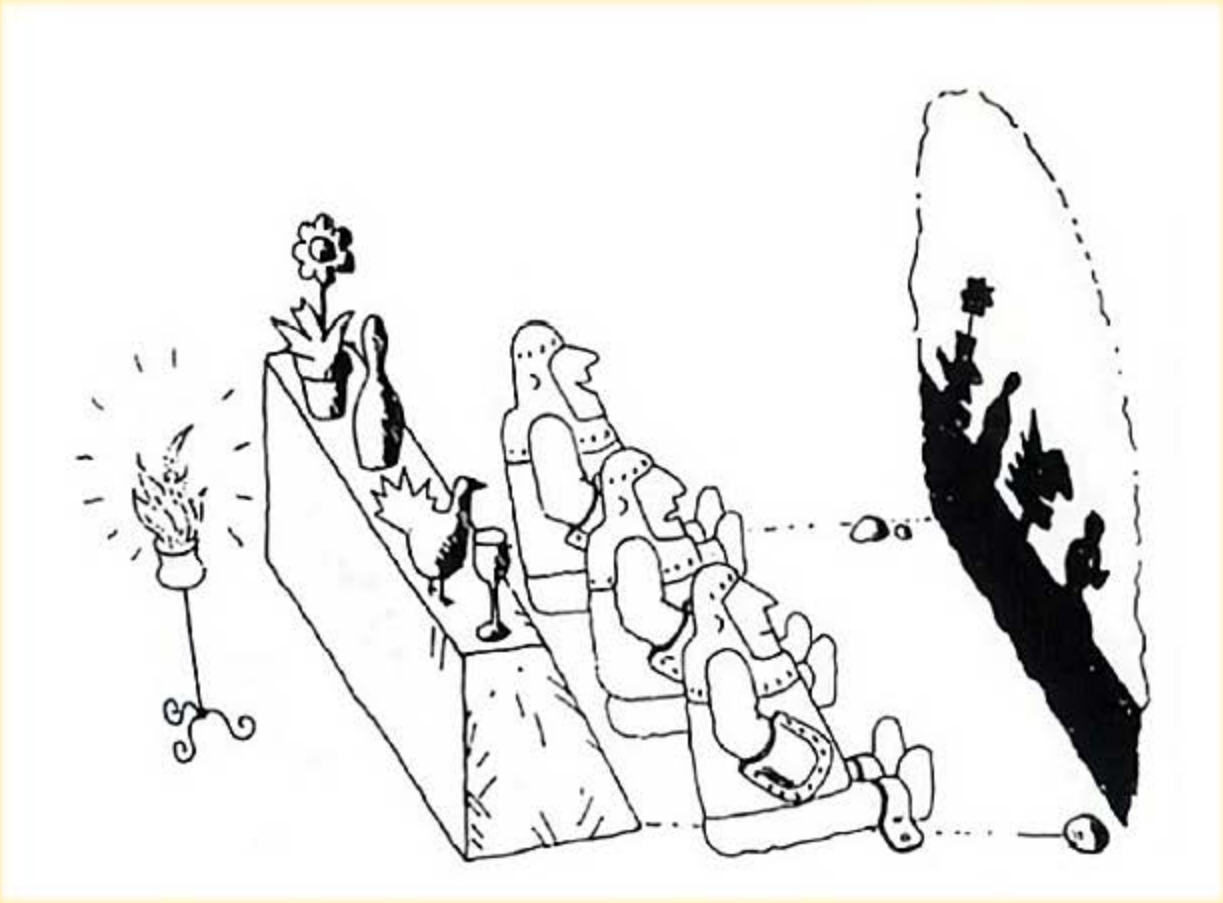
The Physics of Life



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Abstract

This general-audience book introduces the main ideas of the so-called Platonic theory of spacetime, presented in full at my website, and also rebukes the materialistic speculations by many physicists and philosophers regarding the physics of the brain, along with those based on dualistic parapsychology. To that end, three major issues are explained in details: the common origin of matter and psyche, the Heraclitean arrow of Time, and the self-acting faculty of living organisms and quantum-gravitational systems. Hence the human brain is embedded in the quantum-gravitational Brain of the Universe, and the two are governed by the physics of Life.

The first off question in the book is the following: given the fact that the human brain is equipped with mind, consciousness, volition, and memory (abbreviated MCVM), what could be the physics of this chunk of wet warm matter? The two have nothing in common, yet they are perfectly correlated. The solution is based on the Platonic world and the global Heraclitean Time. It leads to a new pre-geometric theory of spacetime, called Platonic theory of spacetime. The latter is suggested as the only possible conceptual solution to the problems in quantum gravity and quantum cosmology. As a corollary, the possibilities for physical theology and spacetime engineering with MCVM are briefly explored.

The electronic version of the book, in PDF format, is available at my website. Ch. 10 is reserved for the contributions by many physicists and mathematicians, expected by Christmas 2021. The publication date is fixed at January 6, 2022, commemorating my fifty years of research. The second video demonstration of spacetime engineering is due on March 27, 2022, and the third one in 2024.

Table of Contents

Questions and Answers

Q1. Why Platonic world and Heraclitean Time?

A1. The Platonic world (*Res potentia*) is explained in Ch. 2, pp. 3-6. It (not "He") is the common source of matter and psyche, after Leibniz[9,16]. To recover the global unobservable Heraclitean arrow of Time (p. 3), I use reverse engineering and interpret (**i**) the *intact*, not-yet-observed quantum state in QM (Erwin Schrödinger in Ch. 2) and the negative energy densities in QFT[40,43], and (**ii**) the "intangible"[34] gravitational energy[32,54] capable of producing Earth tides[33] (p. 18), as Platonic world (*Res potentia*) placed in the potential **future** of the arrow of Time (Fig. 4). Thus, (**i**) and (**ii**) do not belong to the **past**[57], but to the potential **future** depicted with the **carrot** (see p. **iii**) in the first video demonstration from 15 January 2020, entitled *Spacetime Engineering 101*. The second (advanced) video demonstration, *Spacetime Engineering 201*[53], is due on 27 March 2022. It is a very simple exercise: see Fig. 6 at p. 6 and read about the so-called *biocausality* (January 1990) at p. 13. The immediate application of spacetime engineering is natural healing, known as Reiki. It is made of two Japanese words — *Rei* which means "Higher Power" and *Ki* which is "life force". Replace *Rei* with the Platonic Universe as ONE (p. 5), and *Ki* with its *physicalized* mass-energy[57], as explained with a sequence of apples. I hope to elaborate in the third video presentation *Spacetime Engineering 301* in 2024. It will be even more 'advanced', as Reiki is based on physical theology (Ch. 6.4).

But why is the Heraclitean arrow of Time unobservable? Any physical observation will inevitably use light and hence can show *only* in the **past**[57] (Fig. 4, p. 3), which is why I used reverse engineering to uncover the *physicalized* imprints of the arrow of Time, cast in the **past**[57]. Physically, the Platonic world (*Res potentia*), placed in the potential **future** of the arrow of Time, is 'nothing' (Ch. 6 and p. 3 in Time.pdf). We observe, in our physical and mental worlds, only two complementary 'shadows' (Fig. 12 at p. 13), called matter and psyche (the doctrine of *trialism*, Fig. 5).

Now, as I stated earlier, this book introduces the main ideas of Platonic theory of spacetime, presented in full at my website (p. **i**). I do not touch the gravitational rotation, because the issue is too difficult for the general audience, and also because I have explained it elsewhere. In the Gravitationsfeldrelativitätstheorie (Gravitational Theory of Relativity), spacetime guides matter, telling it how to move-and-rotate. At the same instant, matter acts back on spacetime, telling it how to alter the *rate* of Time in the invariant spacetime interval Δs^2. In general, (**i**) the action of gravity, thanks to which matter has inertia (Fig. 9b, Ch. 3), and (**ii**) the ubiquitous gravitational rotation are like two sides of a coin. An apple can fall from a tree and hit your head because they both experience gravitational rotation. Everything rotates, from quantum "particles" endowed with quantum spin to planets, galaxies and beyond. In current GR textbooks, the alleged spacetime "curvature" cannot *in principle* explain the gravitational rotation and Earth tides[33].

How can the spacetime metric ***rotate*** the Earth and ***pull up*** rocks? Can the experts explain the first off puzzle — the energy[32] from gravity[35] (H. Ohanian)? Read p. 18. We cannot make any progress today, because physics is vehemently contaminated with GW parapsychology[50]. Physicists are scared to even *think* about gravity. Sorry.

I thank Stavros (Kavala, Greece) for his question. Do not hesitate to send yours.

Q2. Sorry, I did not understand your explanation (A1). Can you make it simpler?

A2. Let me try. The global Heraclitean Time is the 'vehicle' explained in the first video demonstration from 15 January 2020, entitled *Spacetime Engineering 101*. Please see Fig. 6 at p. 6, reproduced below.

You only have to swing the "carrot" (*potential* **future**) toward your desired destination, and the donkey will carry you and your **4D** "cart" there. The principal question is how to develop feedback from the **matrix** shown as "carrot": follow the Law of Reversed Effort. There is no ***physical*** interaction between you and the *wegtransformierbar* **matrix** — you will only notice that your ability to perform **self-action** (p. 10) has been increased.

To understand the Platonic *Res potentia*, read the explanation of the "trunk" in Fig. 5 at p. 3. Bottom line is the mater-psyche duality and the doctrine of *trialism* (pp. 2-3). Did you get it, my dear Eskimo?

Back to the "carrot" above: we all practice a 'mild' spacetime engineering. Read N.A. Bernshtein at p. 13. Once you include a distant physical system in your perceptional space and body schema, you will obtain a new sensation from the *qualia* of your new "carrot", and you're ready to go (p. 14). But how? I suggested (21.09.2008) two types of distances in **4+0 D** spacetime: (**i**) metric distance (local mode of spacetime), and (**ii**) a *pregeometric* Platonic "distance" (global mode of spacetime). The latter is *exactly* **zero**: see the *atemporal* strips in the movie reel in Fig. 11. Now you say, 'naah, there's no such animal!' But what is the "distance" between the cognitive concepts in your memory, say, between the notion of a tree and that of a mountain? Ditto to the "distance" between electron orbits (Slide 9). They are "just in the middle between possibility and reality" (Werner Heisenberg).

To practice spacetime engineering[53], you only have to follow the Law of Reversed Effort: "To the mind that is still, the whole universe surrenders" (Lao Tzu). Perhaps you will need around 10^{-9} joules (John Baez). Read *Notes on Spacetime Engineering* (SE.pdf). Here is a simple example of how the human brain works 'as a whole':

> Aoccdrnig to a rscheearch at Cmabrigde Uinervtisy, it deosn't mttaer in waht oredr the ltteers in a wrod are, the olny iprmoetnt tihng is taht the frist and lsat ltteer be at the rghit pclae. The rset can be a total mses and you can sitll raed it wouthit a porbelm. Tihs is bcuseae the huamn mnid deos not raed ervey lteter by istlef, but the wrod as a wlohe. Pritie amzanig huh?

Your brain works **upon itself**, **by itself**. This **self-action** is the physical *mediator* of the human mind, consciousness, volition, and memory (abbreviated MCVM, p. 2). Think of Platonic **hand** in a physical glove: all biological and quantum-gravitational systems become **self-acting** "gloves" and can perform work **upon themselves**, **by themselves**. The same **self-action** runs **gravity** as well. This is the hallmark of the physics of Life. This is the **fifth force**. Your MCVM springs from the Platonic **hand**.

Q3. You are denouncing Einstein's GR, but what is your theory of gravity?

A3. As I tried to explain in my contribution to the physics of Life (p. 28), the **global** phenomenon, creating the Large and the Small (Fig. 13), will create gravity **locally**, by "shrinking" the metric to produce local gravitational attraction, and at the same instant by "inflating" the metric in the remaining part of the system to produce local gravitational repulsion, so that the two tug-of-war manifestations of gravity reach dynamic equilibrium. It is a **balance** (Eq. 2 at p. 28). Not "conservation".

Bottom line is the Heraclitean arrow of Time: read *Notes on Spacetime Engineering* (SE.pdf). To quote from W.G. Unruh in ref. [13] therein: "Gravity ***is*** the unequable flow of time from place to place. (…) The phenomena we usually ascribe to gravity are actually caused by time's flowing unequably from place to place." But to grasp the *flow* of Time and explain the flexible and unequable *rate* of Time will require considerable efforts. We can't define the *rate* of Time as 'one sec per sec'. Here's a simple illustration of the *flexible* unequable rate of Time.

Imagine three invariant timelike intervals, called Alice (A), Bob (B), and Carol (C). Here A = ½ B, and B = ½ (C). If we tweak the coefficient, A can shrink to the size of protons, whereas C can be inflated to the size of galaxy clusters and more.

