


1@0 timespace resolving infinitesimal calculus *chimeras*

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Abstract: Here Temporal Mechanics and its associated zero-dimensional number theory ask if there is a root cause to all the issues in contemporary physics, whether mathematical, philosophical, a combination, or something else, issues regarded here as chimeras. Some of these chimeras are proposed to include dark energy, dark matter, quantum gravity, wormholes, to name a few. Specifically, here shall be examined the current basis of physics' own number theory utilities that result in these chimeras, and why physics has been unable to link flat and curved spacetime, namely why physics has failed to reconcile QFT with GR, and what the implications are for physics by its proposed phenomenal promises of those theories. A number theory solution to these chimeras and associated number theory processes is derived as 1@0 timespace describing a universal frame of reference upholding the known limit of c and its features of relativity, thence describing a new model for quantum mechanics and gravity in the same number theory context, both compatible with all known findings of EM and gravity in physics research.

Keywords: 1@0 timespace; temporal mechanics; zero-dimensional; zero dimension; zero-point; Plato; theory of forms; universals; Plato's cave; infinitesimal calculus; chimera; quantum field theory; general relativity; dark energy; dark matter; back hole; time travel; universal frame of reference

1. Introduction

There is no disputing the utility and fundamental importance of modern physics in our everyday lives. Yet physics faces as many challenges as its successes as we stare into the void of space in reaching for the stars while also attempting to understand the nature of the elementary particles. Is it possible to refine away the challenges in physics to take physics up to new levels of performance? Would such be a paradigm shift, and if so, *how* given how formalized the discipline of physics has become?

Here the work of Temporal Mechanics^{1,2} and its associated zero-dimensional number theory (TM-0D) examine its fundamental mathematical code in comparison to the mathematical code of contemporary physics to thence compare the findings of each as to which has the greater *demonstratable qualities* and the least *no shows*³.

As shall be highlighted, physics' core number theories describe the atomic scale with flat spacetime and the astronomical scale with curved spacetime. Yet flat and curved spacetime do not fit with each other, as though such represents an almost absurd tact in itself for physics if not for granting itself the fantastical licence to do so. This paper examines if there are there any inconsistencies to these number theory licencing processes in the number theory executions for quantum field theory (QFT) and general relativity (GR), and if those licencing processes result in absurdities, here identified as "*no shows*", as *chimeras*⁴, as ideas in physics that only exist in theory and have yet to be discovered in any laboratory experiment.

In achieving such, this paper is segmented in the following manner:

1. Introduction
2. On *Plato's cave*
3. Physics modelling
4. Infinitesimal calculus
5. Renormalization licences
6. Renormalization chimeras
7. *That's just the way it is done*
8. The ABC TM-0D number theory
9. The universal frame of reference (UFR)
10. The ABC TM-0D number theory as *1@0 timespace*
11. Conclusion

Specifically, this paper will highlight if any theoretic flaws in physics can be identified in examining the physics' own theoretic design flaws as:

- (i) A fundamental oversight of what a *universal* concept is.
- (ii) A *fudging*⁵ tendency in the form of number theory renormalization processes.
- (iii) A desire to join the dots between different types of *renormalized* equations in using simple/linear equations relationships.

¹The current work of 61 papers detailing a new mathematical approach to the dimensions of time and space as zero-dimensional logic, see <https://www.xemdir.com/>.

²[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25][26][27][28][29][30][31][32][33][34][35][36][37][38][39][40][41][42][43][44][45][46][47][48][49][50][51][52][53][54][55][56][57][58][59][60][61].

³ Ideas that cannot be verified/proven, here termed as *chimeras*.

⁴ Something that exists only in the imagination and is not possible in reality [62].

⁵ Merriam Webster: *to devise as a substitute, to exceed the proper bounds or limits of something* [63].

- (iv) An overarching quest for pre-ordained *unicorn*⁶ phenomena.

Here, this paper shall demonstrate that the key problem with physics is a combination of (i)-(iv). Issues (i)-(iv) are quite the trend in physics today among both professional and amateur physicists who tend to link primary physics equations of a variety of phenomena by using simple multiplication/division relationships between those equations without considering the renormalization processes gone into those primary equations in the first place. The more troubling feature is that those proponents of those proposed new equations are more likely than not unaware of what a *renormalization* process is and how renormalization processes have already been used in the current set of accepted and taught physics equations.

In identifying such, demonstrated here is why number theory needs to be *properly* universally based in being exact with what is observed of the here and now (A)⁷, using a number theory that is consistent and not fudged⁸ (B)⁹, as a combination of which (A)-(B) must arrive at invariant equations properly explaining phenomena with no bizarre requirements, and thus no invariances or proposals of phenomena not able to be demonstrated in the laboratory *time and time again* (C)¹⁰.

The fundamental question being asked here is if physics has the capacity to check itself, to consider the strength of its number theories and the results it is supplying, and if not, are there factors unwittingly related to physics or something else as the cause of its chimeras. The thinking is that no one likes worthless pursuits, so the results here should not be terribly upsetting yet offer better promise for any next events in physics discovery and utility.

2. On Plato's cave

Plato's allegory of the cave as presented in Plato's *Republic*¹¹ asks how well we understand reality as a process of reason compared to mere basic if not inherently thoughtless observation. Here, Plato presents the idea of a people chained in a cave facing a physical mass-based blank wall upon which shadows are projected from objects passing in front of a fire behind them by which names are given to these shadows as how those in this cave describe and understand their physical reality.

The insinuation here by Plato is that the shadows on the cave wall as the prisoners' reality is a far from ideal, far from accurate, representation of the real world. Here, Plato suggests that the

⁶ A mythical horse.

⁷ See point (v) ahead

⁸ Other terms that can be used include *hedged*, *stretched*, *scrubbed*, *hashed*, and so on, anything that changes the pure number theory to *better resemble* a description for physical phenomena as a basic process of renormalization.

⁹ See point (vi) ahead

¹⁰ See point (vii) ahead.

¹¹ Plato's *Republic* (514a–520a, Book VII) [64].

shadows are the menagerie of images that we normally perceive through sensation alone, while the objects beyond the cave under the sun are the metaphor for the true forms of objects that we can only perceive through reason (universal reason of time and space).

In Plato's formulation of *true science*¹², there is firstly natural science (C), thence deductive mathematics, geometry, and logic (B), and finally the theory of forms¹³ (A). It is the theory of forms that Plato is suggesting that is lacked for those stuck in the cave of shadows. It is interesting how this formulation generally encompasses the modern approach to a pan-science, namely as a *natural science*, *formal science*, and *social science*, here the idea of a social science being a theory of forms by proxy. The TM-0D system theory presented this process in paper 60 as follows¹⁴:

- (v) The study of *our sentience* as psychology, knowing those sentient limitations through empirical analysis, what basically is/is-not, true/false, etc. This is considered as a social science, say (A).
- (vi) The study of *how we study* as mathematics and logic. This is considered as a formal science, say (B).
- (vii) Describing the physical world through empirical analysis with the aim of predicting its features via the science of physical matter. This is considered as a natural science, say (C).

Of note is how Plato's *theory of forms*, considered as *Platonic Idealism*, presents the idea that the physical world despite being physical is **not** as real or true as the proposed "forms" underlying the physicality of reality, "forms" as being a type of *fundamental reason* underlying reality itself (A). Here, Plato proposes that *forms* as *ideas* are the *non-physical, timeless, absolute, and unchangeable* essences of all things of which objects and matter in the physical world are merely imitations. Of further note is that the writings of Pythagoras¹⁵ developed a similar theory earlier than Plato in though specifically proposing that the world is entirely composed of numbers.

Fundamentally, Plato's *theory of forms* is widely considered to be a classical solution to the problem of universals¹⁶, an ancient question from metaphysics that has inspired a range of philosophical topics and disputes. Some of these topics/disputes include, "*should the properties objects have in common such as color and shape be considered to exist beyond those objects? And if a property exists separately from objects, what is the nature of that existence?*" There, *universals* are considered as qualities or relations found in two or more objects/entities. Thus, many properties can be universal, and usually these are encompassed by how languages are structured to communicate the existence of any such objects/entities. Thus, philosophers agree that

¹² Plato's sciences and mathematics [65].

¹³ Platonic Idealism; Theory of forms [66].

¹⁴ [60]: p5-10, fig2-5.

¹⁵ *The writings of Pythagoras* [67].

¹⁶ *The problem of universals* [68].

human beings can talk and think about universals, but whether universals exist *beyond mere thought and speech* is a subject of debate.

In all, Plato's insinuation is that the real *universal* for those in the cave became the formless wall that the images are projected upon, and thus as a formless wall *the most basic idea of mass itself*. Indeed, this is no coincidence given the classical sciences are built on the knowledge of the basic primitive talent of counting with small pebbles, namely where the word calculus gets its name from, small pebbles¹⁷. Yet, the fundamental insinuation by Plato is that the cave wall is not the ideal *universal*, not the ideal *theory of forms* description for reality. The quest there of course for a type of natural logic is resolving Plato's cave in finding the right words, the right description, the right reasoning, for a more ideal theory of forms, and thus ultimately a natural logic that may not just be able to describe with words yet as Pythagoras considers with numbers also.

3. Physics modelling

If physics can be summarized in a nutshell *from the time of Plato*, physics takes the problem of *universals* and the *theory of forms* to the basic concept of mass, hence the quest to find the absolute indivisible particle underlying all things in using infinitesimal calculus. Simply, physics uses the cave wall as the basis for its *theory of forms*, as its *universal*. All the steps in physics represent this theme, theory merely keeping up with what can be tested with research. Physics though asks what qualities, *what forms*, exist with mass such as charge or energy that thence can describe how particles with similar qualities relate with each other.

The language of this physics process is in the form of mathematical models and associated abstractions of physical phenomena to explain what has happened, what is happening, and more than likely must happen with physical phenomena if indeed the laws of physics are fixed, as much as reality does not collapse in any moment suggests such to be so. *Experimental physics* thence uses experimental tools to test those models to become a bona-fide physical theory.

Clearly one would like their mathematics to be precise and not fudged regarding how the proofs are constructed and described. Yet can number theory be fudged to fit physical reality. Are there allowable number theory licenses in physics where number theory fudging does occur, and in what instances? One would think if a physical law can be described with numbers and equations that are fixed, then generally there should be no fudging of number theory in play describing physical phenomena, yet has physics stayed on those tram lines in this modern era?

Although the quality of a physical theory is judged on its ability to make new predictions verified by new observation, the idea of a pure number theory in alliance with a pure physical theory has escaped physics theory modelling simply because physics as a discipline is still in the process of gathering all the possible bits of data, of phenomena, that need to be considered for the complete construction of a pan-number theory. Yet, the possibility exists that enough data is already available for that pan number theory to be constructed. The question is how this is or can be flagged.

¹⁷ See section 4.

In the absence of this universal number theory, there is still a lack of cohesion between all the various branches of physics, most notably GR and QFT, owing to their conflicting number theories and absence of compatibility there. Commonly, the quest for a theory of all things assumes everything is connected via the one mathematical theorem, yet such is not how the state of the art stands in physics today.

The question asked here is if such is the case by the omission of a proper *universal* idea that can carry a homogeneous number theory from the theoretic outset.

In its quest for further and further processes of identifying the nature of the tiniest particle, the new age in physics realized the atom at the turn into the 20th century, and there the idea of an electron jumping between the proposed electron shells giving off packages of energy that behaved like a particle and a wave was the great initial discovery. From there, all theories sought to measure physical matter on the number theory basis describing these packages of energy in the form of that number theory describing such. In fact, all of modern physics according to its aetiology could be considered being derived from the basis of examining the behaviour of the electron as a part of the atom, and how such may or may not represent a fundamental basis for all physical phenomena and thence field force activity.

Core therefore in this theorizing and associated mathematical description process is the basis for the behaviour of light in space as described by QFT, namely the mechanics of light/EM, primarily shaped by the Schrodinger equation¹⁸. This equation is a temporally linear equation governing the wave function of a quantum-mechanical system as the quantum counterpart of Newton's second law in classical mechanics. There, given a set of known initial conditions, Newton's second law mathematically predicts what path a given physical system will take over time. The Schrödinger equation gives the evolution over time of a wave function, the quantum-mechanical characterization of an isolated physical system. The equation was postulated by Schrödinger based on a postulate of Louis de Broglie that all matter has an associated matter wave, and thus the cave-universal still being in play, even for light.

Yet the uncertainty principle as presented by Heisenberg¹⁹ based on consistently observed results using EM showed that there is a limit to the precision with which certain pairs of physical properties, such as position and momentum, can be simultaneously known by EM mechanisms of measurement. In other words, the more accurately one property is measured, the less accurately the other property can be known, an issue considered to be intrinsic to the nature of EM and thence its particle/mass-like structure.

