfgang Pauli* (New York: Oxford University Press, 2002).

45. Kaan and Rebsdorf, 143.

46. Kaan and Rebsdorf, 151.

47. Edward R. Close and Vernon M. Neppe."Relative non-locality - key features in consciousness research (seven-part series)." *Journal of Consciousness Exploration and Research* (2015). 6, no. 2: 90-139.

48. Kaan and Rebsdorf, 147.

49. Ibid.

50. Kaan and Rebsdorf, 153.