A _____
B _____
C _____

Suppose the *assembling* of spacetime (Fig. 14 at p. 15) creates A, B, and C (**A5**). As E.F. Taylor and J.A. Wheeler explained, A, B, and C "are *calibrated* in meters of light-travel time", so 1m is app. 3.3 nanoseconds. In relative-scale (**RS**) spacetime (Fig. 13), the **re**-assembling of spacetime (Fig. 14) is a new *relational* phenomenon, meaning that the **rate** (Sic!) of the light-travel Time is both relational and ***flexible***. With respect to Bob (B) at macroscopic length scale, Alice (A) is "small" and Carol (C) is "large", and Bob will speculate that Carol was "inflated" by "dark energy". But if Nature "calibrates" the **rate** ("speed") of light-travel Time, Alice will be assembled with half the **rate** of light-travel Time that assembles Bob, and Carol will be assembled with the double **rate** of the light-travel Time that assembles Bob: a smaller distance assembled with smaller speed is *indistinguishable* from a greater distance assembled with greater speed. Alice, Bob, and Carol will have *indistinguishable* relative-scale (**RS**) "size" of *their* 1m viz. *their* 3.3 nanoseconds in *their* (Sic!) reference frames. Yet relative to Bob, Alice will be "small" and Carol will be "large". Nothing in Nature is absolutely "large" or "small". It is all relative.

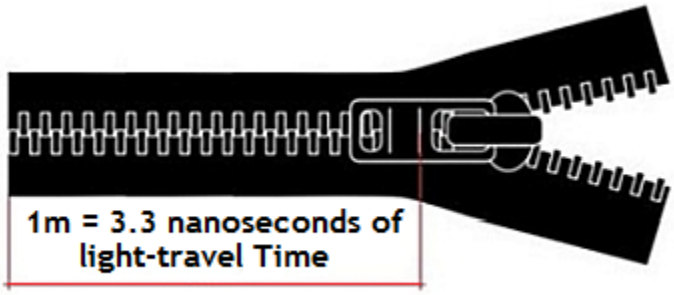
Thus, if we apply this global phenomenon locally at B above, we will experience the attracting effect of gravity, creating *locally-deflated* area of spacetime viz. the attracting gravitational "force" producing, say, the Earth tides. Where does the energy of the "glove" come from? The vacuum in the *evolution equation* at p. 28.

Q4. Why are you banging your head against a wall?

A4. Climate change — check out the Rossby Waves at YouTube (1:48/4:26). We do need unlimited clean energy, and spacetime engineering may be *the only* chance we have to reduce CO_2 emissions by 7.6 per cent every year from 2020 to 2030. If we fail now, by **2025** (Sic!) the cut needed will steepen to 15.5 per cent each year, which is absurd, plain and simple. Read p. 28 (last) in BCCP. **Time is running out!**

Q5. I could not understand the story about Alice, Bob and Carol.

A5. Let me try to explain Alice, Bob and Carol (**A3**) with the Heraclitus' river – everything changes and nothing remains still, you cannot step twice into the same stream. The river (the arrow of Time) creates (assembles) the spacetime (Fig. 14).



See E.F. Taylor and J.A. Wheeler and Fig. 14 at p. 15.

Suppose you stay at the river's bank and decide to measure the speed of the river. You see a leaf floating on its surface and measure with your stopwatch the time it takes to pass 1m, which happened to be 1s, relative to you at rest. You infer from your experiment that the Heraclitus' river flows with *speed* (Sic!) 1m/s.

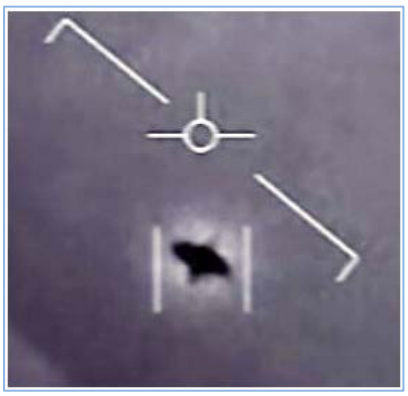
Now, suppose Bob's interval (B) above is 1m, which correspond to 3.3 nanoseconds (ns) of light-travel Time. According to Bob's watch at his reference frame (B), Alice's interval (A) is 0.5m (0.5x3.3 ns), and Carol's interval (C) is 2m (2x3.3 ns). **True**. On the other hand, however, Alice's interval (A) is being created (calibrated) with one-half (0.5) of the *speed* of Heraclitus' river, so Alice's interval (A) is in fact *indistinguishable* from Bob's interval (B), as (A) = (B) = 3.3 ns of light-travel Time. Ditto to Carol's interval (C), which is being created (calibrated) with twice the *speed* of Heraclitus' river. Hence (A) = (B) = (C) = 3.3 ns of light-travel Time in *their* reference frames. **True**. Yet relative to Bob above, Alice is indeed "small" and Carol is indeed "large". How is this possible? Because the 3.3 ns of light-travel Time are like a 'distance' (**A3**) trespassed/assembled with different ***speed***. That is, a smaller distance assembled with smaller speed is *indistinguishable* from a greater distance assembled with greater speed. Voila. There is no "mystery matter" here.

Again, the rate/speed of the light-travel Time is both relational and ***flexible*** (**A3**). There is no ideal or meta-observer, which can "see" Alice, Bob, and Carol *en bloc*, and can tell which one is "small" or "large". It is all relative, as uncle Albert said. We do not accept absolute *physical* phenomena, such as the absolute length scale.

Now we can suggest two hypotheses about modifying gravity locally. Suppose Bob has an apple (recall Newton's apple) at his desk. The spacetime associated with the apple is *deflated* (not "curved"), leading to attractive gravity: please read above. Which means that apple's spacetime, at Bob's macroscopic length scale (B), has been deflated *locally* toward 'the small' (Alice). If Bob alters the *rate* of Time (read W.G. Unruh), he can make the apple both heavier and lighter. In the latter case, Bob can (effectively) eliminate the weight of the apple. This is called **REIM**, from 'reversible elimination of inertial mass', and requires very small amount of energy, like your brain used to read the text above. No, it's not Chinese "magic"[39].

The second hypothesis about modifying gravity locally with **REIM** is explained in *Experimental Tests of Spacetime Engineering* (test.pdf). I suggested a relative scale (RS) factor denoted **Ω**, to quantify the **rescaling** of spacetime. In the initial example (**A3**), the rescaling (calibrating) Bob (B) to Carol (C) is made with **Ω** = 2.

Now we *inflate* the macroscopic spacetime (B) in a REIM drive *locally* toward 'the large' (C) by **Ω** = 1000, and fly with *our* RS speed 1m/s. An observer on the ground will measure our RS velocity to be 1000m/s and will be puzzled by our "immense" acceleration and "impossible" sharp turns. No problem, as we fly with our RS speed 1m/s. Sure enough, we don't use "dark energy" nor "exotic matter". See again the *evolution equation* at p. 28 (last), and recall the so-called gimbal (p. 19 in SE.pdf).



If we push this hypothesis further, we can speculate about the Alien Visiting Craft (AVC) of our genteel visitors. Recall the AVC over Xiaoshan International Airport in Hangzhou (China), detected by their air traffic controllers at 20:40 on July 7, 2010. According to CCTV (07-10-2010), only the residents near the airport took photos of the AVC, one of which is shown below. (The Chinese authorities are kindly inviting us to believe that their air traffic controllers didn't have any digital camera.)

If our visitors can rescale the spacetime (B) toward 'the large' (C) by **Ω** = 10^9, their AVC will fly faster than light (**c** ≈ 3×10^8 m/s) and will *disappear* to all observers at Earth and spying satellites. They will be flying with *their* RS speed 1m/s in *their* RS frame. Perhaps AVC's engine will require more energy than reading the text above.

Impossible? You just never know. Please start from your GR textbooks: how can the spacetime metric *rotate* the Earth and *pull up* rocks (**A1**)? The ball is in your court!

1. Introduction

The author of this book firmly rejects the speculations by many theoretical physicists and philosophers about the human brain, mind, and consciousness (Ch. 6). You will be the judge.

Given the fact that the human brain is equipped with mind, consciousness, volition, and memory[1] (hereafter abbreviated MCVM), what could be the *physics* of this chunk of wet warm matter (Fig. 1)? How is our MCVM connected to its brain[11]? The two have nothing in common![15]

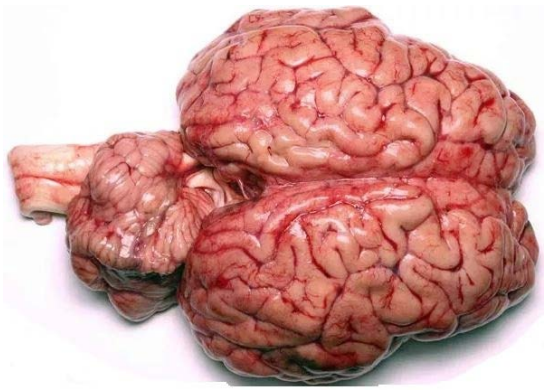


Fig. 1

The easiest approach toward this puzzle is to postulate that MCVM is epiphenomenon: the brain is the "hardware" and MCVM is its "software", so everything we study in psychology is a totally redundant mental reflection (qualia) of neural computations (Fig. 2) in the "hardware" (Fig. 1). For example, it is claim that "an adult human brain carries out about one thousand trillion (10^{15}) logical operations per second" (H. Greenside). But these 10^{15} *logical* operations per second are reserved only for the first homunculus; the second one will control the first homunculus, the third one will control the second homunculus, *ad infinitum* (Fig. 2). Why? Because no computing machine, called homunculus, can *act on itself*, like Baron Munchausen.

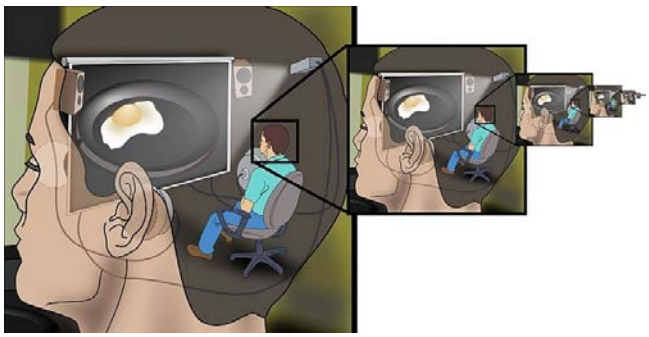


Fig. 2

How can we square the circle? Perhaps with some help from Quantum Mechanics (H.P. Stapp[2]; S. Hameroff[3]) or from gravity (R. Penrose[4])? Or maybe both? Let's face the bold facts about the human brain[11]. We need new physics, which I will call 'the physics of Life'. First, some history.

In February 1943, Erwin Schrödinger[5] stressed that "we are here obviously faced with events whose regular and lawful unfolding is guided by a 'mechanism' entirely different from the 'probability mechanism' of physics. (…) We must be prepared to find a new type of physical law. Or are we to term it a non-physical, not to say a super-physical, law?"

Erwin Schrödinger was right, but his colleagues did not search for a new type of physical law. Look at your prenatal brain (Fig. 3): it will soon grow with the rate of about 250,000 nerve cells per minute or roughly 4000 per second, so that now you can think[1]. How come nothing goes wrong? Why is Murphy's law 'anything that can go wrong will go wrong' not valid here?

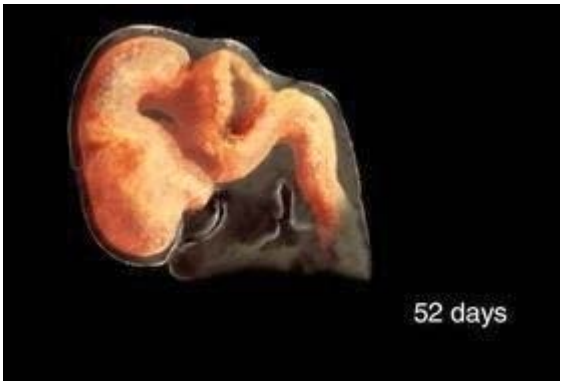


Fig. 3. Compare it to Slide 10 in *Quantum Spacetime*[14].

Our goal is to focus on the physics of Life. We will ignore all materialistic and dualistic[6] ideas and will formulate the simplest possible task: what is the *physical* mediator of MCVM[1] in the human brain? On the one hand, this 'mediator' (*sit venia verbo*) can interact with the human brain[11] and the physical world[1], and therefore it must be *physical* stuff (called 'causal field', Ch. 4). On the other hand, the same 'mediator' has a special[15] *dual nature*, in the sense that it has qualia manifested in our MCVM[1]. Hence it is neither physical[2,3,4] nor mental[6] entity. It is the Platonic world (Fig. 5) casting two *complementary* "shadows", called matter and psyche[7].