This fact alone opened two possibilities:

- (viii) That there is an underlying universal field effect according such a feature for EM in space and thence warranting EM with a linear time component (arrow of time), and that by such trying to know one feature of spatial position compromises the other feature of momentum.

¹⁸ Schrodinger equation [69].

¹⁹ Heisenberg's Uncertainty principle [70].

- (ix) The mathematical description of EM was incomplete given those *then and current mathematical models* cannot adequately describe the nature of a quantum system without such an uncertainty principle, hence Einstein's insistence with his work into general relativity (GR) as being the more certain model where simple linear time is not a consideration yet *time being a secondary feature of the relative motion of objects.*

The obvious solution there for quantum mechanical (QFT) physics was to further itself with a more absolute refinement of the mathematical models used. There, the aim of physics is finding the values of forces at the closest possible distance and times between any two masses and why those forces exist as per the properties of those minutest masses. By such, physics requires a system of calculating infinitesimal increments for the space and time between these minutest particles and their associated motions.

That's *quantum mechanics* in a nutshell as *flat spacetime*.

Different to the idea of EM's flat spacetime became the idea of gravity, namely a theory for spacetime constructed for gravitational freefall by bending flat spacetime as Einstein's *general relativity* (GR), the bending of flat spacetime considered an elegant solution for the concept of gravitational freefall, thence also being able to describe the then unexplainable bending of light around a massive body, together with providing a solution to the perihelion of Mercury which Newtonian Mechanics was unable to achieve. Yet bending flat spacetime created an inconsistency with QFT flat spacetime. Despite such, given gravity is such a weak force, curving flat spacetime was not considered to be a huge problem at the time.

Of note by such, time is absolute and linear for flat spacetime QFT, yet time is malleable for curved spacetime GR, time there for GR being a secondary feature of the relative motion of objects under the influence of gravity, of curved spacetime; for GR, the motion between objects as relative motion defines the passage of time, thence proposing the idea of time to be an illusion of the relative motion of objects.

Given the pre-eminence of the large scale with time, GR was adopted for the general description for time in regard to the then and current models for cosmology. By such, for GR the core *theory of forms*, the *universals*, intrinsic to mass are:

- (x) The distance between two events in space time.
- (xi) The energy and momentum of an object.
- (xii) The speed of light.

By all of such, the aim with physics is finding the values of forces allegedly responsible for an objects motion and associated features at the closest possible distances, and thus infinitesimal increments. To describe this another way, if time were an absolute as time-now, then how could space be associated to time-now, where is the dynamic under investigation if space is reduced to zero? There would be no dynamic²⁰ with such a simple approach, so infinitesimal estimates are used

²⁰ TM creates the dynamic by extending the dimension of time as per the pure number-theory.

for space to get as close as possible to zero-time in allowing for zones known as *action principles*²¹, as infinitesimal parameters that allow forces to become known and conjectured. It is thence those estimates via the action principle and associated Lagrangian/Hamiltonian mechanisms²² that define the nature of reality, according to modern physics.

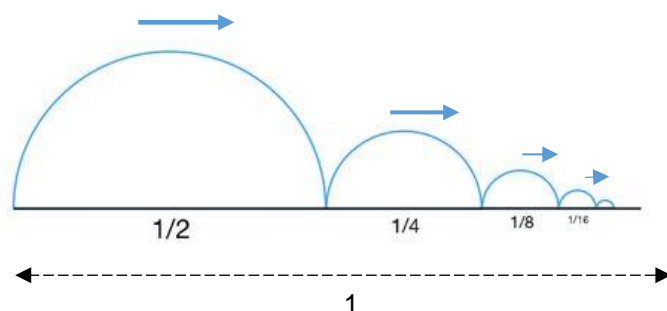
This now brings us to the question of this paper, namely the validity of those infinitesimal estimate processes as the basis for the mathematical framework of action principle zones being used if infinitesimal calculus represents an averaging of space and time to get as close as possible to points in space and moments in time as possible. There, the proposal is that the possibility exists that mathematically based *chimeras* can emerge, fictitious conjectures that show themselves on a truly gross scale owing to the averaging process used in infinitesimal calculus. The thinking here is that those estimates, that infinitesimal fudging, can be shown to emerge the greatest “problems” in physics. So, what exactly is the infinitesimal process and how long has it been in play for physics?

4. Infinitesimal Calculus

Questioning reality has always been a part of human social development, from ancient times to today. Many of the great questions of reality and human achievements have come in the form of paradoxes, or rather puzzles presenting challenges for not just the physical human achievement yet human thought in the form of numbers and geometry and their proposed relationships. Some of these ancient puzzles have come in the form of Zeno’s paradoxes²³, as a method of proof called *reductio ad absurdum*²⁴. One such puzzle is the *Dichotomy argument*, namely:

*That which is in locomotion must arrive at the half-way stage before it arrives at the goal*²⁵.

Figure 6



²¹ Action principle [71].

²² The type of infinitesimal calculus used.

²³ As based on based on Plato's *Parmenides* (128a–d) [72].

²⁴ Also known as *proof by contradiction*.

²⁵ As recounted by Aristotle, *Physics* VI:9, 239b10 [73].

Here, in aiming to achieve “1”, one must quest to complete an infinite number of tasks, and thence by such be *forever unable* to achieve the “1” result given the considered endlessness of infinity. The puzzle is termed a “dichotomy” owing to the constant splitting process involved in each step of the task in highlighting to its core the idea of both fractions and approaching the idea of an infinitely small length. Simply, what makes this puzzle impossible is that the overall aimed length of completion as “1” divided by an infinite number of steps leads to $\frac{1}{\infty}$ which of course approaches the value of 0, and thus an *impossible event* in aiming to reach “1”.

By such debates and puzzles a system of arguments and counter-arguments were formed as the basis for what was to then become *a basis for mathematical logic and the analysis of physical reality*. There, as has become evident today, *describing* physical phenomena “*conjectures how*” to label physical phenomena, namely:

- (xiii) What aspects of phenomena are being labelled?
- (xiv) With what precision?
- (xv) To what extent, namely how broad and wide (0 to ∞)?

Accompanying such is realizing our own limitation of being conscious, namely:

- (xvi) Our resolution/pixilation of quantum (light) perception.
- (xvii) Such (xvi) in primarily occupying the datum reference of time-now in 3d space.
- (xviii) Such (xvii), in the context of a singular dimension (1d) of time’s flow.
- (xix) Such (xviii) in the context of what can be trusted to be physical laws as a consistent feature of physical reality and our consistent observation ability in it anywhere, anytime.

As is generally agreed, our conscious experience of reality (A)²⁶ can be considered involving two basic features, two dimensional paradigms, that of the dimension of time²⁷, and that of the dimensions of space²⁸, all of such though as reality in a datum-reference of time-now, one time-now moment to the next, all of such in 3d space. Fundamental there is the idea of the dynamic of mass in space, how and why mass moves in space and owing to what properties of mass does mass indeed move.

It would be natural for us to consider that the one dimension of time (1d) and the three dimensions of space (3d) are connected as four dimensional spacetime (4d). Thus, as much as we perceive reality in a type of continuous fashion in the datum reference of time-now, we would consider that reality also operates as a type of 3d space and 1d time continuum as 4d spacetime. Such is what physics proposes as 4d spacetime as a grand platform we would exist with/within²⁹.

²⁶ See (v).

²⁷ 1d, as a type of arrow.

²⁸ 3d, namely spatial volume.

²⁹ As a dimensional mathematic model and associated physical theory.

We then with such a basis ask how physical reality as mass (A)³⁰ in the case of contemporary physics performs as 4d spacetime. In fact, we test the number theories we have of 4d spacetime (B)³¹ to see if they measure up with observable physical reality (C)³². Further to this, we assess how the description of 4d spacetime can represent the general platform for the description of all other phenomena. By such, as all the data suggests, two versions of spacetime have become apparent, flat 4d spacetime for QFT and curved 4d spacetime for GR.

Therefore, mass is the *theory of forms*, the great *universal* (A) description ordaining the requirement³³ of flat and curved 4d spacetime (B) questing a mass-based number theory link between flat and curved 4d spacetime as a complete physics theory (C). Simply, the process there is to appreciate how numbers and geometry relate with the idea of dimensionality via an analysis of mass (A) as the chosen universal, the wall of Plato's cave so to speak, namely by recognizing:

- (xx) Features of dimensionality, precisely their known parameters and limitations, specifically how *points in space* and *moments in time* (time-now) are *approached*, such as the idea of:
 - a. an *infinitesimal* datum reference for time-now.
 - b. *infinitesimal* points in space in time-now's *infinitesimal* datum-reference.
- (xxi) How approaching the idea of time-now and a point in space requires a particular type of mathematical approach prescribed by *infinitesimal calculus*³⁴.
- (xxii) How that calculus (xxi) is constructed in adapting to³⁵ the varying features of physical reality.
- (xxiii) How that calculus (xxi)-(xxii) acknowledges the idea of a type of symmetry of laws for each infinitesimal point in space and associated infinitesimal moment in time.

In all, the clear idea here for describing physical processes is assuming the ideas of:

- (xxiv) A datum reference of time needing to approach an infinitesimal moment of time-now.
- (xxv) 3d space needing to approach infinitesimal points as chosen datum references for infinitesimal moments of time-now.

The word *calculus* comes from Latin meaning "small stone", an apt name given calculus is the art of looking at exceedingly small scale on a broad scale whereby:

³⁰ See (v).

³¹ See (vi).

³² See (vii).

³³ By current theoretic and measurement standards.

³⁴ Gottfried Wilhelm Leibniz and Sir Isaac Newton are both given credit for independently inventing and developing calculus, Newton being regarded as the first to apply calculus to physics [74].

³⁵ Not to be forgotten.

- (xxvi) *Differential calculus* is the mathematical art of cutting something into small pieces to find how that something being cut changes in that cutting process, being useful for:
- a. instantaneous rates of change.
 - b. slopes of curves.
- (xxvii) *Integral calculus* joins (integrates) the small pieces together to find how much there is by that integration process, being useful for:
- a. accumulation of quantities.
 - b. areas between or under curves.
- (xxviii) *Differential calculus* and *integral calculus* are therefore *inverse* processes³⁶.

Yet **why** must mathematics be used in dimensional analysis to “*approach*” the idea of a moment in time and point in space? Why not just present a mathematical theory describing zero-dimensional time and zero-dimensional space, as what TM-0D proposes? As presented in the previous section, physics is central to *dimensionality*, namely how *mass* (A) is *dynamically measurable* (B), and so *dimensional lengths* of space and time *are essential* to interface with what is directly perceived of reality to confirm those findings (C). Even if infinitesimally small *points* in space and *moments* in time are required for those actual measurements to take place.

Simply, if one were to design a physics theory based directly on observed measurements then *dimensionality is required*. Technically, nothing can be measured using a zero-point for time and space as an axiom unless deliberately constructing dimensionality from zero-dimensional time ideally as an *axiom*.

Paradoxically though, the *best* number theories aim their focus on a zero-dimensional appraisal of time and space aiming for moments and points, a number theory which thence must accommodate for dimensionality and thence apply itself to known scales for time and space to then be relevant to physical phenomena and known associated equation descriptors. To achieve that description, a spatiotemporal geometric and thence dimensional number theory is required, namely as one proposing to describe the dimensions of space and time, as a 3d space and 1d time mathematical model, ideally as a unified 4d spacetime using infinitesimal calculus, such as what QFT and GR have achieved through its infinitesimal number theory (calculus) approach in trying to average a zero-dimensional realm as best as possible.

The initial question for infinitesimal calculus in starting with the dimensions of time and space is how indeed is space related to time, namely how does space demonstrate the feature of time if not for using a concept associated to space and time such as mass, mass as an extension of space, mass as relative motion in time between masses and how mass moves in regard to space, and thence mass as a basic core descriptor of 4d spacetime. This is no coincidence, as mass yet more pertinently *momentum* is used as the focus of how physical processes change in space:

- (xxix) How mass changes location in space.

³⁶ Considered as the *fundamental theorem of calculus*, describing the proposed convergence of infinite sequences and series to defined limits.

- (xxx) How light as a wave/particle changes location in space:
- a. as a non-mass wave/particle with momentum,
 - b. has a fixed speed of travel in space,
 - c. and why indeed the speed of light is fixed at c for any inertial frame of reference.

In short, *momentum* is used to highlight the idea of motion and thus time regarding space as the subject of mass, and therefore ultimately how mass and light, light as a proxy for mass, move in space using 4d spacetime.