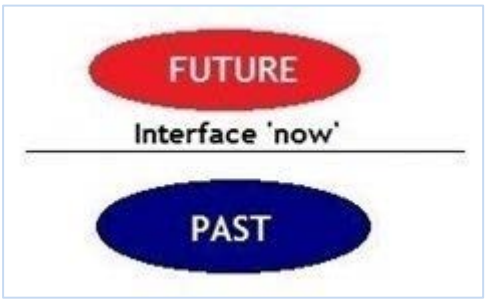
Bottom line is the oldest proposition about matter and psyche as two pre-correlated[9] entities, which emerge from their common source[7] (the doctrine of *trialism*, Ch. 2). Compared to the wave-particle duality in quantum mechanics[8], our theory also suggests two *complementary* presentations emanating from their common source ("trunk", Ch. 2), but in our case the "wave" has particular qualia placed in the potential future ("carrot", Ch. 2) in the Heraclitean arrow of Time[25] (Ch. 3), thanks to which it can act as 'mediator' of the human mind[1] and also deliver the physics of Life (Ch. 4), bootstrapping and guiding the living brain[11] (Fig. 3).

Needless to say, the metaphysical framework was worked out by Gottfried Wilhelm Leibniz[9,16]. We will try to cast it in the framework of modern theoretical physics and cosmology. At the end of the day, we will suggest that the physical partition[30] of the Universe is designed like the human brain[1], thereby suggesting the idea of quantum-gravitational Brain of the Universe viz. a set of faculties of the human brain[10] embedded in the Universal Brain due to their common spacetime. Physically, the Platonic world is always *exactly* nullified (4+**0**-D spacetime, Ch. 4), and is therefore unobservable with light[12]. Physically, it is a 'vacuum'[13,43]. In the doctrine of *trialism* (Ch. 2), we expect to encounter the complementary UNspeakable *cognitive vacuum*[1], as matter and psyche are interpreted as two complementary "shadows" of the Platonic world.

Let me show how all pieces of the Platonic spacetime (Fig. 10) can find their unique places and fit there effortlessly, like the pieces of the jigsaw puzzle of Nature.

2. The physics of Life

Matter and psyche must be separated[12], to preserve their ontologically different nature. But they also must be connected, in order to interact and evolve. The only possible way to fulfill these requirements is to place matter and fields in the *irreversible* past, and the psyche in the *potential* future in the Heraclitean arrow of Time (Ch. 3). Obviously, we need new physics[1], as Erwin Schrödinger argued in February 1943[5]. Physicists can no longer pretend that the Platonic world were "outside" their field of research, hence it might be of interest only to philosophers and priests. Quite the contrary. The task is strictly mathematical, and it requires rigorous investigation of the structure, topology, and dynamics of spacetime[1] (Fig. 4); details in Ch. 4.



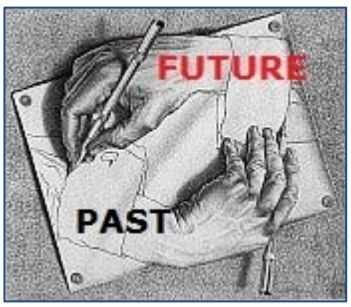
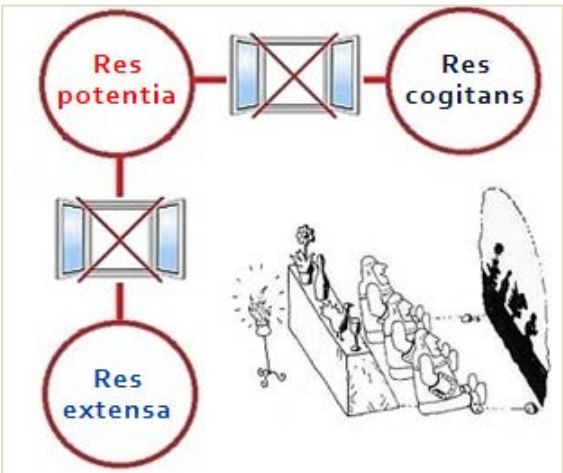


Fig. 4. Explanation in Fig. 11 and in *Quantum of Spacetime*[1].

Let me introduce the doctrine of *trialism* (Fig. 5); see Slide 14 in *Quantum Spacetime*[14].

To explain Res potentia and the doctrine of *trialism*, imagine the following situation: you are an Eskimo, and you have never seen and will never see an elephant in your life. Yet you can make observations on elephant's *trunk* by two complementary devices measuring either properties of *your* arm or properties of *your* nose.



You can never imagine the common source of *your* arm (Res cogitans) and of *your* nose (Res extensa), which you blindly called *trunk* (Res potentia), because the latter does not have any arm-like "windows" nor nose-like "windows": it (not He) is 'the true monad *without* windows'. (Leibniz *Monadology* § 7)

You may suggest, after Leibniz, that what *you* see as an arm (Res cogitans) is always pre-correlated with what *you* see as a nose (Res extensa) by pre-established harmony. But again, you're an Eskimo and cannot even imagine the 'trunk' (Res potentia).

Fig. 5

Notice § 7 in Leibniz's *Monadology* from 1714[16]: "The monads have no windows through which something can enter or leave." There is no mathematical presentation of such unique object, because the monad is *not* the mundane 'empty set'[17]. The latter denotes the absence of some cognizable object, like 'zero *something*'; for example, I suppose the set of bananas, which you have stuck in your ears while reading these lines, is most likely an empty set[17]. The monad, on the other hand, has no 'windows' *whatsoever* (Fig. 5), hence the probability for its observation is *exactly* zero. It (not "He") cannot be grasped even with thought experiment, as it resembles Kant's Noumenon (*Das Ding an sich*)[18]. Thus, the monad might be both 'one' and 'many'. It is the source of both matter and psyche — the Platonic world as Reichenbach's Common Cause[19].

The metaphysics of the doctrine of *trialism* (Fig. 5) is heavier than the wave-particle duality in Quantum Mechanics (QM)[8]. The latter presupposes an object — the **intact** quantum state — which cannot be directly observed, yet it plays the role of Reichenbach's Common Cause[19] to all quantum "particles-and-waves" viewed as its **physicalized** "jackets" (p. 17). For example, in the Schrödinger's cat paradox[20], there are two *physicaliz**able*** states of the **intact** quantum cat, either "alive" or "dead", yet QM textbooks cannot describe the **intact** quantum cat from which they would evolve. As Erwin Schrödinger stressed in 1935[21]:

> The rejection of realism has logical consequences. In general, a variable *has* no definite value before I measure it; then measuring it does *not* mean ascertaining the value that it *has*. But then what does it mean?

It means that the probability for observing the *intact* quantum state — the quantum **monad** — is ***exactly*** zero. Now, in the doctrine of *trialism* (Fig. 5), the Platonic world is explicated as (**i**) *Res extensa* (matter and fields) in the *irreversible* past (Fig. 4), (**ii**) Platonic *Res potentia* in the potential future (Fig. 4), and (**iii**) *Res cogitans* (psyche) placed also in the potential future. Thus, the Platonic world is the ultimate 'monad without windows'[16], and the *Res potentia* (**ii**) pertains to both the living world, such as the human brain[1,11], and the quantum-gravitational world (Ch. 4). Metaphorically, *Res potentia* (**ii**) acts like a "filter" for *Res cogitans* (psyche) in the macroscopic world, thanks to which the psyche is exclusively explicated there. Both the quantum and gravitational systems have their specific *Res potentia* (Ch. 3), but they are *not* endowed with human mind, because the latter can be coupled only to macroscopic systems. Thus, the question of whether the Universal Brain (Ch. 1) may or may not be equipped with some kind of Universal Mind (intelligenten Geist) is outside the applicable limits of the theory.

For example, let me quote Max Planck from his last speech *Das Wesen der Materie*[22]:

> There is no matter as such! All matter originates and exists only by virtue of a force which brings the particles of an atom to vibration and holds this most minute solar system of the atom together. We must assume behind this force the existence of a conscious and intelligent Geist (bewußten intelligenten Geist). This Geist is the matrix of all matter.

Replace 'the matrix of all matter' with *Res potentia* (Fig. 5) — it is neither matter nor psyche. And yes, the matrix or *Res potentia* (p. 19 in *Quantum of Spacetime*[1]) is present everywhere in the quantum-gravitational world[14], and in the chunk of wet matter above your neck (Fig. 3).

Let me go back to Fig. 4 and explain how *Res potentia* — the matrix of all matter — acts as a "mediator" of mind, consciousness, volition, and memory[1] (MCVM) in the human brain (Ch. 1).

Notice that Fig. 4 (called 'atom of geometry'[1]) shows only the left (vertical) section of Fig. 5. Secondly, notice your belief that *your* 'nose' (*Res extensa*) might have some 'nose-like' presentation in the 'trunk' (*Res potentia*), called in physics 'vacuum'[13]. True or false? **JAIN** (yes and no). The same tallies to your stipulation that *your* 'arm' (*Res cogitans*) might have some 'arm-like' presentation in the 'trunk' (*Res potentia*): **JAIN**. This is the lesson from the *absence* of windows[16] toward the trunk (*Res potentia*). And thirdly, notice that the doctrine of *trialism* — one monad explicated by its two complementary emanations — is much simpler in QM, compared to the entire Platonic world. In the former case, the *quantum* monad (Erwin Schrödinger in 1935), placed in the *potential* future (Fig. 4), is casting two complementary "shadows" in the physical (Sic!) world, either a 'particle' or a 'wave'. In the latter case, we face the ultimate Platonic monad (*Res potentia*) placed in the *potential* future (Fig. 5) and casting the two complementary "shadows" of Nature — matter (*Res extensa*) placed in the irreversible past, and psyche (the noetic world or *Res cogitans*) in the potential future.

We have two *complementary* (not alternative) paths toward understanding Mother Nature: from the material world (*Res extensa*), she will look to us like 'the entire Universe as ONE', and if viewed from the noetic world (*Res cogitans*) she will look to us like God in the Gospel. Yet Nature is both 'the Universe as ONE' and God (John 1:1), and we will use the two images in the same way we use the two complementary notions of 'particle' and 'wave' in QM[8]. But how can the 'arm' (psyche) interact with the 'nose'[11] (matter) *via* their common 'trunk'?

Let's make an experiment with our non-verbal processing of mental images, borrowed from Allan Paivio[23]. Imagine two digital clocks, A and B. Clock A shows 10:45 and Clock B shows 13:25. Convert them to analog clocks, and "look" closely at their mental images: which angle between the short hand and the long one is greater? In Clock A or in Clock B? To deliver the answer, your brain[11] must do work. Not your mind or consciousness. Your *brain* does the job. Only matter can interact with matter. Your psyche (dubbed 'arm') only alters the *future* state of your brain ('nose') *via* their common 'trunk' (*Res potentia*), hence the brain interacts **with itself**. Not with its mind or consciousness. We face here two *parallel words* running both in the left (vertical) section and in the upper (horizontal) section of Fig. 5, and these totally different worlds[15] are both separated and united (Ch. 2) by the Heraclitean arrow of Time (Ch. 3).

Again, the self-acting faculty of the brain is the crux of the physics of Life. Otherwise the brain will have to be controlled by some anatomically-privileged system (called here 'homunculus', Fig. 2), which of course does not exist. If people use the language of theoretical physics and stick to their materialistic religion, they would call such homunculus "dark"[24]. (Later in Ch. 3, I will replace the materialistic hogwash about some "mystery matter" with the *self-action* of the entire Universe, in line with the idea of Universal Brain.) To make the presentation of the theory a bit less complicated, I will stress that the physics of Life is *not* particularly concerned with the human mind, consciousness, volition, and memory[15] (abbreviated MCVM) viz. with the mental images from the clocks in the experiment above, but with the physics implied in Fig. 4 and in the left (vertical) section of Fig. 5. To that end, let me quote from p. 20 in *Quantum of Spacetime*[1] (Fig. 6):

You only have to swing the "carrot" (*potential* **future**) toward your desired destination, and the donkey will carry you and your **4D** "cart" there. The principal question is how to develop feedback from the **matrix** shown as "carrot": follow the Law of Reversed Effort. There is no ***physical*** interaction between you and the *wegtransformierbar* **matrix** (p. **19**) — you will notice that your ability to perform **self-action** (p. **24**) has *increased*. But it is not like Baron Munchausen. Newton's 3rd law is **not** valid.

Fig. 6. Read Ch. 8, and p. 19 and pp. 20-25 in *Quantum of Spacetime*[1].