Therefore, 4d spacetime has become the basic emphasis description for not just how light travels in space and thus a description of EM, yet also the movement of mass and how mass relates to mass in space as a useful basis description for gravity. The issue there though are the two types of 4d spacetime, namely flat and curved for QFT and GR respectively, not being mathematically compatible.

As described, modern calculus (B) is purpose built for using infinitesimal structures describing physical phenomena mathematically, namely in being as precise (infinitesimal) as possible, creating nonetheless what are termed *infinitesimal estimates*. Having developed a set of tools for describing infinitesimal calculus, integral and differential calculus of course need to be applied to the conditions specific to physical reality, to the dimensions of space and time, and thus must abide by what is physically observed as those specific conditions of nature³⁷ under examination. Yet as presented in points (xxix)-(xxx), the key basis used by physics to describe the dimensions of space and time is *momentum*. There, to make calculus sensible to the dimensions, five basic ideas are used for momentum:

- (xxxi) *Distance* as length of 1 dimensional space.
- (xxxii) *Time* as duration of 1 dimensional time.
- (xxxiii) *Mass*:
- a. Considered as the intrinsic property of a body.
 - b. Experimentally defined as a measure of the body's inertia.
 - c. Determining the strength of its gravitational attraction to other bodies.
 - d. Proposing inertial and gravitational mass to be identical as per the equivalence principle, such as an *a priori* of GR.
- (xxxiv) *Velocity* of mass as *distance per time*.
- (xxxv) Such (xxxi)-(xxxiv) arriving at the basic idea of *momentum* (p ; $kgms^{-1}$), namely the product of the mass and velocity of an object.

³⁷ Here, the temptation is to think calculus can explain physical reality *primarily* without conditions, yet the fundamental condition of physical reality, what is and what is not, requires calculus in its various forms of construct to adapt to that data.

According to Sir Isaac Newton’s *Philosophiæ Naturalis Principia Mathematica* as a feature of his proposal for inertia³⁸, the rate of change of a body’s momentum is equal to the net force acting on it. To note with QFT is that even though light has no mass it is still considered a particle with momentum³⁹. Specifically, momentum is proposed to depend on a frame of reference such that in any inertial frame of reference momentum is a *conserved* quantity. Such a process is required for the following reasons:

- (xxxvi) *Arbitrating* a closed system not affected by external forces such that in that frame of reference the total linear momentum of mass under examination does not change and can thence be described with calculus.
- (xxxvii) To confirm the required condition of being complete with the calculus analysis process, of not leaving this process of examination and determination to anything else.
- (xxxviii) Such (xxxvi)-(xxxvii) as a way of making momentum *statutory* for the process of calculus.

The next step in arbitrating these statutory frames of reference is how one frame of reference can relate to another frame of reference, namely that there needs to exist a *universal governance* between frames of reference upon space for objects. Physics terms this as the “*symmetry of laws*”, namely that the set of laws in frame of reference R1 must be the same set of laws for frame of reference R2. In short, the idea of universal symmetry of laws between different frames of reference is underwritten in the principle of relativity, namely the *requirement that the equations describing the laws of physics have the same form in all admissible frames of reference*.

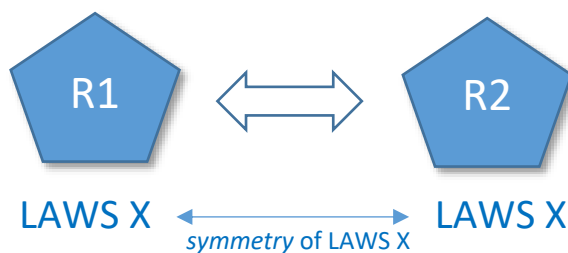


Figure 7: frame of reference R1 having the same laws in play (as LAWS X) as frame of reference R2.

³⁸“The *vis insita*, or innate force of matter, is a power of resisting by which every body, as much as in it lies, endeavours to preserve its present state, whether it be of rest or of moving uniformly forward in a straight line” [75][76].

³⁹ As shown by mathematical deduction based on light being proposed to have kinetic energy and thence momentum.

The required structuration here is extending the calculus of one frame of reference to another frame of reference⁴⁰. Does for instance the calculus of a process of physical phenomena⁴¹ in one frame of reference apply to **any** type of process of physical phenomena for another frame of reference? Can indeed processes of physical phenomena under investigation *be the same fundamental stuff* to allow for a universal calculus to develop between all frames of reference *for all types of objects in space for all types of processes of physical phenomena*?

It so happens⁴² that light and mass have specific conditions for their translational symmetries that require different and specific calculus mapping processes⁴³. Such has resulted in the employment of *flat* 4d spacetime mapping for QFT and *curved* 4d spacetime mapping for mass (gravity). Fundamental there are the two physical constraints as postulates proposed by Einstein *in adapting to known physical data*⁴⁴:

- (xxxix) the laws of physics are invariant⁴⁵ in all inertial systems⁴⁶.
- (xl) the speed of light in vacuum c is the same for all inertial observers, regardless of the motion of the light source⁴⁷.

The proposed if not required result of combining these postulates is the join between space and time, as 4d spacetime. Henceforth, a variety of methods of calculus have been required to describe the nature of light, primarily the natures of the electron and light, all of which have been consistently tested and refined to reach the level they are now at, namely QFT as a *flat* 4d spacetime model and GR as a *curved* 4d spacetime model, noting they are still just models and not reality *per se*.

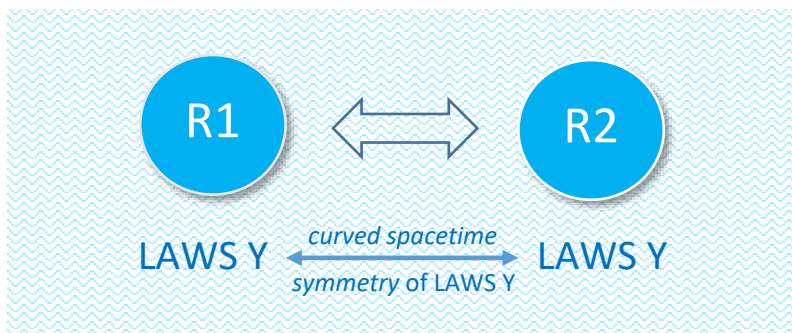


Figure 8: *frame of reference R1* having the same laws in play (LAWS Y, as curved spacetime) as *frame of reference R2*.

⁴⁰ A process named practically as *translational symmetry*.

⁴¹ Such as mass or light.

⁴² According to all known measurements of physical phenomena.

⁴³ As per the development of 3d space and 1d time mathematics described initially by Galilean transformations to thence Lorentz transformations forming the basis of QFT's flat spacetime, and thence Minkowski flat 4d spacetime and associated Riemannian geometry adapted by Einstein in his formulation of GR.

⁴⁴ Not to be overlooked.

⁴⁵ *Identical*.

⁴⁶ *Non-accelerating frames of reference*.

⁴⁷ An experimentally known *requirement*.

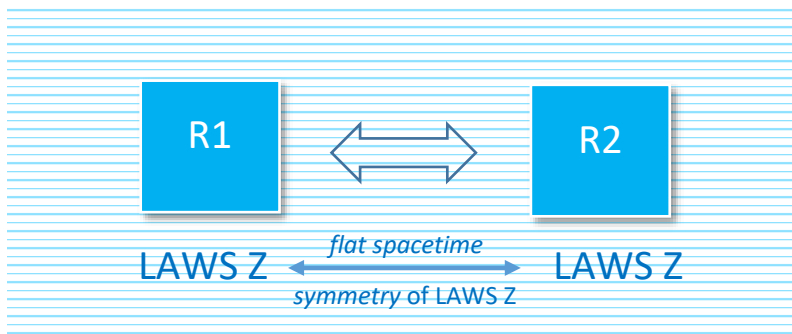


Figure 9: *frame of reference R1* having the same laws in play (LAWS Z, as flat spacetime) as *frame of reference R2*.

Of note regarding the disparity between the *flat* 4d spacetime and *curved* 4d spacetime models is how a 4d spacetime interval is classified as being either dependent⁴⁸ or independent⁴⁹ of the inertial frame of reference. There, with GR the 4d spacetime interval between inertial frames of reference is derived to be *dependent* and not *independent* of inertial frames. This was so to allow for gravitational free fall, specifically *curvature* as the proposed only process available for the infinitesimal calculus of 4d spacetime to accommodate for gravitational freefall.

Simply, with GR the 4d spacetime interval between inertial frames of reference is *dependent* and not *independent* of inertial frames. Yet with QFT the 4d spacetime interval is *independent* of the inertial frame of reference. The real issue though is what has happened to flat spacetime in being curved in the process of describing how gravity is proposed to work? Further still, what are the implications of averaging an *action principle locale* to find zero-dimensionality for time and space?

5. Renormalization licences

*Renormalization*⁵⁰, as the name suggests, is a process of scrubbing derived mathematical values to better fit known/normal physical values of the concepts being modelled. Such would indicate that the mathematical process being used is faulty, yet in the absence of better description processes, *renormalization* can only suffice until a better process that does not use that scrubbing process can be found.

5.1 Renormalization licence (1): infinitesimal calculus

The first renormalization license is infinitesimal calculus as a process of renormalizing infinitesimal action principle locale estimates of time to time-now and space to points in space *as proxy mass locales*. Here, *infinitesimal estimates* are used to have time become

⁴⁸ *Inclusive*.

⁴⁹ *Non-inclusive*.

⁵⁰ *Renormalization* [77].

relative to space, that time is relative to and thus dependent on the motion of objects, and if time's moment is a zero value, ultimately an infinitesimal estimate of space needs to correspond to such mathematically, numerically, to account for time's apparent arrow as the motion of objects in space.

In short, the quest for physics is to find the cause of what makes relative motion for mass objects happen, and thence a value for momentum of a mass object, and so physics with its number theories does such in going to as close to zero scales as possible as a guarantee of pixilation for mass objects and light in space in needing to be as close to a moment in time as possible.

From another perspective, if time were an absolute as time-now, as zero-time, then how could dimensional space be associated to time-now? How could space also be zero as zero spacetime? It can't, so infinitesimal estimates are used for space to get as close as possible to zero-time to estimate zero-space. It is thence those estimates via the action principle and associated Lagrangian/Hamiltonian mechanisms that define the proposed nature of reality, according to modern physics.

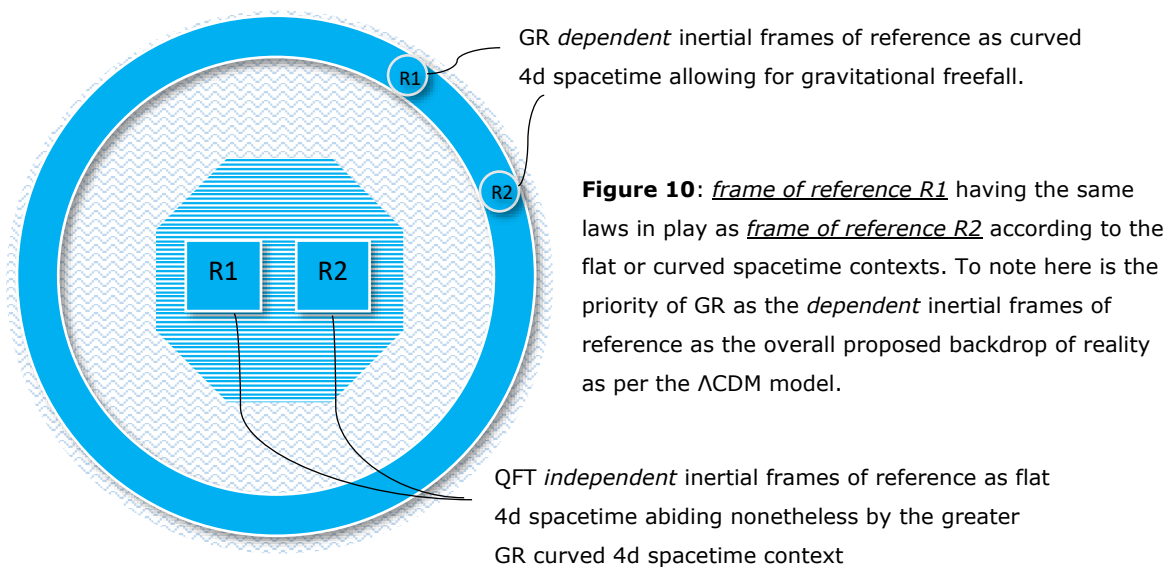
By all of such, the infinitesimal calculus approach became all about *time* being due to *relative motion of objects*, and thence the idea of two locations of a body in space, one at one point in space and moment in time and then one at another to then capture such by creating an action principle locale for those two events in different time-now event locations, and to then use the Lagrangian/Hamiltonian infinitesimal calculus approach to bring those value of one moment in time to the next as close to each other as possible to then formulate a definition for the mass-dynamic happening in 3d space and thence also presumably 1d time.