Just like the brain, the donkey has an additional input of energy from its potential future in Fig. 4, thanks to which it can **act on itself**. Pity many people would call this additional energy "dark"[24]. Read about the Platonic "hand" in a 4D "glove" at p. 5 in *Quantum of Spacetime*[1].

To complete this brief overview of the physics of Life, let me explain the "carrot" in Fig. 6, placed exclusively in the *potential* future in Fig. 4: it contains the *not-yet-physicalized* states of the donkey and its cart, bundled with all *not-yet-physicalized* states of the *potential* roads ahead. The "road" is not fixed on the ground, and neither is the "carrot". The two are being ***re**-created* 'on the go', and in this sense they are an inherently *flexible* potential reality (*Res potentia*) — "just in the middle between possibility and reality"[26]. The biological entanglement of all *not-yet-physicalized* states, called here **matrix**, is the hallmark of the physics of Life. Otherwise you will have to choose from "neural computing" (Fig. 2) or supernatural "ghosts"[6].

In the next chapter, I will list all major assumptions made so far, and will show how they can fit effortlessly in modern theoretical physics. I will start with the fundamental flow of events, called Time. It is manifestly present in Nature (Slide 1 and Slide 2), but not in the physics textbooks[29]. Why not? Because the Heraclitean Time *cannot* by driven by any physical stuff. If it were, the Heraclitean Time (Fig. 4) will be exposed to physical observations, which will kill the Theory of Relativity by pinpointing an absolute reference frame and absolute *physical* time. I will argue that the Heraclitean Time can be driven only by the Aristotelian Unmoved Mover[27] endowed with **self-action**. Hence Time is *perfectly* hidden by the "speed" of light[12].

Needless to say, there is no consensus on the issues raised in this book. It's a total mess[28]. Follow the facts, cut the "dark" crap[24], and take my opinion[57] with a grain of salt. The only reason for writing these lines is that the theory has been experimentally confirmed, many times indeed. Yes, spacetime engineering (Fig. 6) works[1], better than a Swiss watch.

3. The arrow of Time

Time is indissolubly linked to energy. Every physical process uses energy and evolves in time; for example, a detonating cord (Fig. 8). Let me first choose a clock related to what is labeled in physics textbooks with 'time as read with a clock': the "expansion" of space (Fig. 7). Later I will come back to its "fuel" and will suggest, *faute de mieux*, the so-called negative mass[13,43].

To quote Davide Castelvecchi[31]: "American astronomer Edwin Hubble (…) discovered in the 1920s that the Universe is expanding by showing that most galaxies are receding from the Milky Way — and the farther away they are, the faster (Sic! – D.C.) they are receding. The roughly constant ratio between speed and distance became known as the Hubble constant. For each additional megaparsec (around 3.26 million light years) of distance, Hubble found that galaxies receded 500 kilometres per second *faster* (emphasis mine – D.C.) — so the Hubble constant was 500 in units of kilometres per second per megaparsec."

I will use the "expansion" of space as a clock. Consider three instants 'here and now' along the cosmological time, $t_1 < t_2 < t_3$ (Fig. 7).

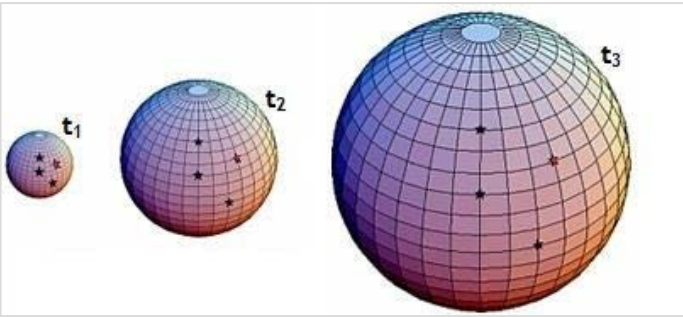


Fig. 7

What kind of energy could be spread across the entire "ballooning" universe? It cannot be any localizable physical energy of some *physical* field, like a burning detonating cord (Fig. 8).

Fig. 8

As Zhao-Yan Wu[32] explained, "there is no spring or sink everywhere in spacetime for matter energy-momentum, therefore gravitational field does not exchange energy-momentum with both electromagnetic field and particles (charged and uncharged). Hence it does not carry energy-momentum. Gravitational field is not a force field, and gravity is not a natural force."

NB: Here is the crux of the problem of the energy *from* gravity. Suppose you are looking at a mountain. It has a shape, which is sheer geometry. And the mountain is the "source" of its shape. How can the shape itself act back on its mountain? It does not have any mountain-like features, namely, gravity is not some *physical* field. It is "not a natural force," as Zhao-Yan Wu[32] put it. Nobody can question the bold fact that gravity can perform work, for example, in producing Earth tides[33]. Nobody would suggest that a purely mathematical object, such as Christoffel symbols (J. Bloomfield), can pull up the body of the Earth[33]. Very tough problem.

The only possible solution to the *origin* of gravitational energy requires new physics. Recall that we have the same problem with the action of the human mind on its brain, and have suggested a new 'mediator' called *Res potentia* (Fig. 5), which would look like a vacuum[13,40]. To use the metaphor of Platonic "hand" in a 4D "glove" (p. 5 in *Quantum of Spacetime*[1]), I suppose the former is *Res potentia* (Fig. 5), related to the so-called negative mass[13,40]. The physical "glove" will experience an influx of *positive* energy density: only mater interacts with matter. Hence the total energy of the gravitating system will be *flexible*, meaning the total energy will fluctuate due to the *non-conservation* of energy[35] viz. the influx of *physicalized* "intangible energy"[34]. We will need quantum gravity to describe quantitatively the influx of mass-energy into the 4D "glove", leading to its **self-action** (Ch. 2). Surely it is not "magic"[39] — any sufficiently advanced technology is indistinguishable from magic (Clarke's Third Law).

The point I wish to make here is that the physical time, as read with a clock (Fig. 7), does not require conservation of energy. The physical partition[30] of the Universe, called "glove", is like the prenatal brain (Fig. 3) governed by its biological **matrix** (Fig. 6) and *Res potentia* (Fig. 5).

But does the physical time, as read with a clock, *require* the global Heraclitean arrow of Time? Absolutely. The arrow of Time never stops, even if we are at rest and do not "consume" 3D space. Only this "arrow" does *not* have direction in 3D space (Slide 2). It is omnidirectional.

Look at the car in Fig. 9a below: it is at rest (Wikipedia), yet its physical time does not stop. Physicists claim that the car is "propelling" with the "speed" of light[37], but cannot show its direction. We face exactly the same puzzle in the direction of the universal 'pull up↑' of the elevator[38] in the famous thought experiment by Albert Einstein in 1907, depicted in Fig. 9b.

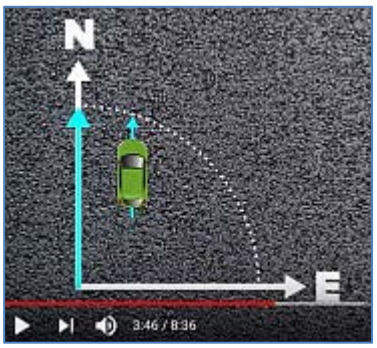


Fig. 9a. Watch Don Lincoln[37].

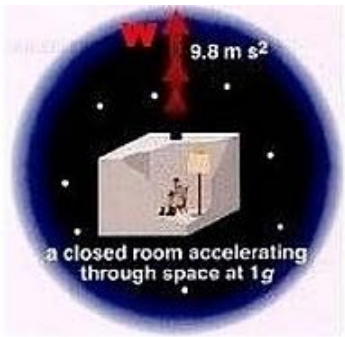


Fig. 9b. Read Markus Pössel[38].

The "direction" of the universal propagation of light is non-relational, because it is impossible to show any direction in 4D spacetime, in which light is *not* propagating. It is omnidirectional. The hypothetical Ether, in which light would propagate, is not *physically* detectable, as proved by the negative result from the Michelson–Morley experiment. Physically, the Ether is squeezed to **zero**[12], matching the "size" of every 4D spacetime point of joint emission-and-absorption of photons. Physically, we can observe only the irreversible past (Fig. 4) — only once at a time. Physically, the global Heraclitean arrow of Time[41] is *exactly* **re-nullified**[12] — once at a time.

On the other hand, the physical time 'as read with a clock' has no direction whatsoever. It is squared, along with 3D space, in the invariant spacetime interval[42]. In GR textbooks[29], moving

along **+t** and back along **-t** is like moving from the left to the right and back. Physicists claim that the unquestionable difference between the past and the future is caused chiefly by the second law of thermodynamics, which is tantamount to saying that I am getting old *because* my hair is 'more salt than pepper'. Why put the cart before the horse? I can understand why physicists[29] may feel uncomfortable with the unobservable, due to the "speed" of light[12], Heraclitean arrow of Time[41], but the only alternative will be invoke some new *physical* stuff (Fig. 8) creating the physical time, then suggest yet another physical phenomenon acting as its source, etc., *ad infinitum* (Fig. 2). Bad idea. Aristotle suggested the solution many centuries ago: the Unmoved Mover[27] endowed with **self-action**. There is no need for any "dark energy"[24] (Ch. 2). Are the Earth tides[33] caused by "dark energy"? How can geometry produce work?

Our theory fits perfectly in QM, because the *intact* quantum state — the quantum monad — is *not* included in the quantum wave function: read Erwin Schrödinger in Ch. 2. Physically, the quantum monad is always **nullified**, because it belongs to the Platonic realm of *Res potentia* (Fig. 5). In Quantum Field Theory[40] (QFT), we talk about quantum vacuum[13], which it is *not* directly observable either. We can only detect its "jackets"[12]. The "Higgs field" is **un**physical.

Can we work out a new theory of quantum gravity, based on the 'common denominator' of gravity and the quantum world[14], called *Res potentia* and placed in the *potential* future of the arrow of Time (Fig. 4)? First, we need new numbers, called hyperimaginary numbers (p. 10).

4. Quantum gravity

Let me introduce the geometric model of Platonic spacetime containing a new degree of freedom depicted with the axis **W** in Fig. 10[36]. It is *exactly* **nullified** in the physical world, leading to a 4+**0**-D spacetime — the Platonic world lives "within" the **null interval** along **W**.

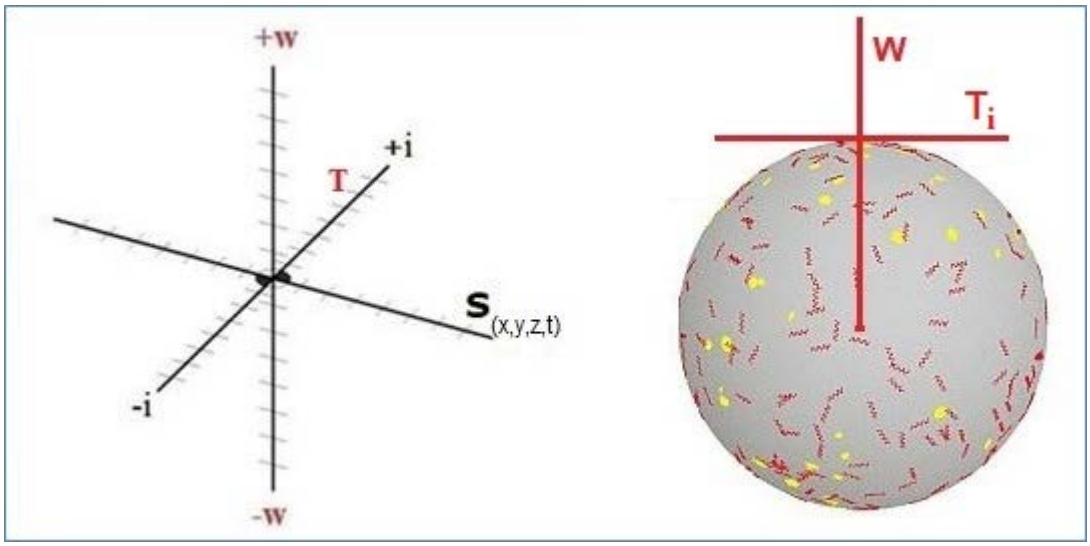


Fig. 10. See Fig. 11, Fig. 12, and read p. 15 in *Quantum of Spacetime*[1].

Quote from Wikipedia[42]: "Spacetime intervals are zero when **x** = **±** **ct**. In other words, the spacetime interval between two events on the world line of something moving at the speed of light is **zero.** (Time along the axis $\mathbf{T_i}$ is ***imaginary***, Arthur Eddington[36] – D.C.). Such an interval is termed lightlike or null. A photon arriving in our eye from a distant star will not have aged (it is *timeless* – D.C.), despite having (from our perspective) spent years in its passage."