Thus, the initial question for infinitesimal calculus in starting with the dimensions of time and space is how indeed is space related to time, namely how does space demonstrate the feature of time if not for also being reduced to as close to zero value as possible as a length in space? The simple answer is to bring the spatial lengths as close to zero as possible via the presumption time's moment is also a zero value. By such, modern calculus (B) is purpose built for using infinitesimal structures describing physical phenomena mathematically, namely in aiming to be as zero-point and thence as precise (infinitesimal) as possible, creating nonetheless what are termed *infinitesimal estimates*. The mathematical approach though is an estimation given both spatial locales represent moments of time, the only thing that changes being the location of an object in space which the infinitesimal process is trying to refine and describe, hence time being conditionally relative to space. The problem therefore occurs when these infinitesimal estimations are allowed to grow in time and space when calculating the greater structures of space and time, of the universe, as shall be described ahead.

5.2 Renormalization licence (2): GR curving QFT's flat spacetime

The problem thence is encountered with the opposing features of flat and curved spacetime, namely a different symmetry of laws (invariances) being in play given curved spacetime is a bending/stretching of flat spacetime. This is the next renormalization licence, primarily the line of sight for GR being altered to a curve via Lagrangian infinitesimal straight line functions in an overall infinite function, thus having the stationary-action principle⁵¹ being averaged again in a new way while being factored to large scales via these Lagrangian functions⁵².

Of note regarding the disparity between the *flat* 4d spacetime and *curved* 4d spacetime models is how a 4d spacetime interval is classified as being either dependent⁵³ or independent⁵⁴ of the inertial frame of reference. There, with GR the 4d spacetime interval between inertial frames of reference is derived to be *dependent* and *not independent* of inertial frames. This was so to allow for gravitational free fall, specifically *curvature* as the proposed only process available for the infinitesimal calculus of 4d spacetime to accommodate for gravitational freefall. Simply, with GR the 4d spacetime interval between inertial frames of reference is *dependent* and not *independent* of inertial frames. Yet with QFT the 4d spacetime interval is *independent* of the inertial frame of reference.



Thus, the disparity between QFT and GR was cast regarding the dependence (GR) and independence (QFT) of the inertial frames of reference. Such is entirely intuitive in

⁵¹ [40]: p9-10); ([47]: p3-12).

⁵² [40]: p5-14.

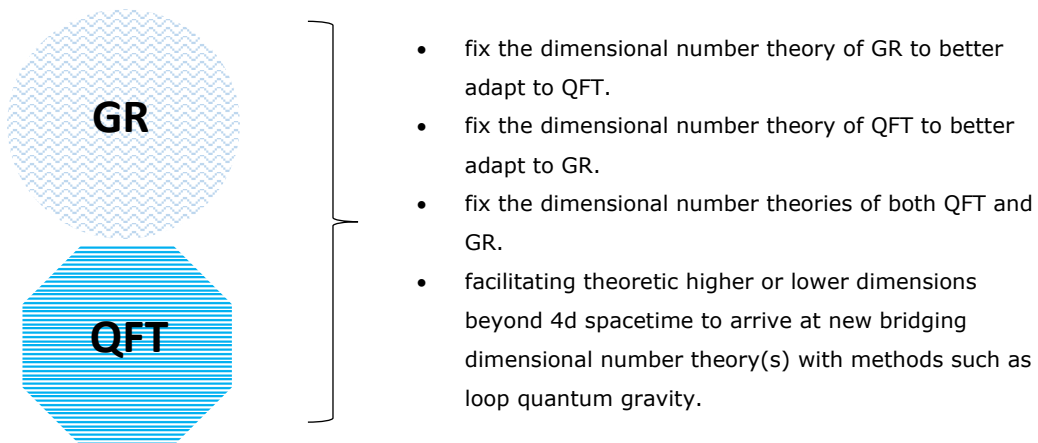
⁵³ *Inclusive*.

⁵⁴ *Non-inclusive*.

considering that as EM technically has no actual mass it could only be expressed as an inertial frame of reference *independently from* its general overall system mass-inertia context-source⁵⁵, relegating EM to flat 4d spacetime⁵⁶. Of note in this entire process of describing EM and gravity is the mathematical geometry describing these certain aspects of physical reality, dimensional number theories that can only merely be tools in, as all data has demonstrated, flat and curved spacetime not being truly homogeneous with each other⁵⁷.

Experimentally, given the eminence of QFT describing the microscopic world of particles⁵⁸, the current quest in physics is to somehow quantize gravity if not making the process of GR compatible with QFT, and thus somehow forging a basis or feature of GR being like QFT such that as the rules of curved spacetime are proposed to breakdown for GR in that process then GR can thence be described in terms of having *independent* inertial frame of reference features on the microscopic scale. Consider figure 11.

Figure 11: options to link GR and QFT include:



To note is that currently there is *no mathematical way to link GR and QFT*, an impossible task given that such would need to represent an absolute dimensional number theory description of physical reality, a task not possible for the *infinitesimal estimates* approach. Simply, in bending flat spacetime to make it curved to explain gravitational free fall, one can explain everything from light bending to massive objects, even the perihelion of planets. Yet that fix is very simple, ultimately a betrayal of flat spacetime and thus of QFT. How it was accepted is extraordinary, the only guess being none back in the day were well versed in infinitesimal calculus and the solution seemed a good fit for the time.

⁵⁵ Curved spacetime.

⁵⁶ Thence making flat spacetime secondary to curved spacetime.

⁵⁷ The quest though is on to find the homogeneity between flat and curved spacetime.

⁵⁸ As compared to the GR cosmological scale of stars.

5.3 Renormalization licence (3): Additional QFT and GR *renormalization* processes

QFT has additional renormalization processes on top of infinitesimal calculus as a series of number theory techniques used to treat infinities arising in calculated quantities by altering the values of these quantities to compensate for effects of the *self-interactions of those modelled concepts*, once again as a scrubbing of the mathematical effects of the echoes of those infinitesimal number theory results not matching with observed phenomena. In another way of describing this, *QFT-specific renormalization* aims to account for self-interactions of particles, those feedback loops which are in the constitution of the infinitesimal calculus describing those particles and field relationships. Specifically, here *QFT-specific renormalization* was first developed in quantum electrodynamics (QED) to make sense of infinite integrals in perturbation⁵⁹ theory.

Here once again renormalization is a process that is a feature of scrubbing derived values to better fit known physical values of the concepts being modelled. Such would indicate that the mathematical process being used is faulty, yet in the absence of better description processes, renormalization can only suffice until a better process that does not use that scrubbing process can be found. Renormalization here also specifies relationships between parameters in the theory when parameters describing large distance scales differ from parameters describing small distance scales.

The *standard model* of particle physics *being based on QFT* therefore contains only *renormalizable* operators. Yet, the interactions of GR with QFT become *nonrenormalizable operators* in attempting to quantize gravity by treating the metric in the Einstein–Hilbert Lagrangian as a perturbation about the Minkowski metric, simply because GR is already a part of its own renormalization separate to that of QFT. This quite simply presents the case that perturbation theory and thus *additional renormalization* is not useful as application for constructing quantum gravity field models. The basic issue here is infinitesimal calculus, that it needs to use infinitesimal sequences requiring a basic renormalization. Thus, GR is perturbatively non-renormalizable because GR already takes the infinitesimal calculus approach and bends those infinitesimal links, so is already renormalized in its constitution making it non-renormalizable beyond that, and thus is perturbatively non-renormalizable. Because of such, gravity is rather assumptively considered more water-tight than QFT, yet gravity is fundamentally an already renormalized structure itself that cannot be further renormalized.

In short, in attempting to quantize gravity a super-renormalization comes into effect as *infinitely many independent parameters* defining the process, a very counterintuitive thing to do, thence requiring infinite processes to fix the values of every parameter. All of this though would ultimately reduce to the usual GR renormalization because that is how renormalization worked in the constitution of GR, namely by curving flat spacetime, namely renormalizing flat spacetime to

⁵⁹ Perturbation theory [78].

make curved spacetime. Thus, super-renormalizing GR to re-fit QFT would only require infinitely high quantum energies where quantum effects take over where measurement and prediction become impossible.

6. Renormalization Chimeras

As mentioned in the previous section, *renormalization* is inclusive of both the primary infinitesimal calculus averaging method while also being a secondary number theory technique for QFT flat spacetime that alters the values of calculated quantities, quantities as either infinities and/or non-infinities for mass and associated action field values in the Lagrangian integral, all of such to better fit a “normal”/idealized value outcome. This secondary feature is a step beyond the basic primary averaging process of infinitesimal calculus in the action Lagrangian. In fact, general relativity is an absolute form of renormalizing flat spacetime to make it curved to have that curve represent/carry the idea of gravitational freefall.

Most simply, renormalization is a hedging process to better account for known normal/expected/ideal values. One would think that, as a fudge, renormalization should at best be a placeholder until more exact equations can be arrived at. The problem though is that the renormalization process has become such an accepted way to present mathematical concepts in physics it is rarely disputed. One would therefore expect that the renormalization process could, although appearing accurate for the results in our local here and now reality, lead to some anomalies on the large scale, considered here as *chimeras*.

6.1 The astrophysical cave

As mentioned in 5.1, “*The problem therefore occurs when these infinitesimal estimations are allowed to grow in time and space when calculating the greater structures of space and time, of the universe, as shall be described ahead*”. Thus, the first chimera of note is the basis of astrophysics, here as *the astrophysical mass cave*, of assuming that *enormous* time and space scale *with an infinitesimal estimate process*.

A key feature of modern physics is the need to explain the stars with a suitable theory that aligns with known features of this solar system. The idea there is to consider the stars as points of light that represent mass-based solar systems in their own right as a suitable way to compare the universe of points of light with this solar system. This is fine if indeed the stars are in fact solar systems, yet to base a physics on the need to describe the entire universe with such a broad brush-stroke is exactly that, a major broad brush-stroke. Not only is it a broad brush-stroke, yet the idea of Plato’s *theory of forms* and associated *universal* could be confused with the idea of the universe itself, which may seem logical if not intuitive, yet doing such makes it very difficult to convince oneself something has been proven if one is unable to travel to the stars and prove such facts and associated alleged scales.

On this note, it is recognised that GR is considered ideal to explain all the different features of astrophysical observations because quite very simply curving flat spacetime allowed for anything, anything such as a metric expansion of space, the idea of black holes where spacetime becomes so twisted no light can escape, and so on and so forth. Yet when one thinks about such, betraying all the known benchtop data QFT as flat spacetime can prove and replacing such with the ability to curve spacetime to explain the stars is quite a hedging, quite the fudge, the simplest hedging one can perhaps conceive. Are there offspring features to this curving and stretching of spacetime therefore that represent chimeras in their own right?

6.2 Dark energy and dark matter

The Λ CDM cosmological model is the cosmological constant Λ (namely the required dark energy as based on Einstein's formulation for gravity and the proposed energy requirements there) Cold Dark Matter model⁶⁰. The Λ CDM model is proposed to represent the basis for explaining the redshift of light put down to a metric expansion of space with the following associated features:

- (xli) The cosmic microwave background (EM radiation).
- (xlii) The large-scale structure of the universe as with the distribution of galaxies.
- (xliii) The accelerating expansion of the universe observed in the light from distant galaxies and supernovae.

In short, the Λ CDM model assumes general relativity to be the correct theory of gravity on cosmological scales given curved spacetime accommodates for the basic presumption of a metric expansion of space. A few points on general relativity:

- (xliv) General relativity was Einstein's development upon special relativity.
- (xlv) The confidence in special relativity was nonetheless down to the fundamental idea of c being a constant for any reference in space where the passage of time approaches 0 at c .
- (xlvi) Einstein by his calculations arrived at what he termed a cosmological constant value for energy as Λ , a value approximately $10^{111} Jm^{-3}$, well above by a factor of $\sim 10^{120}$ the known energy value of space $10^{-9} Jm^{-3}$.
- (xlvii) Λ then required the invention of energy as dark energy, given the notation of Λ .
- (xlviii) The idea of an expanding universe was created to explain this energy together with explaining the phenomena of the redshift of stars presumed to be due to a metric expansion of space.

⁶⁰ Λ CDM (*big bang*) model [79].

Simply, dark energy (Λ) and cold dark matter (CDM) as the Λ CDM cosmological model are required to explain the observed metric expansion of space, dark energy being necessary to explain the energy for the alleged expansion of space and cold dark matter to explain how galaxies clump together without flying apart in the context of the metric expansion of space. The sizeable problem with this chimera is that dark energy and dark matter account for close to 80% of GR's proposed reality, none of which can be accounted for by benchtop experiments.

6.3 Wormholes

In physics using its GR renormalization approach, the resultant mathematics although trying to better explain physical reality with that renormalization process thence leads to secondary theoretic side-effects, notably to do with the whole idea of trying to approach a zero-point domain for space through a law of averages infinitesimal process as an ultimate curving of space to the zero-point level.

The outstanding feature there for GR is the idea of a zero-point that can exist anywhere and everywhere as that which transcends space and time, leading to the idea of inter-dimensional access through time and space, through the connection of these zero-point regions. This is the idea of a wormhole⁶¹ as a solution to the Einstein field equations of GR. There, a wormhole can be visualized as a tunnel with two ends at separate points in spacetime (i.e., different locations, different points in time, or both). By such, according to curved spacetime GR a wormhole is *thought to* connect extremely long distances such as a billion light-years to a few meters, connect different points in time, or even connect different universes.

Simply, a wormhole is the vagrant zero-point dimensionality that is presumed dead-centre in the infinitesimal calculus fudging process used to make curved spacetime from flat spacetime. This vagrant dimensionality although considered topologically trivial to curved spacetime becomes more pronounced at the extremes of spacetime curvature and thence black holes. Wormholes, like dark matter and dark energy, have no benchtop experimental success.

6.4 Quantum gravity

*Quantum gravity*⁶² is a term to describe the quest that seeks to describe gravity as GR according to the principles of quantum mechanics and thence QFT. It deals with environments in which gravitational and quantum effects are considered as one, namely in the centre of proposed zero-point regions like what would be found in the proposed black

⁶¹ Wormholes [80].

⁶² Quantum gravity [81].

holes, or at the very earliest stages of the proposed beginnings of the universe. The idea of *quantum gravity* theory is in making GR abide by QFT, to quantize GR, and to do this in the theorized place where both are proposed to break down and thence become as one.

Black hole physics⁶³ has therefore been used as the platform for *quantum gravity* as a way to describe distances very close to the Planck scale, namely distances close to the center of a black hole as possible, the thinking there being examining any quantum breakdown in the black hole and how that would relate with the idea of gravity as the presumed curvature of *spacetime in that black hole*, to analyze what happens there when that happens and to put a theory to it, and thus linking gravity with EM.

Therefore, the key difficulty in formulating a successful *quantum gravity* theory is that quantum gravitational effects are only proposed to appear at length scales near the Planck scale, around $10^{-35} m$, a scale far smaller than what research can currently make available. Therefore, physicists lack experimental data which could distinguish between the competing theories which have been proposed.

To note is that no theory has yet proven successful in describing the case where the dynamics of matter modeled with quantum mechanics affect the curvature of spacetime. As mentioned in section 5, if one attempts to treat gravity as curved spacetime as simply another flat spacetime quantum field, the resulting theory is *non-renormalizable*. Thus, GR is considered as the more effective field theory, an anchor, making itself as the proposed basis in allowing legitimate predictions for QG in which the only physically relevant information is the relationship between different events (unfixed) in GR's spacetime.

In short, there is no theoretic link between GR and QFT. However, such does not mean there is no link between EM and gravity, yet that there is no link between how EM and gravity are explained according to infinitesimal calculus.

6.5 The Standard Model of particles

The Standard Model⁶⁴ (SM) of particle physics describes three of the four known fundamental forces, namely electromagnetic, weak and strong interactions, and thus fails with describing gravity. Conversely, gravity is described by Einstein's curved spacetime GR. SM aims to classify, to put into classes by their observed behavior, all the elementary particles.

The context of the SM is the building upon QFT and the idea of what was achieved through the research of the atom and those subatomic particles and thence their more fundamental constituent elements as their masses conferred by the energy released from particle collision experiments, most notable of those experiments and results conducted at the CERN⁶⁵ research facility.

⁶³ See section 6.7.

⁶⁴ The standard model of particles [82].

⁶⁵ CERN, the *European Organization for Nuclear Research* [83].

The quest of particle physics was to ultimately determine the nature of how the classes of subatomic particles and their constituent building blocks can be organized together in the one theory, and so is a model that has been built in stages based on the evolution of the particle accelerator technology available to them and associated recording instruments through the latter half of the 20th century through to today.

In all, QFT provides the mathematical framework for SM in which a Lagrangian controls the dynamics and kinematics of the theory, and thus the infinitesimal mathematical approach the basis of SM. With SM, each kind of particle is described in terms of a dynamical field that pervades 4d spacetime. The construction of SM proceeds following QFT by first postulating a set of symmetries of the system, and then by writing down the most general renormalizable Lagrangian from its particle (field) content that observes these symmetries, as with QFT.

Despite such, SM in employing QFT's flat spacetime is still unable to describe:

- (xlix) Baryon asymmetry, namely the preponderance of matter over antimatter.
- (l) The theory of gravitation as described by GR.
- (li) The universe's accelerating expansion currently proposed to be maintained by dark energy.
- (lii) Dark matter particles, the stuff that is meant to keep galaxies together.
- (liii) Neutrino oscillations and their non-zero masses.

The real failure of SM is of course being unable to derive the basis of neutrino mass and their oscillations. This is understandable, as the infinitesimal calculus approach assumes the concept of mass in the first place, and makes time and thence things like oscillations illusionary-based on a sub-quantum level.

To note there is that GR is unable to describe the above (xlix)-(liii) other than proposing to describe gravity. It would therefore seem the infinitesimal calculus process for both QFT and GR is unable to describe the experimentally verified existence of neutrino mass and baryon asymmetry, and the experimentally unverified existences of dark energy and dark matter. One would therefore think that a number theory model that can derive and thence predict known results for quantum phenomena and mass with gravity, together with describing neutrino mass and baryon asymmetry, should be considered seriously⁶⁶.

6.6 Phantom chimeras

On top of the previously mentioned astrophysical issues proposed by Λ CDM cosmology, GR based cosmology is unable to account for actual key facts, and thus *curved* infinitesimal calculus based GR taking the stage as a parent chimera in representing a host

⁶⁶ Considered here as a requirement for any relatively complete theory covering basic astrophysical data.

of chimeras, a parent chimera that is unable to account for known realities. A list of these general offspring chimeras that GR is unable to substantiate in theory are as follows:

- (liv) *The Horizon Problem*⁶⁷: photons have the same uniform temperature, regardless of distance, roughly 2.725 K of the CMBR⁶⁸.
- (lv) *The Flatness Problem*⁶⁹: nearly all the evidence collected by cosmologists indicates that the Universe is flat, as though spacetime shows almost no curvature whatsoever, an extremely unlikely thing in the context of the curved spacetime GR-based Λ CDM model.
- (lvi) *The Monopole Problem*⁷⁰: the enormous energies that would have been produced by the Λ CDM big bang should have created a magnetic particle as a monopole, not a dipole, a unique entity, and yet there is no evidence for it.
- (lvii) *The Hubble Constant Problem*⁷¹: the difference in H_0 determinations has surpassed 5σ .
- (lviii) *The Cosmological Constant Problem*⁷²: that the amount of energy required for the big bang to have taken place is well off the scale compared to the calculated background energy, of an order of 10^{121} .
- (lix) *Axis of evil Problem*⁷³: given the CMBR data that there must be a type of geocentric (Earth-central) cosmological model in play.

It could therefore be argued that cosmology theory is entirely upside down with its *logos*, namely that it is presupposing a reality which has no real gross data relevant to our local reality, where in fact the data should point to a theory that is relevant to our local reality.

6.7 Black holes

The description of black holes⁷⁴ is a build-on of the theoretic device of light bending to gravity; supermassive structures as black holes were proposed as an ultimate form of mass directing the path of light in accordance with known ideas of light bending to mass, or more specifically, aligning to *the effect of mass on space-time*. Once again, affiliation for this concept is granted to Einstein's *primacy of mass* theory of relativity.

⁶⁷ The Horizon problem [84].

⁶⁸ Cosmic microwave background radiation.

⁶⁹ The Flatness problem [85].

⁷⁰ The Monopole problem [86].

⁷¹ The Hubble constant problem [87].

⁷² The Cosmological constant problem [88].

⁷³ The Axis of evil problem [89].

⁷⁴ A concept proposed by John Michell [90].

The idea of black holes is a basic prediction for the effect of ultra curved space and thus a massive amount of mass resulting in such huge gravitational field effects in the form of the curvature of spacetime. Yet, despite this prediction for astrophysical observations seeming correct, the failure of black holes to present the case of wormholes, or rather, the inability to demonstrate such in a laboratory, shows the number theory behind black holes lacks utility. Further, black holes are incompatible with the known findings of the data of the astrophysical issues of 6.6, particularly the axis of evil problem which would thence suggest this solar system must exist in a black hole.

6.8 Time as an illusion

Here we come back to the root issue of infinitesimal calculus, namely the basic assumption of bringing space to time-now through an infinitesimal calculus approach to express a dynamic zone known as the action principle⁷⁵. To note there is that giving precedence to mass and why mass moves in the first place, raw mass, and thence to the idea of gravity, and thus giving precedence to GR, is giving precedence to the cave, to mass, while assuming mass is 3d space and that time is merely a derivative and thence an illusion cause by either mass, or gravity, or both⁷⁶.

Indeed, today's advanced musings of GR theory present cases of time being an illusion⁷⁷, that time does not exist other than by virtue of objects in relative motion under the influence of gravity, and gravity as curved spacetime being told how to bend by mass. Yet time is related to space as spacetime, especially in approaching the proposed zero-point levels of a black hole singularity. There, if time is an illusion, then so is space, and thence so too the absolute basis of gravity itself, and thence so too the whole theory of reality using infinitesimal calculus, thence the whole process revealing itself as being counter intuitive, as suggested by Plato. Physics by all of such has created the "problem of time" in being stuck in Plato's cave giving priority to mass and not mathematical reason.

6.9 Time travel

Aside from GR considering time to be an illusion, infinitesimal calculus as a pathway of incorrectly considering time in any way, shape, or form, simply because that option is made available by considering time as an illusion, gives into the idea time-travel, of breaking the arrow of time, of defying time-now. There, time-travel into the past, reversing time's arrow, is proposed by going faster than the speed of light as a type of ultimate bend of spacetime, of going from time-forward to time-reverse. One would think therefore that at

⁷⁵ [40]: p9-10); ([47]: p3-12).

⁷⁶ On this note, no one can say what comes first temporally, mass or gravity.

⁷⁷ Illusion of time [91][92].

the very centre of a black hole are time-reversal qualities, and this is in fact proposed by physicists⁷⁸ in the form of time-travel using wormholes.

To travel in time, whether forward or backward outside the universal time-now zone we all exist in, in considering time as an illusion, then such would require themselves to be entirely illusionary, entirely imaginary, in their approach. Perhaps this is why all of these features have yet to be proven in the laboratory, only demonstrated in science fiction books, TV shows, and movies⁷⁹. Physics though has presented the idea of particles time-hopping as evidence for time-travel, yet such is not time-travel per se.

6.10 The fantastic

On top of the idea of time being an illusion, and thence spacetime being an illusion, comes the idea of a multiverse, of multiple universes. There, the idea of the multiverse plays on the idea of extra dimensions of space with time being an illusion, even space being an illusion in the manner of extra dimensions.

One of the ideas there is that the universe expanded at a mind-boggling speed in the fraction of a second after the big bang during which process there are proposed to have been quantum fluctuations that caused separate bubble universes to pop into existence and themselves start inflating and blowing universal bubbles into existence. Such musings would be fine if they could be replicated in the laboratory, yet the only place they seem to be replicated is in story-telling⁸⁰.

The great concern therefore is that the possibility exists that physicists both academic and amateur don't understand their own physics system, the basis and production of their number theories in play and how they result in chimeras, and are careering headlong into chimeric pursuits, which is a great shame.

7. *That's just the way It Is done*

The first key flaw in physics appears to be the assumption/basis of mass itself as the universal *theory of forms* in play, say (X).

The second key flaw thence is creating the general real-world context for this basis as the universe of stars assumed to be solar systems, galaxies, and so on, say (Y).

The third key flaw is thence needing to describe the small scale with flat spacetime infinitesimal calculus and large scale with curved spacetime infinitesimal calculus, say (Z).

⁷⁸ Black holes and time reversal [93].

⁷⁹ *Time travel* [94][95].

⁸⁰ *The multiverse* [96][97][98][99].

Here, (X)-(Y)-(Z) is central to giving rise to a litany of chimeras, namely results that cannot be demonstrated in the laboratory, yet only proposed to exist by proxy.