Thus, any time we look at the physical world with light[25], the Platonic world (Fig. 5) placed in the *potential* future of the arrow of Time (Fig. 4) has *already* (Sic!) disappeared, like the mysterious cat Macavity[43,25], and has *already* (Ch. 6.5) moved to the *potential* future of the **next** 4D event 'here and now' (Slide 1), *ad infinitum*. This **cycle** is powered by the **self-action** (Fig. 6). I called it 'causal field'. It "takes place" in the pre-geometric Platonic world (Fig. 5).

The Platonic world, called here *Res potentia*, lives in the pre-geometric causal field. There is no metric in the causal field, just as there is no metric in our cognitive structures with which we think. If we take, for example, the notion of a tree, it is not "smaller" than the notion of a mountain. Compared to the physical, 4D partition[30] of the Universe, the entire causal field is *timeless*. It is the **matrix** of all living and quantum-gravitational matter, e.g., the human brain (Fig. 3) and the proton (Slide 10 in *Quantum Spacetime*[14]). It controls the action of gravity as well, for example, the Earth tides[33] and the "inflation" of space (Fig. 7). It is not some Chinese "magic"[39], nor "bewußten intelligenten Geist" (Max Planck). Sure enough, it is not "dark"[24]. It is neither matter nor psyche: recall the doctrine of *trialism* (Fig. 5). The latter is not original, as Wolfgang Pauli suggested the common source of matter and psyche in 1948[7], after Leibniz[16].

Now we can offer a straightforward solution to the mystical anthropic principle in Wikipedia[44]: "the universe would not even be possible if the laws of the universe had been incompatible with the development of sentient life." Of course the evolution of the physical partition[30] of the Universe will be correlated, since 'time zero', with the future emergence of sentient life. We do not accept some "multiverse" containing roughly 10^{770} "smaller" universes[45]. There is no absolute meta-observer, which can "see" the global "curvature" of spacetime *en bloc*, and count these 10^{770} "smaller" universes, like the number of angels dancing on the head of a pin.

Thus, the physical "interpretation"[46] of the so-called anthropic principle[45] is parapsychology, no matter how much math you dump in it. Our solution is simple and straightforward, but the model of 4+**0**-D spacetime (Fig. 10) does not have an exact mathematical description. Not yet.

I suggested new numbers (called hyperimaginary numbers, pp. **8-12** in *Can Geometry Produce Work*[12]), but the task requires professional knowledge and skills in differential geometry and topology, number theory, and set theory. Help is needed, I am just a simple-minded engineer.

5. Spacetime engineering

The first thing to remember about spacetime engineering (Fig. 6) is that we do *not* use the squared symmetric "time" in physics textbooks[29], but the global Heraclitean arrow of Time[41]. We still do not know how the so-called negative mass[13,40] could be replaced with the *potential* future (Fig. 4) spanned along the axis **W** in Fig. 10, and explain the ubiquitous phenomenon of mass-energy **non**-conservation[34,35] in the presence of gravity[54]. As of today, physicists cannot explain even the mundane Earth tides[33]. Under these circumstances, any demonstration of spacetime engineering (Ch. 8), involving mass-energy **non**-conservation[53], will be most likely brushed away by the established theoretical physics community and voted "magic"[39].

Suppose, for the sake of argument, that one day some obscure guy decides to fly over the River Thames in London. Many tourists there will be fascinated (they *love* free entertainment),

but will the established theoretical physicists and mathematicians become interested in spacetime topology (Fig. 10) and the origin of gravity (Fig. 7)? When pigs fly. On 15 February 2020, I announced **5** (five) confirmations of spacetime engineering[47], but nobody showed even a trace of curiosity. It's like talking to a brick wall. Perhaps theoretical physicists simply *hate* the possibility that God (John 1:1) could exist "inside" every 4D instant 'here and now', as advocated in physical theology. Or perhaps they just don't care about Physics. Or maybe both.

6. Summary

Many physicists and philosophers have published and promoted their ideas about the physics of the brain and the origin of mind and consciousness, ensuing from their materialistic religion, known as anti-theism. They also deeply believe that that the *flow* of Time[41] does not exist. Only global hyperbolicity.

One typical example is Thibault Damour[48], who bluntly stated that "the direction of time with respect to which entropy grows, is what determines the sensation of "the passage of time", through the irreversibility of the process of memorization in the neuronal structures which give rise to the phenomenon of consciousness". As Murphy noticed, complex problems have simple, easy to understand, wrong answers. Why? Because all these speculations lead to a dead-end. Just read Ch. 1. The main challenge is the ontological embedding of 'nothing' (Ch. 6.4) in our Weltbild (pp. 3-4 in Time.pdf) with hyperimaginary numbers. We need new Mathematics.

Here's why. According to Quantum Mechanics (QM), at any pointwise (at each point of a given set) instant 'here and now', the physical world is made of a *superposition* of many states. The fact that we never see "cats that are actually both dead and alive at the same time" (Viktor Toth) is an unsolved mystery, known as the measurement problem in QM: read again Erwin Schrödinger from 1935 in Ch. 2. Physicists still cannot provide a rigorous presentation of the Aristotelian *potentia* (Werner Heisenberg), and use *only* the metaphysical notion of 'physical reality out there' from the Theory of Relativity (p. 4 in Time.pdf). For the same reason, they cannot explain the *wegtransformierbar* gravitational energy[47,54], and never will.

I have been arguing, for many year, that every 4D event 'here and now', depicted with the black balls in Fig. 11, is only a 4D "jacket" (p. 23 in *Can Geometry Produce Work*[12]), also called "shadow" (Fig. 12). To understand the Platonic world, recall the metaphor of Platonic "**hand**" inside a 4D "glove" at p. 5 in *Quantum of Spacetime*[1]. The only possible path toward quantum gravity (Fig. 10) begins with the joint phenomenon of Time and Continuum[1] (Fig. 11). The facts of the matter are that (**i**) the human brain[11] can act on itself *by* itself, and (**ii**) the common source of matter and psyche[7] is unobservable in principle, even with thought experiments[25].

The task is strictly mathematical. Recall Leibniz's *Monadology* from 1714[16]: "The monads have no windows through which something can enter or leave." There is no mathematical model of such unique object, because the monad is *not* the mundane 'empty set'[17]. The monad (called "trunk", see Fig. 5) has no 'windows' *whatsoever*, hence the probability for its observation is ***exactly*** zero (Fig. 11). It (not "He") cannot be grasped even with thought experiment, as it resembles Kant's Noumenon (*Das Ding an sich*)[18]**.** It is the source of both matter and psyche — the Platonic world as Reichenbach's Common Cause[19].

I have tried here to derive my viewpoint from firmly established facts from life sciences and psychology, hoping that at the end of the day I will *not* encounter any error or contradiction with firmly established facts from theoretical physics. The theory is of course speculative, but physicists should *not* reject it simply by referring to what they do *not* know.

Let me enumerate the main points in this book, along with their concise explanations.

6.1. The doctrine of *trialism*

Suppose you buy a TV from a local shop near you. The exact same TV was in the shop before you bought it and install in your living room. Previously, it was delivered to the shop from some factory in, say, China. So, you can trace your TV to the factory where it was assembled and picture its worldline. Nice and clear. Also, you know very well that the images and sound from your TV are not generated solely inside the TV set: they are broadcasted by some remote TV network, and your TV only facilitates their reception. Again, everything you see and hear from your TV can be traced back to its origin, like the limit of a sequence, at which you **stop**. What will happen if you replace your TV with your brain, and the images and sound with your psyche? The brain is right there above your neck, but you cannot trace it back to its prenatal stage (Fig. 3) in *exactly* the same way you did it with your TV. You cannot trace back your subjective world, called for short psyche, to your brain and its "broadcasting TV network". Something *essential* is missing. Can't reach the ultimate limit (Ch. 6.4) and **stop** there[56].

The doctrine of *trialism* — one monad explicated by its two complementary emanations — is aimed at explaining the *third* missing element in your brain-and-psyche system. The TV factory in China and the broadcasting TV network may share the same location in the physical world, but our case is far more complicated[15]. We definitely need new physics (Ch. 2).

6.2. The Heraclitean arrow of Time

The arrow of Time[41] runs in successive cycles, yielding *the* infinitesimal displacement in the physical time and space, dubbed Zenon connection[1]. The invisible vertical strips from the movie reel in Fig. 11 do ***not*** belong to the *assembled* (Fig. 14) 4D world (Fig. 10), because they are "before"[25] light[12]. We are "shadows" watching "shadows" (Fig. 12). If we picture Fig. 11 as a movie screen, our "thickness" along the axis **W** in Fig. 10 will be *exactly* **nullified** (Ch. 4). If the 'movie operator' decides to stop the 'movie' for a coffee break, we will ***not*** notice[25].

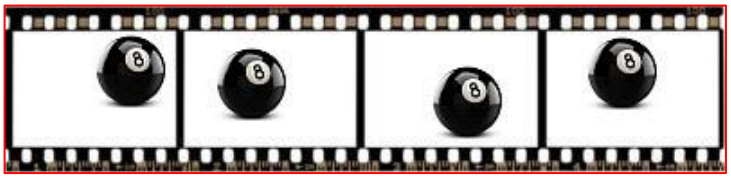


Fig. 11. See Slide 1 and read p. 1 in *Quantum of Spacetime*[1].

We are confined in the physical, 4D partition[30] of the Universe, like the Eskimos in Fig. 12, and cannot "turn around" and look *directly* at the Platonic world called *Res potentia* (Fig. 5). We can only see the 4D "shadows" of the Platonic world, cast upon the cave wall (Wikipedia).

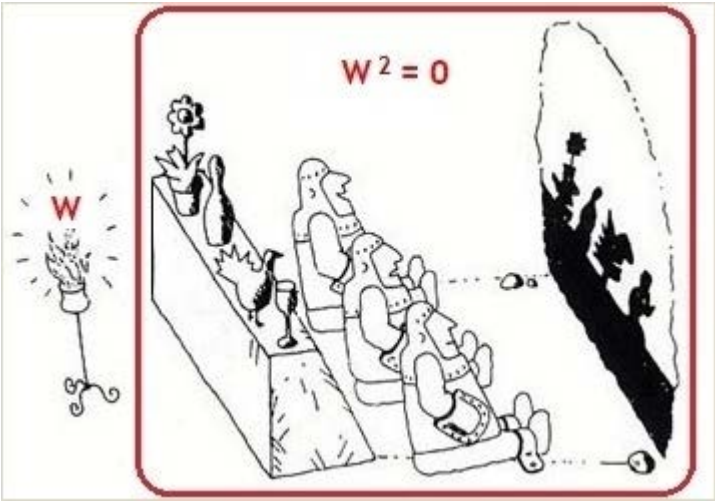


Fig. 12. The Eskimos (Fig. 5) are "shadows" watching "shadows".

We are always guided by our potential future ("carrot" in Fig. 6). In the physiology of activity developed by Nikolai A. Bernshetin[49], every perception and action is guided by the *difference* between the future state (*Soll-Wert*) and the current state (*Ist-Wert*), called delta-Wert (ΔW). For example, you sit at a dinner table on which there is a glass of water. Suppose you are thirsty (*Ist-Wert*), so your desired future state (*Soll-Wert*) is to drink the water and reach your ΔW = 0. You stretch your arm toward the glass of water, in such way that the states of your arm (*Ist-Wert*) are being continuously adjusted by anticipating[49] the final goal (*Soll-Wert*) at which you will grab the glass and drink it (ΔW = 0). But you don't stop there, because your desired future state (*Soll-Wert*) is a complex set of many various "targets" guiding your goal-directed behavior. Sounds simple, but it isn't. Unlike the arm of a robot, the human arm is not designed to perform any specific movement, thanks to which your arm can perform *any* movement. This is the crux of the physiology of *activity*. Robots are not 'active', because they are not guided by their *potential* future ("carrot" in Fig. 6), but by software programs installed in the 'hardware' (Fig. 2). Check out the experiment with your **self-acting** brain in Ch. 2.

In the quantum-gravitational world, the *Soll-Wert* is presented with the *atemporal* **matrix**; for example, the **matrix** of a proton (Slide 10 in *Quantum Spacetime*[14]). The list goes on and on. Back in January 1990, I suggested the most general form of relativistic causality (dubbed *biocausality*): 'if **P**, then **Q**'. It is applicable to all living and quantum systems, and includes *two* ontologically different antecedents — **P** from the irreversible **past**, and **P** from the **matrix** in the potential **future** (Fig. 4) — which jointly (Sic!) guide the outcomes **Q**, one-**Q**-at-a-time (Slide 1). In the inanimate macroscopic world at the length scale of tables and chairs, the **matrix** — the antecedent **P** — has vanishing small feedback, which gradually increases in the living-and-quantum-gravitational world, along the (hyperimaginary) axis **W** in Fig. 10.

NB: The most important question is, and has always been, about the influx of energy (Ch. 3) that makes all living and quantum-gravitational systems **self-acting**. Is *Res potentia* (Fig. 5) related to the so-called negative mass[13,40] ? They both are *unobservable* with light[12]. See again the metaphor of Platonic "**hand**" inside a 4D "**glove**" at p. 5 in *Quantum of Spacetime*[1], and the 4+**0**-D spacetime in Fig. 10. All we know is that the influx of **self-acting** energy does *not* come from GW parapsychology[50]. It is not some paranormal "magic"[39] either. It is easy to just say 'may the Force be with you'. The Force is definitely **real**, but we need quantum gravity.

6.3. Quantum gravity

In addition to the common denominator of gravity and the quantum world[14] — *Res potentia* spanned along the axis **W** in Fig. 10 — we need the so-called Relative Scale (**RS**) spacetime: read a brief expose at p. 22 in *Quantum of Spacetime*[1] and notice the two **red** arrows in Fig. **L** therein. I am relativist and do not accept any *physical* absolute phenomena, such as absolute length scale[51]. There are two opposite "directions", starting from the macroscopic world at the length scale of tables and chairs: toward the Small, and toward the Large. At this length scale, all macroscopic observers will see a proton as 'small' and a galaxy as 'large'. True, but in the quantum-gravitational world, the proton and the galaxy will share 'the same' RS size. Bottom line is the mutual penetration and entanglement of the Small and the Large (Fig. 13).

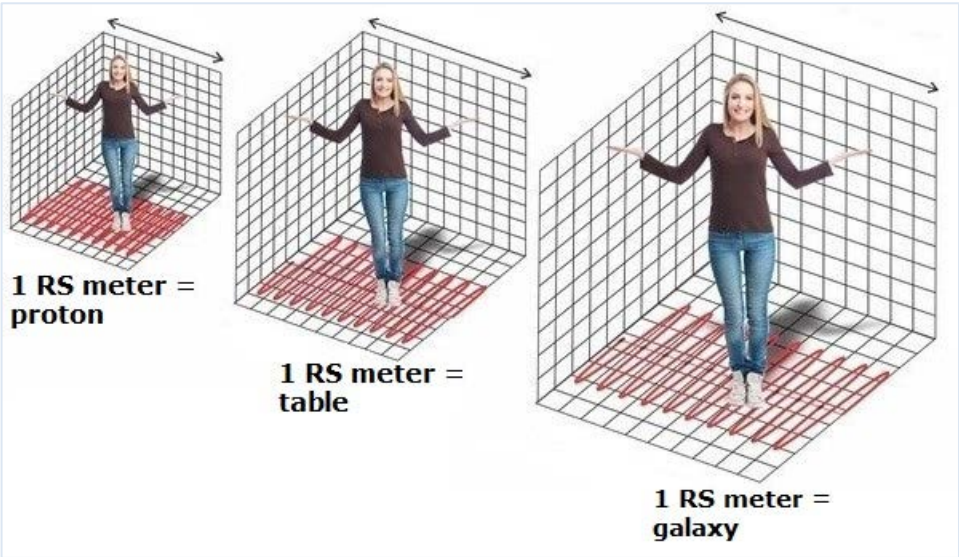


Fig. 13

Nothing in Nature is absolutely "large" or "small". It's all relative, as uncle Albert used to say.

6.4. Physical theology

Physical theology has nothing to do with *any* religion. We cannot have "faith" in calculus, for example. The difference is that the two *complementary* paths to Nature (Ch. 2) cannot be unified with our cognition, thanks to which *we* cannot understand Nature. If we could, we will immediately question the origin of Nature and its "final goal", the "reason" for its existence, *etc*. Thank God, this is impossible. In one sentence, Nature is smarter. That's it.

6.5. Spacetime engineering

We certainly can change our anticipated goals, called *Soll-Wert*[49] (Ch. 6.2) and depicted with the carrot in Fig. 6. In this sense, our goal-directed behavior is a 'mild' spacetime engineering. Once you include a distant physical system in your perceptional space and body schema, you will obtain a new sensation of your "carrot" (Fig. 6), and you're ready to go. As I stated above (Ch. 2), it works better than a Swiss watch. However, there are tons of issues with the physical

mechanism of spacetime engineering, starting with the *biological* entanglement of your brain and the distant physical system[53]. There is no possibility for *biological* entanglement in the QM textbooks[14], and we cannot explain what might look like a macroscopic[39] quantum tunneling[52].

Also, the perpetual emission and absorption of virtual particles in particle-antiparticle pairs is ***not*** a temporal process evolving in the physical time 'as read with a clock' — at any instant we see only their *end result* (e.g., a proton), and at *the same* instant their 'source' has *already* disappeared (Ch. 4), like Macavity[43,25]. Why? Because the 'source' does *not* live in the physical world modeled with the light cone: read Erwin Schrödinger from 1935 in Ch. 2. We need the atom of geometry (Fig. 4) to "split" the photon[25] and reach the *atemporal* "dough" of virtual particles and the *atemporal* source of gravitational energy[54] (Ch. 5), in **RS** spacetime (Ch. 6.3).

Again, we do *not* use the physical time, pictured with the zipped fixed section in Fig. 14.

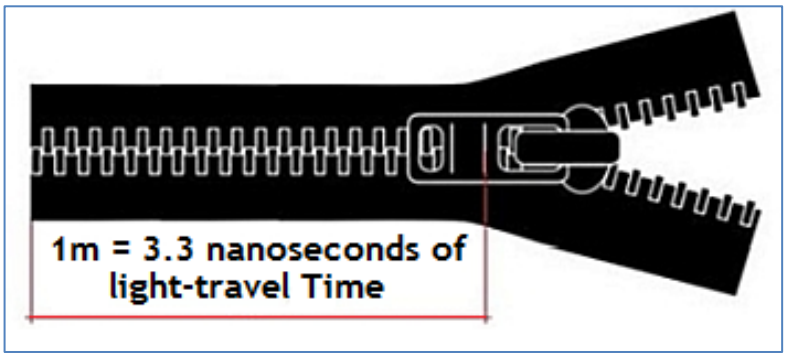


Fig. 14. The unzipped **Platonic** section[25] is the unobservable Macavity[43].

The fundamental difference between the *assembled* (zipped) 4D spacetime endowed with metric, and the *atemporal* pre-geometric *Res potentia* (the "carrot" in Fig. 6) is that the former is irreversibly fixed in the past, whereas the latter is the **flexible** "carrot" (Ch. 2) living in the *potential* **future** (Fig. 4) in the arrow of Time[41]. It is crucially needed in Physics (Ch. 1), but is banned in GR textbooks[29]. You can lead a horse to water, but you can't make it drink. Why? Because of GW parapsychology[50] ?

Anyway. What matters here is that everyone can learn spacetime engineering[53] (Fig. 6). The learning process is similar to learning a new motor skill, for example, to juggle three balls in the air (pp. 21-22 in *Quantum of Spacetime*[1]). All you need is available at my website. Take it and use it for your purposes. It is *not* parapsychology (*ibid*., **M2** at p. 13). It is the future[10].

As of today, nobody is interested. The latest feedback to my theory, launched in July 1997, came nine years ago from Maurice de Gosson at the University of Vienna: "Buzz off, idiot!" (Mon, 21 May 2012 18:47:46 +0200).

Any other suggestion?

D. Chakalov
chakalov.net
June 6, 2021, 10:37 GMT

7. Appendix 1

How do we explain the event 'here and now'? How Nature creates the ultimate limit (Fig. 15)? Does it (not "He") have to **stop**[56] there? **JAIN** (yes and no). It does **stop** in the physical, 4D world, but not in the Platonic world along the axis **W** in Fig. 10. It is an infinite ***cycle*** (Ch. 4).

A point of M, then, represents an event. A region of M, on the other hand, represents some collection of events, for example, the collection "all events which occurred within this room between 10:30 and 11:30 on 8 January 1976." As an illustration, we will now describe in terms of space-time the idealization involved in the original description of an event. Let a firecracker explode, and consider the collection of all events internal to the explosion itself. They would correspond to some region, as shown in figure 1.

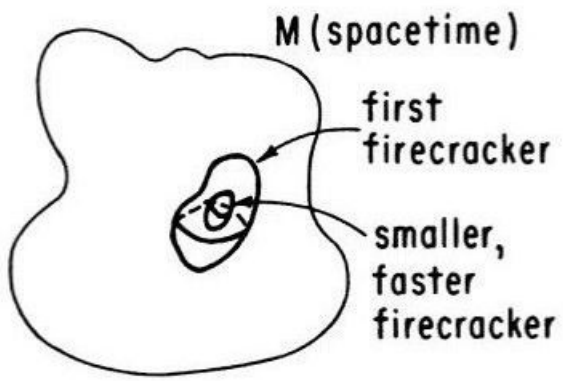


Fig. 1
The representation within space-time of the idealization implicit in the definition of an event. In the limit of "smaller, faster-burning" firecrackers, the region converges on a point of space-time.

Fig. 15. Borrowed from Robert Geroch[29].

The "firecracker" (Fig. 15) smoothly follows a special "unphysical" manifold (Roger Penrose) inflated *exactly* to infinity ($\Omega = 0$), with sheer imagination. How can *any* physical stuff, even a light beam, *actually* reach the ultimate endpoint and ***stop*** there, like at the edges of a pizza? Perhaps with some advanced math (Helmut Friedrich) and GW parapsychology[50] ? No way José. We do not tolerate mathematical poetry, like "local differential geometry" (Robert Geroch).

The issue is strictly mathematical. It is rooted on the topology of spacetime (Ch. 4). Currently, theoretical physicists use only the physical time (Ch. 3) from the 'clock' in the expanding **4D** "surface" of the balloon (click Fig. 7). But this physical time is inevitably *squared*, and the "time-orientable Lorentzian manifold" contains only two symmetric future/past "vectors" (Piotr Chrusciel). It's like the ancient god Janus looking simultaneously along the future/past.

Moreover, mathematicians have to choose between two topological alternatives: either the spacetime interval is 'open' and hence does *not* contain its endpoints, or it is closed and bounded (compact), as explained eloquently at Wikipedia below. This is how bartenders think.

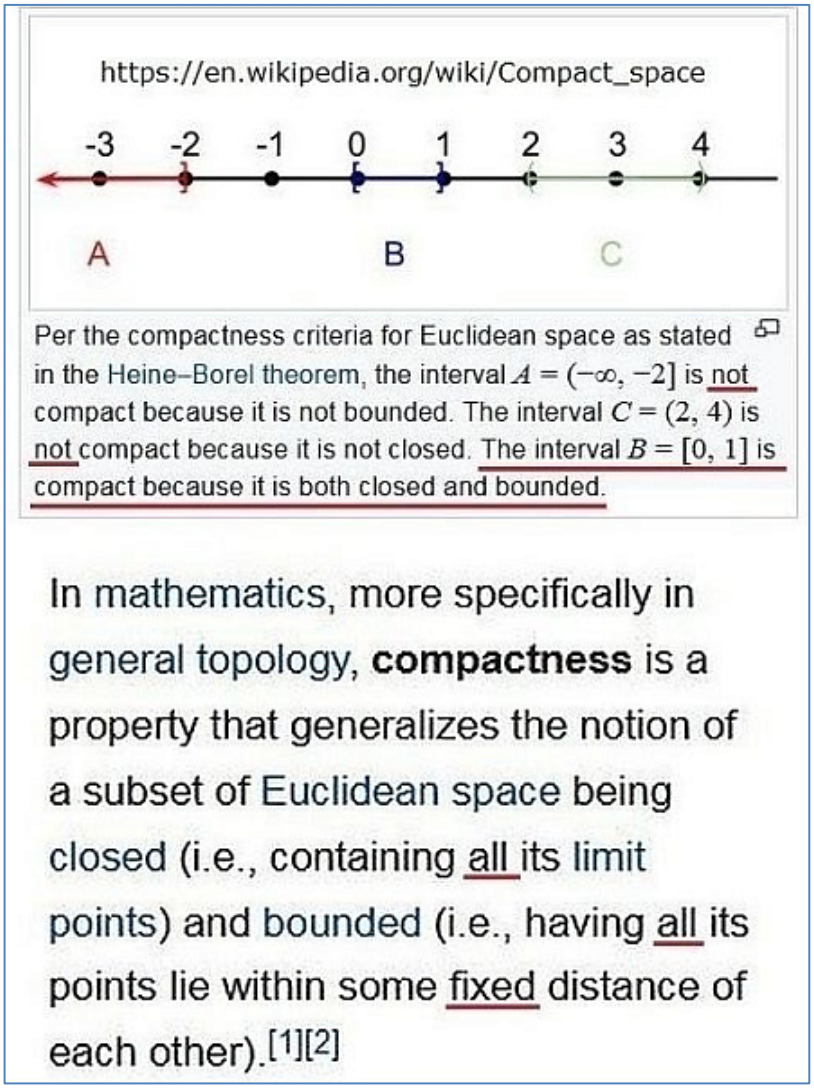


Fig. 16.