This is not to say the stars are not real, yet to presume they are real as suns as per (Y) is to assume a scaling system already from the outset. It's almost like betraying the idea that one should not presume heaven itself yet get there through the correct stairway of logic. Here therefore it is conjectured that to presume what the stars are, that greater greatness, without using a proper pathway of logic, *is flawed*.

Indeed, Plato's *theory of forms* and associated *universals* ideas suggests that physics theories ideally reflect our deepest human natures and our ability to communicate and thence read and write. There, in philosophizing the idea of GR and the inter-relationship of mass and gravity, one could thence consider that GR has done a great job in keeping logic uneven if not 3-body problem/chaotic⁸¹; *mass goes here, then gravity says how other masses move, and then other masses tell that source mass where to go because they also have their own source-telling of how to move, all at the speed of light*. One could suggest that such is so much like chaotic individuality, namely that we are all mass and have our own trajectories, just like we are all also people with our own free choices that allow us to go any direction we choose and how precisely, yet where no one can ever agree with one another.

Indeed also, the continuity of purpose despite great argument and failure in understanding each other is evident with humanity through all time periods. And that is a very hard thing to snap, especially with infinitesimal calculus and how that works with averaging on the small and large scales. Are there recent examples in physics history where breaking a type of mould has yielded great results? There aren't many recently (last 50 years) other than chasing bigger and greater unicorns. The emphasis here with ABC TM-0D theory is to present what works, and so ultimately the thinking is the ABC TM-0D theory will yield new experimental results QFT and GR cannot.

A good example of how in our recent history someone sought to break a mould with little to apparently no prior experience is Steve Jobs, co-founder of Apple. Here in this interview⁸² Steve Jobs is questioned on a number of things, primarily what he thought made business sense:

Interviewer (I):

You don't have any particular training in this. How do you, how do you learn to run a company?

Steve Jobs (SJ):

Um.

You know, throughout the years in business, I found something which was, I always ask why you do things.

⁸¹ [61]: p15-16.

⁸² Steve Jobs, *the lost interview* [100][101].

And the answers you invariably get are, oh, that's just the way it's done.

Nobody knows why they do what they do. Nobody thinks about things very deeply in business.

That's what I found. I'll give you an example. Um.

When we were building our Apple-1's in the garage, we knew exactly what they cost.

When we got into a factory in the Apple-2 days, um, the accounting had this notion of a standard cost, where you kind of set a standard cost, and at the end of a quarter, you'd adjust it with the varied. And I kept asking, well, why do we do this?

And the answer was, well, that's just the way it's done.

And, and after about six months of digging into this, what I realized was the reason you do it is because you don't really have good enough controls to know how much it costs.

So you guess, and then you fix your guess at the end of the quarter.

And the reason you don't know how much it cost is because your information systems aren't good enough.

So, but nobody said it that way. And so later on, when we design this automated factory for Macintosh, we were able to get rid of a lot of these antiquated concepts and know exactly what something cost to the second ...um.

So, in business, a lot of things are I-I call it folklore; they're done because they were done yesterday and the day before. And so, what that means is if you're willing to sort of ask a lot of questions and think about things and work really hard you can learn business pretty fast it's not the hardest thing in the world.

Interviewer (I):

Not rocket science?

Steve Jobs (SJ):

It's not rocket science.

If physics is a business, the chances are it is also vulnerable to the folklore, “*that’s just the way it is done*”.

The chimeras derived in this paper are considered to be a folklore that physics is still unable to shake off, unable to properly confront. The problem that more than likely exists though is that physics has so much money riding on what they are currently doing/researching that physics has become detached from reality, of not knowing what reality really is, in chasing unicorns. The chances are physics has become complacent *in staring into all the infinitesimal calculus fantasies on offer*. Indeed, the danger of great wealth in the context of a false theory of reality is such. More than likely though upon that quest the future of humanity has become tight, and we need to be exact given all of what we have laid claim to and developed improperly with nature.

More likely than not, the key reasons physics has been unable to make the next paradigm step is that when physics is studied physicists seem more likely than not to accept how number theory is applied to time and space *without question*, especially regarding GR. Here, that status quo is being analysed and then the question is asked if the right number theory approach to physical reality is in play. There, the greatest problem in physics as demonstrated here is not realizing the implications of the mathematical infinitesimal calculus code and those associated allowed fudges.

Indeed, one cannot understand the most contemporary data of modern physics without understanding that mathematical trail first. The Clay Mathematics Institute (CMI)⁸³ though is an example of the general haze there, for the Millennium Prize questions have asked mathematicians to solve 7 key questions more relevant to mathematical physics than mathematics alone, specifically how to bridge the large scale with the small. Yet, the design of the questions as the prize problems almost entirely favours an infinitesimal calculus solution approach. Thus, it seems the infinitesimal blinkers are on in both physics and mathematics houses of learning in regard to how reality can be conjectured, theorized, and demonstrated. The only solution is to propose a new approach, a *de novo*, beyond the infinitesimal calculus process.

8. The ABC TM-0D number theory

The ABC feature of the TM-0D number theory is a pan-science descriptive inclusion to highlight the relevance of a pan-discipline approach to physics, to leave out all assumptions. This was presented in papers 60⁸⁴ and 61⁸⁵, here as per points (v)-(vii). By such, the work of Temporal Mechanics (zero-dimensional logic) generates *theory of form* (A) *words* based on known and continually well researched ideas of physical phenomena as an epistemology to the number relationship (B) *equations* from the proposed zero-dimensional axioms, much like mathematical hieroglyphs as primers that need to be deciphered into contemporary physics language (C) *theory*. By such, the ABC TM-0D approach represents a consecutive series of papers [1]-[61] that began

⁸³ CMI Millennium Prize problems [102], *as also cited in the following papers*: [44][49][55][56].

⁸⁴ [60]: p7-12.

⁸⁵ [61]: p2-6.

with the proposal of taking the concept of time and allowing it to resound the feature of reality existing *in the moment, one moment to the next*, and thus in *zero-dimensional time*. Such was the conjecture in paper 1 [1]. That conjecture was proposed to be resolved *mathematically* in deriving dimensionality from that zero-dimensional conjecture for time by using a *sentient based (A) number theory (B)* extending zero-dimensional time to time-before and time-after that conforms to our sentient talents of time-before and time-after, namely time-before as a known entity and time-after as an unknown entity. By extending the dimension of time in this way, in tagging time with space, dimensionality for space was achieved as the three dimensions of space.

To make that conjecture applicable to physics data (C) if not spacetime theory, the aim has been to only consider the rearrangement of the idea of time according *to how* we are *sentient* in time (A), namely the datum-reference of time-now *as our usual sentient existence reference (A)*, the datum-reference of time-before as the past, and the datum-reference of time-after as the future. The difficulty from paper 1 [1] was finding a way to cross-match the new zero-dimensional time conjecture (A)-(B) with contemporary physics (C), and the solution there was to extend the zero-dimension of time to the datum-references of time-before and time-after, to then allow proposed points of space, of zero-dimensional space in zero-dimensional time, to also be dimensionally extended to form the feature of 3d space from the 0d basis of time-now as presented in paper 2 [2].

Indeed, if physics theories require the expression of our deepest human natures, and if such represents a tendency to hedge/stretch the truth, to chase dragons and unicorns, to be above nature's invariant laws, then we must accept that and realize those consequences with reality and thence a tendency to dream realistic opportunities away. Proposed here is that the only way to arrive at invariant laws is not to fudge (hedge/stretch) the mathematics, to not use mathematical systems that average like Lagrangian/Hamiltonian and associated infinitesimal calculus methods, yet something more absolute. The proposed solution there is first tuning the description process to how we fundamentally are sentient with time and space, how we naturally exist in space and more importantly time, and to then ask if there is a number theory associated with such. By such, if one could refresh the theorizing process in physics today to accommodate for all of today's new data capabilities, it would be more practical to consider everything is connected in space and time using the one standard number theory upon the one universal *theory of form* basis embedded in that number theory. Thereby:

- (lx) When space and time are measured, the measuring process itself needs to be measured, and so on and so forth, such that the measurement process is consistent with that *theory of form precise universal* basis.
- (lxi) The ultimate *measurement basis* ideally therefore should be zero-dimensional, ultimately as a baseline and thence zero-point measurement standard for both time and space.
- (lxii) It would be correct to consider reality exists in time's moment, one to the next in the context of that zero-point standard, and that mathematically there is a $0 \rightarrow \infty$ scale of zero-dimensional points in space all connected in such a medium where light travels at a fixed speed c despite relative frames of motion reference.

- (Ixi) A new common theory for EM and gravity thence needs to be formulated to accommodate in the least for those principles (I)-(Ixi).

That's the basic adjustment physics is proposed to need.

The ABC TM-0D theory⁸⁶ presents not a number theory alone, yet a number theory relevant to how we exist in reality, in the dimensions of time and space. A number theory alone, whether 1-based, 0-based, and so on, is merely an abstraction that lacks purpose if it cannot be shown relevant to how one exists in dimensional reality. There, the ABC TM-0D theory considers the idea of zero-dimensionality of time's moment as the true *universal*, the true *theory of form*, we exist in. It is the one proposed constant of our existence, namely that we exist in the same time's moment as everyone else.

In granting such, does time's moment have a numerical value? The novel approach of ABC TM-0D theory is to give time's moment as zero-dimensional time not the value "0" yet the value "1". The thinking there is that it is more correct to assign "0" for a point in space and "1" as a moment in time if time is not space.

Thus, the ABC TM-0D general proposal is one of defining mathematical axioms *ab initio* for the zero-dimensionality of time and space and to then let that system of zero-dimensional time and zero-dimensional space relate with each other as a number theory. By their proposed relationship new mathematical and dimensional equations and associated descriptive constructs emerge which then relate an interpretation for themselves and how they relate with other emerging number paradigms and associated mathematical equation descriptors. Here therefore an epistemology emerges from the *ab initio* axiomatic constraints for the zero-dimensionality of time and space, the fundamental axioms for zero-dimensionality being the only constraint for the emerging epistemology.

The manner of this proposal needs to consider the following:

- (Ixiv) The zero-dimensional number theory and associated formalism is based on axioms as a hypothesis that emerges descriptions to be tested with physical phenomena.
- (Ixv) As a dimensional description conjecture, such is proposed to execute its proof by being scaled with known physical phenomenal scales (Bohr radius a^0) deriving the values for c and α , and the fundamental nature of light⁸⁷.

This number theory process was presented in papers 43-49⁸⁸ and papers 55-56⁸⁹ as the zero-dimensional number theory series of papers. What needed addressing by this "epistemology by axioms" approach was how to define basic axioms for time and space, and so the idea of the philosophy of not just numbers yet the dimensions had to be addressed. Indeed, numbers can only

⁸⁶ [60]: p7-12.

⁸⁷ Paper 60

⁸⁸ [43][44][45][46][47][48][49].

⁸⁹ [55][56].

be calculated *based on* a mental facility that one has, to then relate concepts calculated in one's mind to physical reality. Thus, the process that ensued was one of:

(lxvi) *zero-dimensional philosophy* → *zero-dimensional number theory* → *zero-dimensional physical theory*.

This process was executed with papers 50-56⁹⁰ as the *zero-dimensional physical theory* series of papers. There, the key human quest of calculating reality with numbers was explored; despite a moment of time existing everywhere and anywhere, and with each moment of time a point in space existing anywhere and everywhere, the human task is calculating how all that works. Paper 48 [48] describes that process of numbers as different numbers labelling the proposed zero-dimensionality of time and space so as not to lead to the contradiction of *time=space*. For that contradiction to be avoided (as much as moving a unit length in space is not a second), two basic unique mathematical values needed to be tagged to the ideas of a moment in time and point in space. The conjecture was and still is to use 1 for a moment in time and 0 for a point in space. There, one moment in space compared to another moment in space is still separated in time by 0 as $1 - 1 = 0$, more specifically as $t_{N1} - t_{N1} = 0_{t_A}$ where the flow of time is required to resolve the proposed $0-\infty$ scaling paradox⁹¹ of points in space.

The interesting feature to all of this is that in introducing *time-before* and *time-after* with *time-now* (moment), space is then able to become dimensionally relevant from zero-dimensionality. By such, the 3 dimensions of space are derived, more specifically are capped there at the value of 3, as presented in papers 44 [44]⁹² and 49 [49]⁹³. To note, *relative time (time's flow)* is still a feature of *absolute time-now* as derived in paper 60⁹⁴ where the speed of light c is calculated as a constant for all frames of relative motion for objects in space. Perhaps this can be further explained in the next section.