In my theory, every spacetime interval is both 'compact' (Fig. 16) in the irreversible **past**, and 'open' in the potential **future** (Fig. 4 and Ch. 4). Have your cake and eat it.

Thus, all physical systems can *exactly* (Sic!) reach their endpoints from a closed interval in their irreversible **past**, and at *the same* instant are shifted to an open interval **short-circuited** with the Platonic world in the potential **future** (Slide 1). In the physical world placed in the irreversible **past** (Fig. 4), there is no "superposition" *whatsoever* (Ch. 6), and the Ghosts of departed Quantities (George Berkeley) are *exactly* **re**-nullified, once-at-a-time, *ad infinitum*.

NB: We cannot in principle reach the *intact* quantum cat (read Erwin Schrödinger in Ch. 2) nor the Platonic *wegtransformierbar* gravitational energy[34,54] if we use *only* the physical time. It is *not* like the example with tracing back the TV factory in Ch. 6.1. If people believe could solve the puzzle with the current physics (Ch. 6), they will make QM a mundane statistical theory, and will also convert gravity[33] to some brand new physical field: read Zhao-Yan Wu in Ch. 3.

Yesterday (30 May 2021), I kindly invited two renowned theoretical physicists[43] to write up their critical opinions on the issues raised in Ch. 4 and Ch. 6.5. Surely they will disagree with my interpretation of 'before light'[25]. As soon as I receive their papers (hopefully by Christmas), I will gladly include them at p. 28 below, without *any* comments. They will have the last word. I might only quote from their papers in March 2022[53]. The fun part is just around the corner!

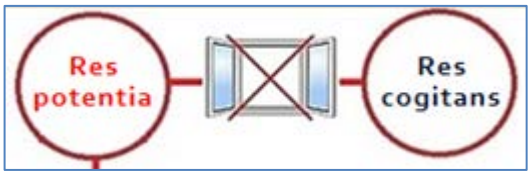
31 May 2021, 21:28 GMT

The two contributions by Adam Helfer and Peter Milonni[43], in PDF, will be inserted at p. **28**. They will not accept my interpretation of 'before light'[25] (Ch. 10), and will have to solve the following conundrum. We have an object, called **A**, which is not *directly* observable with the physical time 'as read with a clock'. We can observe only another, definitely physical, object, called **B**[57], which is *caused* by **A**, namely, if **A** then **B**. The object **A** stands for (**i**) the *intact*, not-yet-observed quantum state in QM (cf. Erwin Schrödinger in Ch. 2) and the negative energy densities in QFT[40,43], and (**ii**) the "intangible"[34] gravitational energy[32,54] capable of producing Earth tides[33]. I am sure Adam Helfer and Peter Milonni[43] will not accept my interpretation[25], and will rigorously explain how **A**, in the cases (**i**) and (**ii**), could be **short-circuited** to **B** along the physical time 'as read with a clock', so that **A** can produce **B**. But if they cannot, I do hope they will explain ***why***. With lots of math (hopefully). Now replace **A** with the potential **future**, and **B**[57] with the *physicalized* **past** (Fig. 4) in the arrow of Time (Fig. 9a). Voila. Neither the two gentlemen mentioned above nor their esteemed colleagues can **short-circuit A** and **B**[57], because they have at their disposal only the physical time, but the latter *necessarily* requires the mundane 'physical reality out there', like the state of the Sun when nobody is looking at it (p. 4 in Time.pdf). This type of reality is not applicable to QM or QFT (**i**), nor to GR[32,54] (**ii**).

Why is this important? You will need to know *much* more about cases (**i**) and (**ii**), in order to practice industrial spacetime engineering. Take the experiment with your **self-acting** brain in Ch. 2: instead of working with two mental images of clocks, you could work with the complex phase[55] of virtual "particles" (e.g., Peter Milonni[43]) and mitigate the constraints on "negative" energy[40,43]. It is not Chinese "magic"[39] for sure. Perhaps you need to get a grip on the **matrix** of matter (Max Planck), controlling the quantum-gravitational world[14] (Slide 10) and the living organisms, such as the human brain[11,49] (Fig. 3). How about the so-called evolution equation?

8. Appendix 2

A brief note on spacetime engineering (Fig. 6), from the *horizontal* section of Fig. 5.



The *vertical* section of Fig. 5 stands for the 'engine' of spacetime engineering: the Heraclitean arrow of Time, explained in Ch. 2 and in my first video presentation from 15 January 2020. We do not "move" anything. There is no "mind over matter" or any other parapsychological crap. We only **tweak** the *potential* future depicted with the **carrot** in Fig. 6. Read pp. **10**-**11** above.

Let me zoom on the *horizontal* section of Fig. 5 above.

First, what is *Res cogitans*? And what could be the 'agent' (*sit venia verbo*) operating with the mental representation (qualia, cf. Wikipedia) of the tree branches in Fig. 3 and the two analog clocks in the experiment at p. 5? Any mental representation, no matter how subtle, *always* has delocalized neural correlates spread across the entire brain, which requires that the 'agent' (we usually talk about it as 'human self' or 'me', and point to the chest) has a special ***physical*** (Sic!) mediator in the human brain, called 'causal field' (Fig. 3). Again, this mediator *cannot* be replaced with "logical operations" (Fig. 2): read the doctrine of *trialism* at p. **3** above.

All this may sound quite complicated, so let's use a very simple example: the *redness* of 'red' (Wikipedia). Suppose its physical correlates are around 650 nm EM wavelength. It is still totally unclear how the physical correlates are *converted* (not "encoded") into the neurophysiological correlates of what will be perceived as 'red', from the optical apparatus of the human eye to the immensely complicated visual cortex. Surely there is no 'red stuff' in the brain, only some perpetually changing neurophysiological correlates, which are unique in every brain, at any instant. We may wish to call the 'red' Rot (German), nyekundu (Swahili), or Hóngsè de (紅色的, Mandarin), and in all these instances the neurophysiological correlates will be different.

There is no *invariant* object in all human brains, isomorphic to the *meaning* of 'red'. Another example of '*meaning*' is shown with the four sayings below (p. 16 in *Quantum of Spacetime*[1]):

1. You can't hide a piece of broccoli in a glass of milk.
2. Only dead fish go with the flow.
3. Don't wear polka dot underwear under white shorts.
4. A fish has no concept of water.

Which sayings present similar meaning? My answer: 1 & 3. Your brain is different from mine, you may use different languages, etc., but we all can and will identify the *invariant meaning*.

Where does it come from? From what I called 'cognitive vacuum'. How does it exist? Like the quantum vacuum[13,43]. Both vacua are 'potential reality' dubbed *Res potentia* above. Notice that the so-called cognitive vacuum is **UNspeakable**. When searching for particular word, for example, we "scan" the entire cognitive vacuum *en bloc*, but we "see" only particular mental presentations (recall the experiment with your brain at p. 5) carrying different meanings, from which the 'agent' chooses the desired one. We can never *directly* interact with our common cognitive vacuum (Carl Gustav Jung called it *Das kollektive Unbewusste*), just as we can never *directly* interact with the quantum vacuum itself[43] – we can "see" only energy **differences**[13].

As I tried to explain on 20 December 1998, we operate *simultaneously* at **two** layers, Platonic ideas and their concrete 'here-and-now' explications. The former ***cannot*** "collapse" (p. 9 and Ch. 2), and has two *complementary* explications, **both of which** (Sic!) inhabit the *potential* future in the Heraclitean arrow of Time (Fig. 4). Thus, if we alter the *potential* **carrot** (Fig. 6) with our MCVM (Ch. 1), the *potential* states of the physical world will be altered accordingly, and we will practice spacetime engineering[53]: if we change the 'arm', the 'nose' will change accordingly, and vice versa (Fig. 5). This is *The Bridge* (April 2014). It is not Chinese "magic"[39].

Yes, my theory is speculative, like the dubious map used by Christopher Columbus in August 1492. But if he didn't go west, with the insane hope to find some shorter route to the Far East, he could have never discovered America. Besides, we have no alternative "route" (Ch. 10).

What do you prefer, my dear reader? GW parapsychology[50] ? Or maybe nuclear fusion plants☺?

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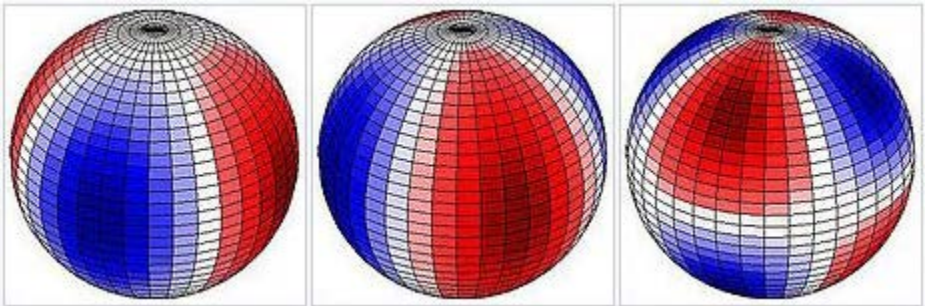

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"It has been known for some time that, unlike classical physics, quantum field theory allows the local energy density to be negative [1, 2], and even unboundedly negative at a single spacetime point. These situations imply violation of the weak energy condition. If field theory places no constraints on negative energy (perhaps these constraints, see Adam Helfer[43], can be mitigated[53] — D.C.), then it might be possible to produce gross macroscopic effects. Such effects might include: violation of the second law of thermodynamics [4, 5], (…)."

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53. D. Chakalov (2022), *Spacetime Engineering 201*. Video demonstration of energy non-conservation[34,35] and brain-controlled quantum tunneling[52] (Full HD, app. 20 min). Updated version of the video lecture *The Bridge* from April 2014. Read explanation.pdf and *Notes on Spacetime Engineering* (SE.pdf, 21 pages).

54. Charles W. Misner, Kip S. Thorne, John Archibald Wheeler, *Gravitation*, 1973, p. 467.
https://www.directtextbook.com/isbn/9780716703440
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Note: Time (Carlo Rovelli) and energy[34] are intrinsically nonlocal (Laszlo Szabados), yet we can observe only their local values: "In relativity a non-localizable form of energy is inadmissible, because any form of energy contributes to gravitation and so its location can in principle be found", says Sir Hermann Bondi[34]. "But then what does it mean?" (Erwin Schrödinger, Ch. 2). It means that QM[21] and GR[35] are *essentially* incomplete[1]. Read **NB** in Ch. 7 and the final note[57].

55. Chen Ning Yang, Square root of minus one, complex phases and Erwin Schrödinger. In *Schrödinger: Centenary Celebration of a Polymath*, 2010, pp. 53-64; cf. p. 55.
https://www.directtextbook.com/isbn/9780511564253
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56. Robert M. Wald, *General Relativity*, 1984, p. 201.
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http://www.god-does-not-play-dice.net/Wald_p201.jpg
"It follows immediately that for any Cauchy surface $\sum$, we have edge ($\sum$) = **Ø**".
Note: Will the maximal Cauchy surface (R. Schoen and S.T. Yau) include the "edge ($\sum$) = **Ø**" in a closed interval (Ch. 7)? Can you reach the "edge ($\sum$) = **Ø**" of a 4D pizza[30]?

57. Regarding the note at the last page in Ch. 7: the simplest example of *physicalized* object, denoted **B** , is the photon. It is a "jacket" (p. 23 in *Can Geometry Produce Work*[12]) depicted with four balls in Fig. 11. The balls are "separated" by invisible — with light[25] — vertical strips: *perfect* continuum[1]. Physically, the omnipresent Ether (Ch. 3) is squeezed to **zero**[12], matching the "size" of all 4D spacetime points (four balls in Fig. 11) of **joint** emissions-and-absorptions (like clapping hands, see Slide 1) of photons (Slide 9). Thus, **B** is *caused* by **A** : the **Platonic** Ether (Ch. 3) modeled with the axis **W** in Fig. 10. Physicists claim that light "propagates" in the "vacuum" depicted with black outer space in Fig. 9b. True or false? **JAIN** (yes and no).

Light does not propagate *anywhere*, because its proper time is **null**[42]: "A photon arriving in our eye from a distant star will not have aged, despite having (from our perspective) spent years in its passage." Light itself (**A**) is a **timeless**[12] *atemporal* web bootstrapping the Universe. Only light's "jacket" (**B**), called photon, propagates in the *physicalized* partition[30] of the Universe. There is only ONE multiplicative photon with **zero** rest mass[36] (**M**^{2} = **0**); all the rest is 'retarded light' with *positive* mass-energy. The latter is also an example of the "jacket" **B**: read again the note at the last page in Ch. 7. Physicists suggest some weak energy condition[40], yet they acknowledge that the strong energy condition "is strongly violated in any cosmological inflationary process" (Wikipedia). But if *one* of the energy conditions is violated, the rest must be violated as well. It's a package. Even one "negative" particle (Adam Helfer[43]) will **nullify** (Robert L. Forward) the entire physical world, quietly and instantaneously. The puzzle is very complicated[36], and the so-called hyperimaginary numbers are still out of sight. The state of affairs resembles the chemistry in 1799[10]. We cannot make any progress though, as theoretical physics is vehemently contaminated with GW parapsychology[50]. As of today, nobody cares about Physics (Ch. 1). **Nobody**. The only feedback hit me nine years ago, in May 2012 (Ch. 6.5): "Buzz off, idiot!".

10. Contributions

The first contribution to *The Physics of Life* was made by Erwin Schrödinger[5] in 1943 (p. 2): "we must be prepared to find a new type of physical law." My invitation for contribution was sent to many physicists and mathematicians two months ago, and I offered them to prove my 'new type of physical law' **false** (p. 18). I expect to receive their contributions by Christmas this year, and will include them below, without any comment. Hence the reader will benefit from their professional insights and will compare them to our theory and experimental facts[53].

Back in 1987 (p. 4 in *Quantum of Spacetime*[1]), I suggested *two* types of distances in what was later called **4+0** D spacetime (pp. 12-13 in *Experimental Tests of Spacetime Engineering*[53]): metric distance (local mode of spacetime), and a *pregeometric* Platonic world (global mode). Physically, the latter is *exactly* **zero** (Fig. 10), resembling a single geometric point inflated to actual/absolute infinity (G. Cantor). Hence the *pregeometric* Platonic world is simultaneously "inside" the instant 'here and now' (Fig. 4) and "outside" the physical 4D world[30]. Needless to say, the so-called hyper-complexified spacetime in Fig. 10 is completely different from the complex Minkowski space or the H-space.

In my opinion, the model of spacetime in GR[43,54,56] is *essentially* incomplete[30,32] (H. Ohanian). It is based on ridiculous speculations[29] and leads only to wishful thinking (H. Puthoff). Get real. We need new Mathematics. Physically, the **squared** axis **w** in Fig. 10 is **zero**: $|\mathbf{w}|^2 = \mathbf{0}$.

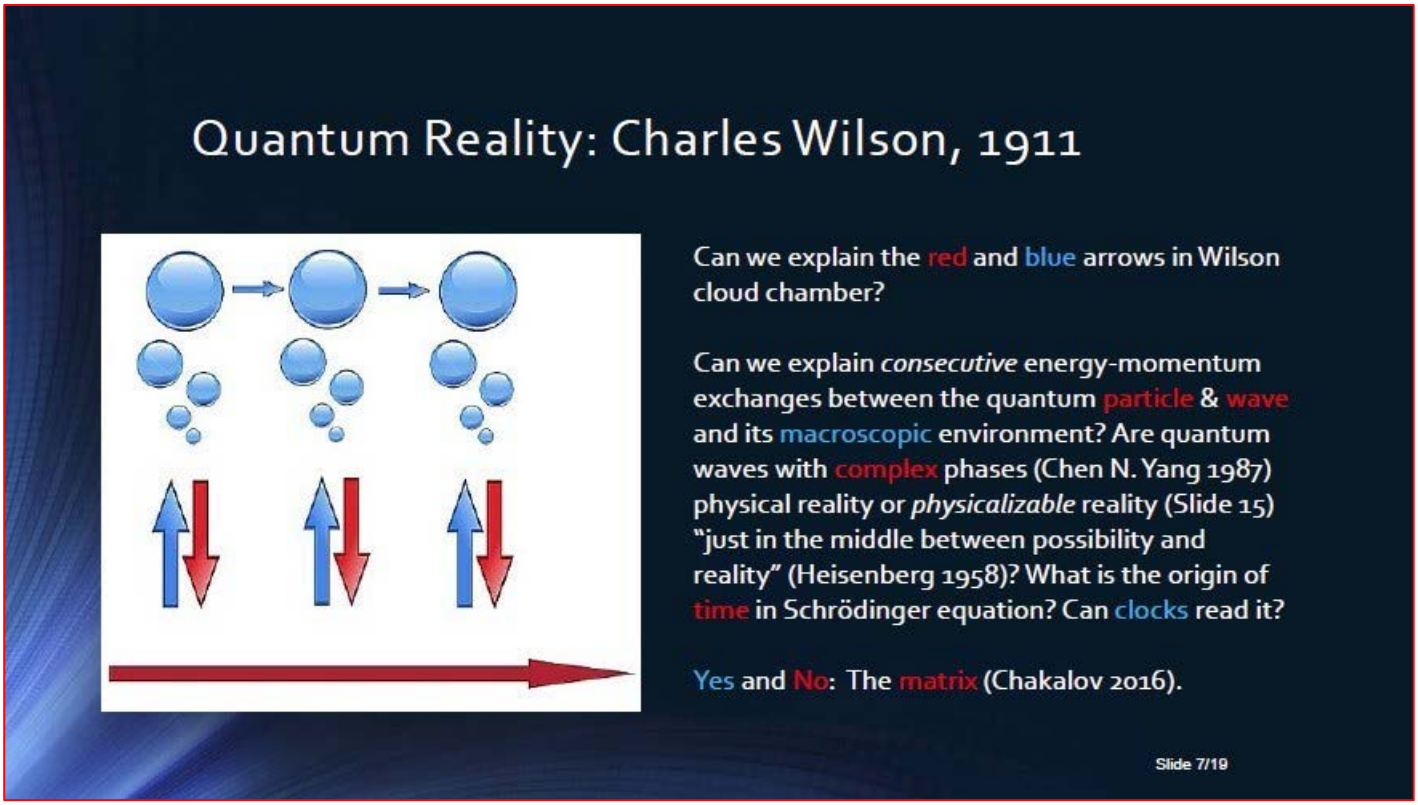
Read **NB** at p. 17. Recall (p. 18) that case (**i**) refers to QM and QFT textbooks, and case (**ii**) to current GR[54]. Regarding QM, recall the *intact* quantum state, after Erwin Schrödinger in Ch. 2:

> The rejection of realism has logical consequences. In general, a variable *has* no definite value before I measure it; then measuring it does *not* mean ascertaining the value that it *has*. But then what does it mean?

The *intact* quantum state is the Platonic *Res potentia*: before its measurement, it does not live anywhere on the light cone. The act of measurement projects its *physicalizable* "jackets" into the physical world *via* the apex of the light cone: "one always takes the *real part* at the end"[55]. More at p. 9. If you could short-circuit the *Res potentia* with its fleeting 4D "jackets" along the physical time (p. 4 in Time.pdf), you will make QM a simple statistical theory (p. 17).

Regarding QFT: The quantum vacuum (e.g., Peter Milonni[43]) is also Platonic *Res potentia.* If you could short-circuit the Platonic *Res potentia* with its fleeting "jackets" in QFT along the physical time, you will flood the vacuum with *real* particles 'out there' (p. 4 in Time.pdf), which contribute to gravity, which immediately leads to the cosmological constant problem.

Regarding GR[32,35,54]: read again p. 17 and H. Ohanian. If GR and QFT are too difficult, focus on QM above. If you reject my conceptual solution[1,12] (p. 9), you will have to explain Charles Wilson's discovery from 1911. And if you can 'square the circle' below, you might also discover "time operators" in QM.☺



CERN uses modern versions to measure the quantum "jackets" in the so-called standard model. They cannot explain the effect from 1911 either, so the talibans at CERN blocked my email. I was only trying to help them, as quantum chromodynamics cannot explain even the **proton**. Before spending $13.25 billion for some "Higgs field", CERN should have done their homework.

NB: You shall not waste money earned with hard labor by millions of people. Read also p. 5 and p. 10 (last) in explanation.pdf, and the bold facts of GW parapsychology[50].

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I am deeply grateful to the Eugene Higgins Professor of Physics and Natural Philosophy at Yale University Henry Margenau for his moral support and encouragement in June 1990, and to my parents Gocho G. Chakalov and Dany Chakalova for their love and financial support. They went back home and are now with Jesus.

D. Chakalov

Invited contributions

Peter W. Milonni flatly rejected my invitation for contribution to this book (p. 18), and wrote (June 14, 2021): "I will not pay further attention." His reply essentially matched the feedback from his colleague at the University of Vienna in May 2012 (p. 15), but was far more polite.

The contributions by Adam Helfer and his colleagues (p. 18) will be inserted below. You need to know *much more* (Appendix 2) to practice industrial spacetime engineering. I'm fine.☺

The contributions by Adam Helfer and his 88+ colleagues will be inserted above ↑, without any comments. As stated previously, I might only quote from their papers in March 2022 (p. 18).

Let me briefly explain the first part of my video talk *Spacetime Engineering 201*[53], which deals with energy non-conservation[34,35] – read the illustration with apples (apples.jpg) at p. 12 in *Quantum of Spacetime*[1], and notice the so-called *evolution equation* from 8 November 2015 (p. 24 in rs_spacetime.pdf and p. 4 in zenon.pdf) at pp. 3-4 in *Gravitational Energy*[47]. The equation is still in symbolic form, pending the precise formulation of quantum gravity (Sec. 4):

$$|\mathbf{w}|^2 = |\mathbf{m}|^2 + |\mathbf{m_i}|^2 \qquad \text{(Eq. 1).}$$

Eq. 1 does *not* show the intangible, not-yet-squared **Platonic** world[30], but the dynamic **balance** of the real mass (**m**) and the imaginary mass ($\mathbf{m_i}$), shown in diagram.jpg. In the physical world, the left-hand side at Eq. 1 is always **re-nullified**[25] (recall the cat Macavity[43]). The second term $|\mathbf{m_i}|^2$ at the right-hand side in Eq. 1 always creates "negative mass"[40], so I will rewrite Eq. 1:

$$|\mathbf{m_i}|^2 = |\mathbf{m}|^2 \qquad \text{(Eq. 2).}$$

If you rotate Eq. 2 at 90 degrees clockwise, you will obtain the 'drawing hands' by M. Escher. Notice that the *physicalized* $|\mathbf{m}|^2$ at the right-hand side in Eq. 2 contains an **input** (Sic!) from $|\mathbf{m_i}|^2$ smuggled into the *squared* mass $|\mathbf{m}|^2$, which enables the entire 'retarded light'[57] in $|\mathbf{m}|^2$ to perform **self-action** (p. **6** in *Can Geometry Produce Work*[12]): read again p. 5 above. Thus, we can eliminate all "dark matter" and "dark energy" with the **Platonic** 'hand' in 4D 'glove' (p. 5 and pp. 24-25 in *Quantum of Spacetime*[1]). The 'glove' (the *physicalized* $|\mathbf{m}|^2$ at the right-hand side in Eq. 2) will exhibit **self-action** by **additional** (p. 13) energy, momentum, and angular momentum. At every instant from the time read with a clock (p. 4 in Time.pdf), the total energy will be made entirely **positive** and **re-balanced** (Eq. 1). Not "conserved".

Try the so-called Relative Scale (**RS**) spacetime (p. 14) with variable ***rate*** of Time (Fig. 14): the **global** phenomenon, creating the Large and the Small (Fig. 13), will create gravity **locally**, by "shrinking" the metric to produce local gravitational attraction, and at the same instant by "inflating" the metric in the remaining part to produce local gravitational repulsion, so that the two tug-of-war manifestations of gravity reach dynamic equilibrium. Again, it is a **balance**. Not "conservation". Read again pp. **iii**-**vi** in Sec. Q&A above. We need Mathematics (p. 10).

> Don't call the **Platonic** hand "mystery matter". Parapsychology sucks, with or without math. What kind of stuff (p. 7) empowers the Earth tides[33]? You have to start from scratch ASAP.

The second part of *Spacetime Engineering 201*[53] is about brain-controlled quantum tunneling[52]**.** Again, it is not some weird "magic"[39]: read p. 12 in facts.pdf. Should you wish to learn more, follow steps (**1**)-(**2**)-(**3**) at p. **5** in explanation.pdf. I will reply within five working days and will gladly send you the requested information, along with the link to *Spacetime Engineering 201*[53].

D. Chakalov
August 25, 2021, 10:55 GMT