9. The universal frame of reference (UFR)

A frame of reference⁹⁵ (FR) is considered as an abstract⁹⁶ coordinate system whose origin (place), orientation (alignment), and scale (size) are specified by a set of geometrically placed reference points. These geometric points as a position are thence applied to whatever physical description required such as distance, time, temperature, and so on. Simply, for n dimensions, $n +$

⁹⁰ [50][51][52][53][54][55][56].

⁹¹ [43]: p1-5.

⁹² [44]: p8-12.

⁹³ [49]: p10-16, (xliv)-(lxxv).

⁹⁴ ([60]: p22, (lviii)-(lx)), also derived in the following papers: [2][52][60].

⁹⁵ Or *reference frame*.

⁹⁶ A purely geometric mathematical application.

1 reference points are sufficient to fully define a FR. So, for 1 dimension as a line, two reference points are needed to define that line. For 2 dimensions, 3 points are needed. For 3 dimensions, 4 points are most basically needed, and so on.

In Einstein's relativity, FRs are employed to specify the relationship between a moving observer and the phenomenon under observation. This is the basis of relativity theory for both special and general relativity. There, the primary reference frame, say FR1, is considered as an observational frame of reference⁹⁷ thence implying that the observer is at rest in that primary frame of reference. The secondary reference, say FR2, therefore for moving bodies involves a temporal component if the primary reference FR1 is at rest. Consider figure 12.

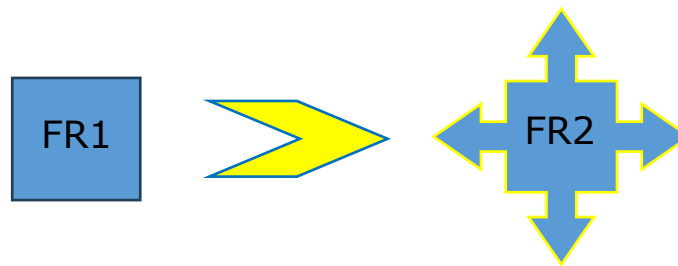


Figure 12: FR1 as the rest reference frame, and FRW as the non-rest frame of reference, the yellow chevron symbolizing the idea of motion being observed of FR2 from the stationary FR1 reference.

The secondary reference frame FR2 therefore does not equate across different secondary reference frames, say as FR2a-FR2b-FR2c, moving relative to each other owing to the primary reference **rest** frame FR1 defining the temporal component for each of the secondary reference frame **motions** FR2a-FR2b-FR2c. Consider figure 13.

⁹⁷ Or *observational reference frame*.

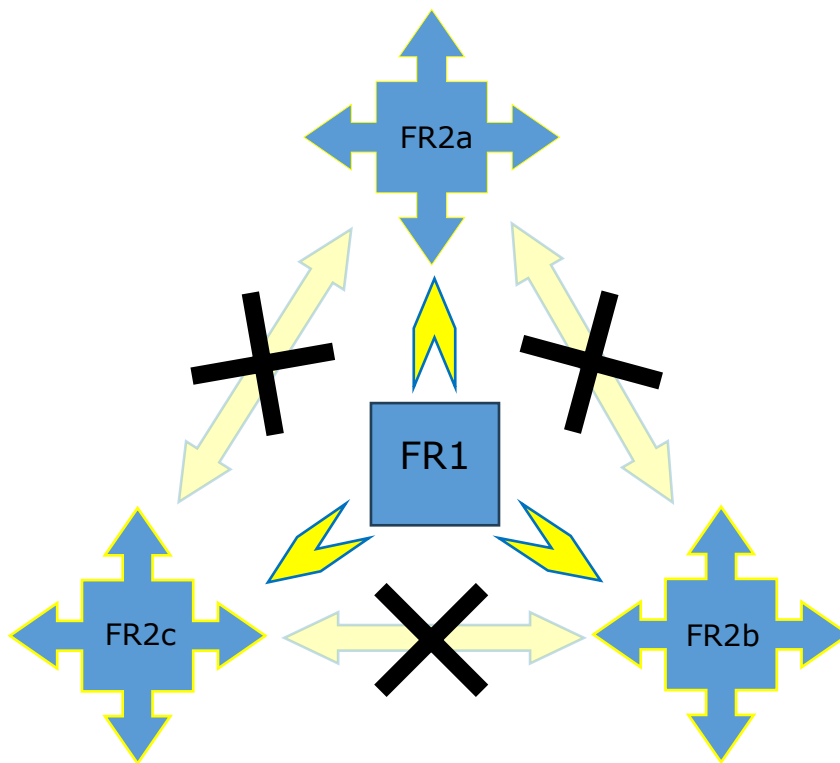


Figure 13: three motioning reference frames FR2a-FR2b-FR2c as observed exclusively from the rest reference frame FR1.

Physics data has consistently shown the speed of light c to be a constant for all relative frames of reference as FR2a-FR2b-FR2c for FR1. In other words, despite the motions of FR2a-FR2b-FR2c the speed of light c is always still a constant for FR1, meaning that light emanating from any of FR2a-FR2b-FR2c is still registered as c by FR1. This thence implies everywhere/anywhere is a potential rest frame reference mandating the constant value for c for bodies in relative motion. Consider figure 14.

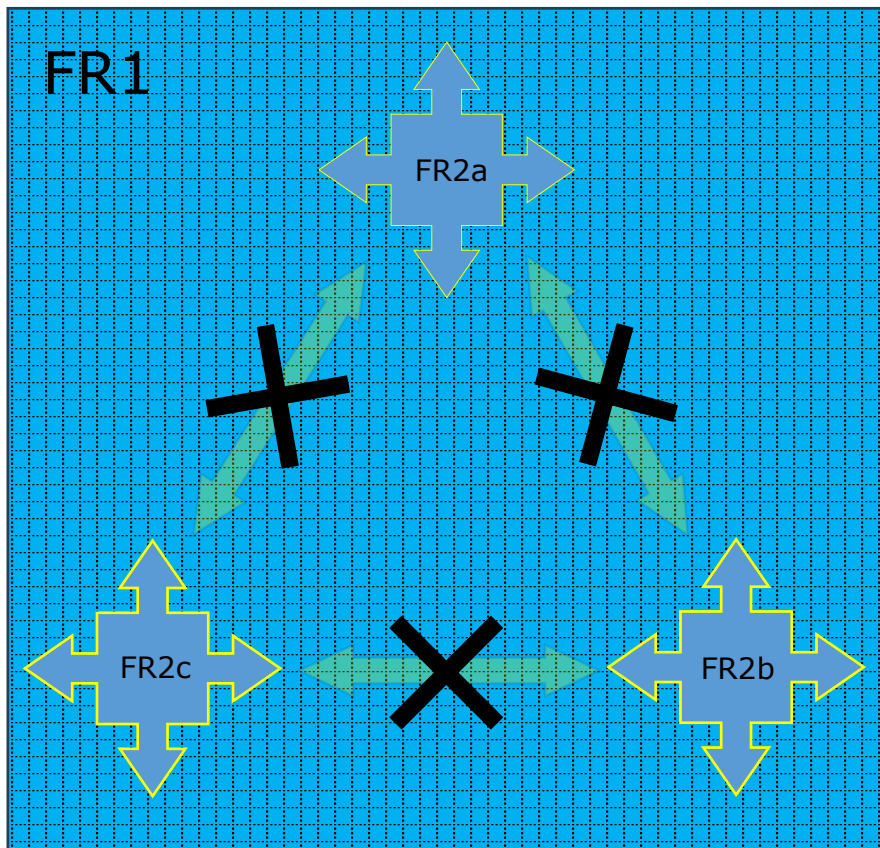


Figure 14: extending the rest frame of reference FR1 to every location in space as the FR1 spatial grid.

This pan-locale rest frame idea implies there could be a *universal particle aether*⁹⁸ **or** a *spacetime grid* underlying all of reality as the universal rest frame that mandates the speed of light c as such. The latter is the cornerstone of Einstein's relativity as 4d flat spacetime, as that background medium. To achieve this, Einstein had to dismiss the idea of 4d spacetime as a particle aether in view of the results of the Michelson-Morley experiment⁹⁹. The particle aether idea though is a step ahead of Galilean relativity where all secondary frames of reference are treated as primary frames of reference, say as FR1a-FR1b-FR1c, and thus where all those primary frames of reference become *temporally equivalent*. Consider figure 15.

⁹⁸ Particle aether [103][104].

⁹⁹ Michelson-Morley experiment [105].

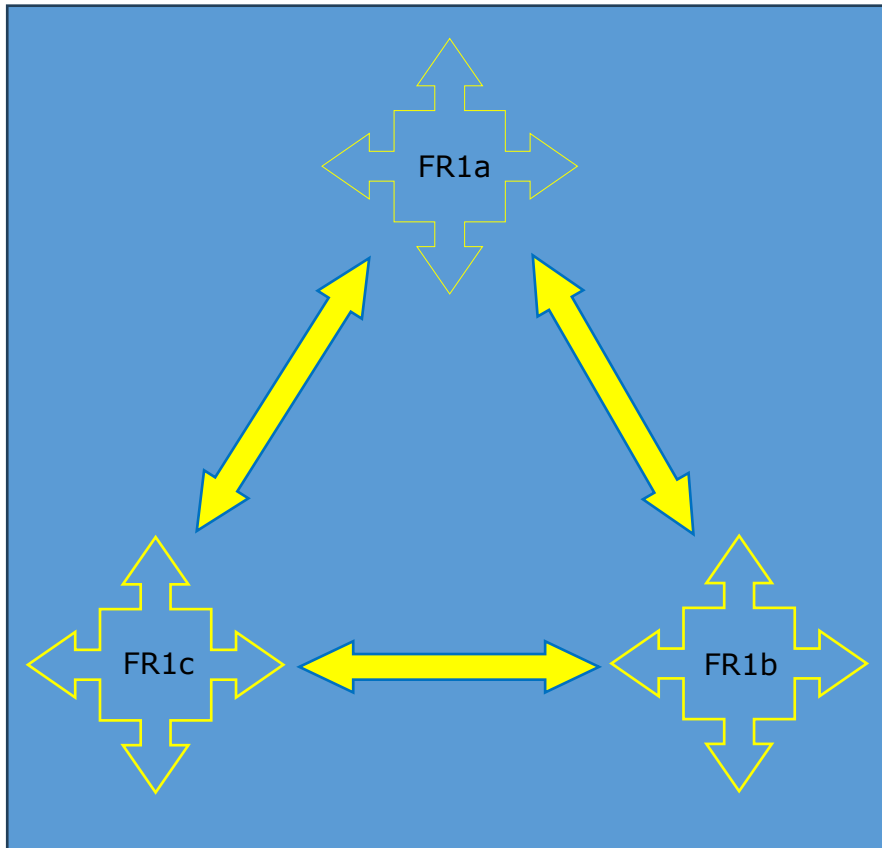


Figure 15: each non-rest frame of reference FR2a-FR2b-FR2c is now considered as the primary observation frame of reference and thus FR1a-FR1b-FR1c.

The obvious problem with Galilean relativity is that the relative speeds between FR1a-FR1b-FR1c would thence represent varying speeds of light c emanating from each of FR2a-FR2b-FR2c, which is proven to be false according to all the data.

The problem with 4d spacetime though has been presented in this paper, namely how it uses a mathematical infinitesimal calculus averaging process that leads to truly anomalous large scale phenomenal chimera proposals¹⁰⁰. A proper universal frame of reference (UFR) therefore needs to be proposed as a theoretical system of coordinates that is designed to be at absolute rest for any FR1a-FR1b-FR1c system to impartially view motion to describe ideas of relativity without corrupting known data and without fudging the number theory. Consider figure 16.

¹⁰⁰ Sections 5-6.

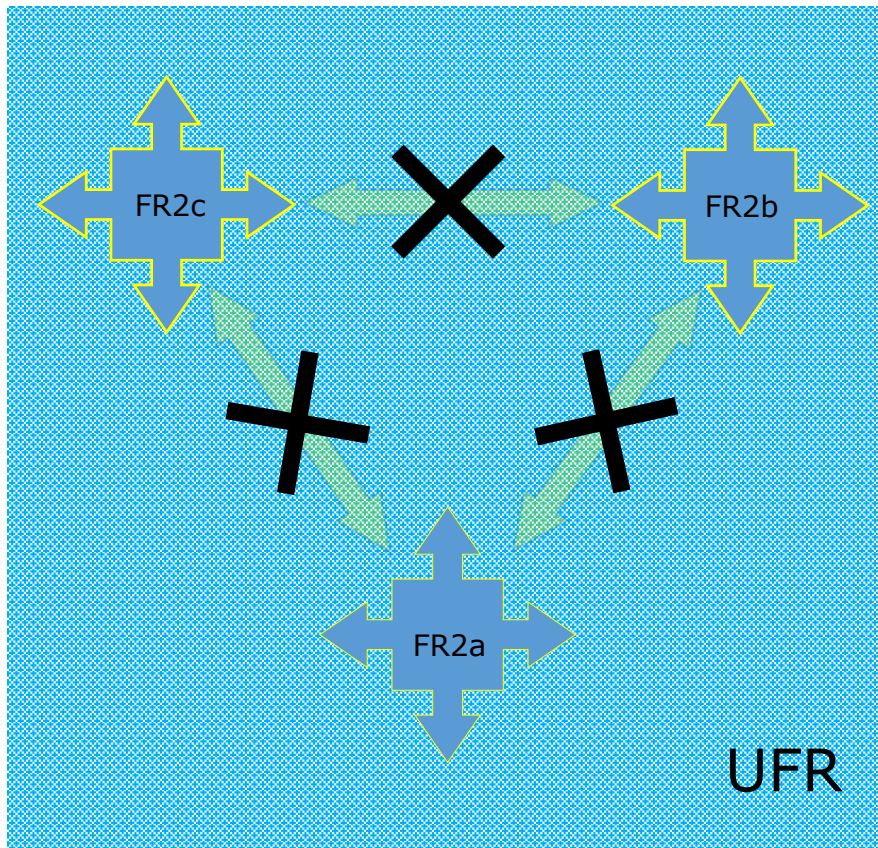


Figure 16: similar to figure 14 except here using not a 4d spacetime FR1 yet a zero-dimensional FR1 as a proposed UFR existing anywhere and everywhere.

This UFR was proposed in addressing the question of the $0-\infty$ paradox of paper 43¹⁰¹. There, the question was asked about how to determine what a zero-dimensional point in space is in being relative to another zero-dimensional point in space in the absence of dimensionality for space, hence the requirement of resolving a $0-\infty$ scaling paradox of points in space and how that relates to dimensionality if each spatial point is zero-dimensional. Paper 43 thence addresses this $0-\infty$ paradox in deriving dimensionality for time and space, allowing for any and every zero-point reference in 3d space, all in time's moment as time-now=1. This UFR 4d timespace field was constructed in its complete form in paper 60¹⁰² where the speed of light c was calculated to be a constant for any relative frame of reference, and there by using the Bohr radius a^0 the speed of light was calculated precisely to its known value c ¹⁰³. The question now in this paper is, "what are the key temporal and spatial features of this UFR?".

¹⁰¹ [43]: p1-5.

¹⁰² [60]: p23-66.

¹⁰³ [60]: p57-66.

10. The ABC TM-0D number theory as $1@0$ timespace

Paper 61 [61] took the step beyond the derivation of c to identify the time and space natures of this UFR as the $ETS\odot$ timespace field¹⁰⁴, namely the ellipsoid (E) timespace (TS) field (\odot). Here, the fundamental mathematical status of that field shall now be described as a zero-point UFR construction.

As the development of paper 61, three basic equations became apparent, three equations forming the hub of the ABC TM-0D secondary plexus of equations:

- (lxvii) The time-equation¹⁰⁵: $t_B + 1 = t_A$ (where $t_B^2 = t_A$).
- (lxviii) The space-equation¹⁰⁶: $e^{\frac{i\pi}{t_B}} + 1_{t_N} = 0_{t_A}$.
- (lxix) The ellipsoid-equation¹⁰⁷: $S_{\left(\varphi, \frac{-1}{\varphi}\right)} = \pi \cdot \varphi \cdot \frac{-1}{\varphi} = -\pi$.

The great implication there is that if time equates to space as per the requirement of the time-equation to find parity with the space-equation as an expression of proportionality, then length per time would be a fundamental universal constant as though dimensionless. The speed of light c is derived to have this capability though where at c time does not pass and is thus $0s$.

Thus, if a length of time at c is 0, then how can a length of space also be 0 at c ?

The ABC TM-0D theory finds that spatial length is zero at c because spatial length at c is a proxy zero-point reference. This zero-point reference is the derived solution to the proposed $0-\infty$ paradox of paper 43¹⁰⁸. In paper 61¹⁰⁹, *and throughout the preceding papers in volumes 3-9*, gravity as a force is proposed to operate this way as a mechanism of the $ETS\odot$ field where EM is limited to c for any frame of reference and relative motion, where at c time does not pass as $0s$ and thence space also $0m$ as a zero-point. The actual speed of light as c though and thence a dimensional distance per unit of time is granted as a process of zero-dimensional points being relative to each other in a dimensional realm for time and space. And that's it, as derived in paper 60. Therefore, the following logically proceed:

- (lxx) Any mass that approaches c would thence approach a zero-point spatial status and thence by deduction would approach 0 mass ($0kg$).
- (lxxi) Thus, only the lightest particles travel close to c , like electrons, protons, and neutrons; the fastest speed of a subatomic particle has been derived in paper 40¹¹⁰.

¹⁰⁴ [61]: p9-23.

¹⁰⁵ [61]: p10.

¹⁰⁶ [61]: p10.

¹⁰⁷ [61]: p9, eq1.

¹⁰⁸ [43]: 1-5.

¹⁰⁹ [61]: p9-16.

¹¹⁰ [40]: p19-25, eq4-14.

- (lxxii) The zero-point field would limit if not determine how EM and mass-bodies can absolutely move in space.
- (lxxiii) Gravity would be a zero-point background field effect for EM and mass determining their absolute range of motion, *yet range of motion nonetheless* from rest to c .

As the ABC TM-0D number theory has found, mass as EM resonance represents a *non* zero-point reference¹¹¹. Mass can only thence:

- (lxxix) Seek to find equilibrium with other mass in being repelled from speed status c .
- (lxxx) Mass thence seeks to find non rest status (non- c status) in a general zero-point system where mass-particles are in constant motion flux as described by the proposed solution to the 3 body problem¹¹².

Gravity as a field force can only logically therefore be proposed to:

- (lxxxix) Be the resultant zero-point field influence on EM and mass.
- (lxxxii) Be a force field thence measured to be limited at c **as** this UFR zero-point field that forces, prevents, mass from reaching c -speed status.
- (lxxxiii) Thus, be a repulsive zero-point field forcing by proxy the attraction of mass objects to each other.
- (lxxxiv) Thus, cause EM itself to be repelled by mass perpendicularly to the field line of gravity¹¹³, and thence have light behave as a curve around any large scale body.
- (lxxxv) Thus, have light scattered by mass particles on the small scale.

Points (lxxxix)-(lxxxv) thence propose EM to be perpendicular to gravity's virtual field lines. Thus, as EM approaches a body it would be ever so slightly deviated from that mass noting the relative strengths between EM and gravity¹¹⁴ would have EM generally strike mass, both as known finding in physics core to one of the proofs for Einstein's curved spacetime GR, yet here no estimations are used.

These same findings were also derived in paper 57¹¹⁵ in considering the zero-dimensional number theory approach to resolving the GR and QFT chimeras, where:

- (lxxxvi) The idea of "extending" dimensionality from a zero-dimensional basis is explored.
- (lxxxvii) Such (lxxxvi), as what is proposed to emerge as a *repulsive* effect of a zero-point time-space field,

¹¹¹ [52]: p36-40.

¹¹² [61]: p15-16.

¹¹³ [47]: p15-19.

¹¹⁴ EM being stronger than EM by a magnitude of 10^{35} .

¹¹⁵ [57]: p32.

- (lxxxviii) Such (lxxxvii), thence representing an absolute time-space barrier repelling both EM and mass.
- (lxxxix) Such (lxxxviii), proposed here as the *overall* resultant observed force of gravity.
- (xc) Such (lxxxix), as a more fundamental field force than QFT and GR.
- (xci) such (xc), as an eternally potential repulsive field *basis* as the "cause" that in theory would have existed before the theoretic big bang and thus in theory would exist ahead of the theoretic big bang shock front of time and space¹¹⁶.
- (xcii) Such (xci), as a force that moulds dimensionality of time and space into the shape it is perceived in according to our sentience ability of time and space.
- (xciii) Such (xcii), as a force that moulds the physical constants and associated equation descriptions they are calculated as.
- (xciv) Such (xciii), as a field force effect that seeks to restore and uphold those physical constants and associated equations when it as a gravitational field force effect is generated.
- (xcv) Such (xciv), all in the one general zero-dimensional time and zero-dimensional space number theory context.

The gravitational field effect¹¹⁷ by such represents the very zero-dimensionality of time and space the dimensional systems of time and space are established upon incorporating the theoretical ideas of the *before-event* of the perceived big bang and thence what's still ahead of the theoretical big bang as a zero-dimensional field code representing a repulsive effect. As derived in section 7 of paper 57¹¹⁸, this results in a steady state solar system and associated holographic depiction of the stars beyond, solving the core known data requirements for cosmology (liv)-(lix).

In short, these derivations are confirmed by known physics data, here without any fudging and without any resultant chimeras¹¹⁹ noting that all the equations of the ABC TM-0D number theory are linked in the one context, upon the one consistent number theory basis, without using renormalization processes, making this theory the only proper unified equation theory. In a nutshell, the ABC TM-0D number theory:

- (xcvi) Takes the idea of time-now as zero-dimensional time as "1"¹²⁰, and zero-dimensional space as a spatial point as "0", and asks how to derive dimensional time and dimensional space from such.
- (xcvii) To achieve such, the proposal is to consider that fundamentally zero-dimensional time and space are in the same zero-dimensional set, like zero-time as time-now, a condition of our existence, relates to every zero-point in space, thence proposing

¹¹⁶ [43]: p1-5.

¹¹⁷ [47]: p15-19.

¹¹⁸ [57]: p24-27.

¹¹⁹ Solutions to (liv)-(lix) as per paper 35 ([35]: p32).

¹²⁰ Noting time-now=1 is *zero-dimensional*, and thence *dimensionless*, not a value of *seconds*.

that 1-time @ 0-space (1@0) is the universal basis of reality, as a zero-dimensional basis for time and space.

- (xcviii) The ABC TM-0D theory thence asks how dimensionality is created from this 1@0 zero-dimensional basis for time and space.
- (xcix) The solution to deriving dimensionality is to extend time-now (1) to time-after and time-before, as presented in papers 1 [1], 8 [8] and 43 [43].
- (c) This thence derives the golden ratio equation for time which when applied to Pythagorean geometry derived the 3-dimensions of space¹²¹.
- (ci) This then led to number theory derivations for resolving the Riemann hypothesis *et al*¹²² in paper 44, further described in paper 55, creating a virtual $0 \rightarrow \infty$ 3d mathematical grid for space in the context of time.
- (cii) All of such thence derived in paper 60 [60] how/why c is a constant for any relative frame of reference, warranting a sense of confidence in this newly constructed *timespace* number theory.
- (ciii) Following paper 60, paper 61 [61] asked how the golden ratio time-equation can more directly link with the Euler identity space-equation which then led to the *ETS*⊙ *timespace* field equation.

In all, here the idea has been to first ask why this new theory is necessary, namely what it is superseding and why, and to then highlight how this new theory is entirely consistent *without fudging* other than exercising allowable step-by-step theoretical refinement processes¹²³. The hope here is that this has not been too confronting, for such has not been the intention, for we as a scientific community have needed what we have needed as steps of theory through the millennia. Indeed, without the current *action principle* based data of physics the 1@0 *timespace* theory would be totally meaningless, hence all effort has been made in volumes 1-9 to show that gratitude with ample references to the works of others.

11. Conclusion

Demonstrated here has been why mainstream physics and its use of number theory has been brought into question, namely by virtue of those chimeras it proposes in association with those number theories. Yet such leads to the idea of a required paradigm shift in number theory basis and associated formulation. Historically, paradigm shift changes in physics have been central to a fundamental change in how physical reality is being thought of. One would therefore suspect that

¹²¹ ([2]: p3-16); ([43]: p6-8); ([49]: p10-35).

¹²² Riemann hypothesis ([44]: section 8), Goldbach's conjecture ([44]: section 7), Beal conjecture ([55]: section 9).

¹²³ [60]: p29-34.

the next paradigm shift will not only be a change in how physical phenomena is thought of in a fundamental way, yet practiced more diligently in a fundamental way.

There also, mathematics when applied to physical reality is meant to be precise, not a rounding off. This is why the $1@0$ timespace approach is being proposed as that paradigm shift. Here, a next-step theory as $1@0$ timespace proposes itself to be does not seek to destroy other theories, yet describe and harbour them based on their merits of achievement. In physics, an ideal physics theory explains where physics is at and why, and thus an ideal theory explains itself, and more importantly what it is being used for. Here the case is presented that there are too many chimeras in contemporary physics for physics theory not to be more fundamentally questioned and resolved.

Conflicts of Interest

The author declares no conflicts of interest; this has been an entirely self-funded independent project.

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