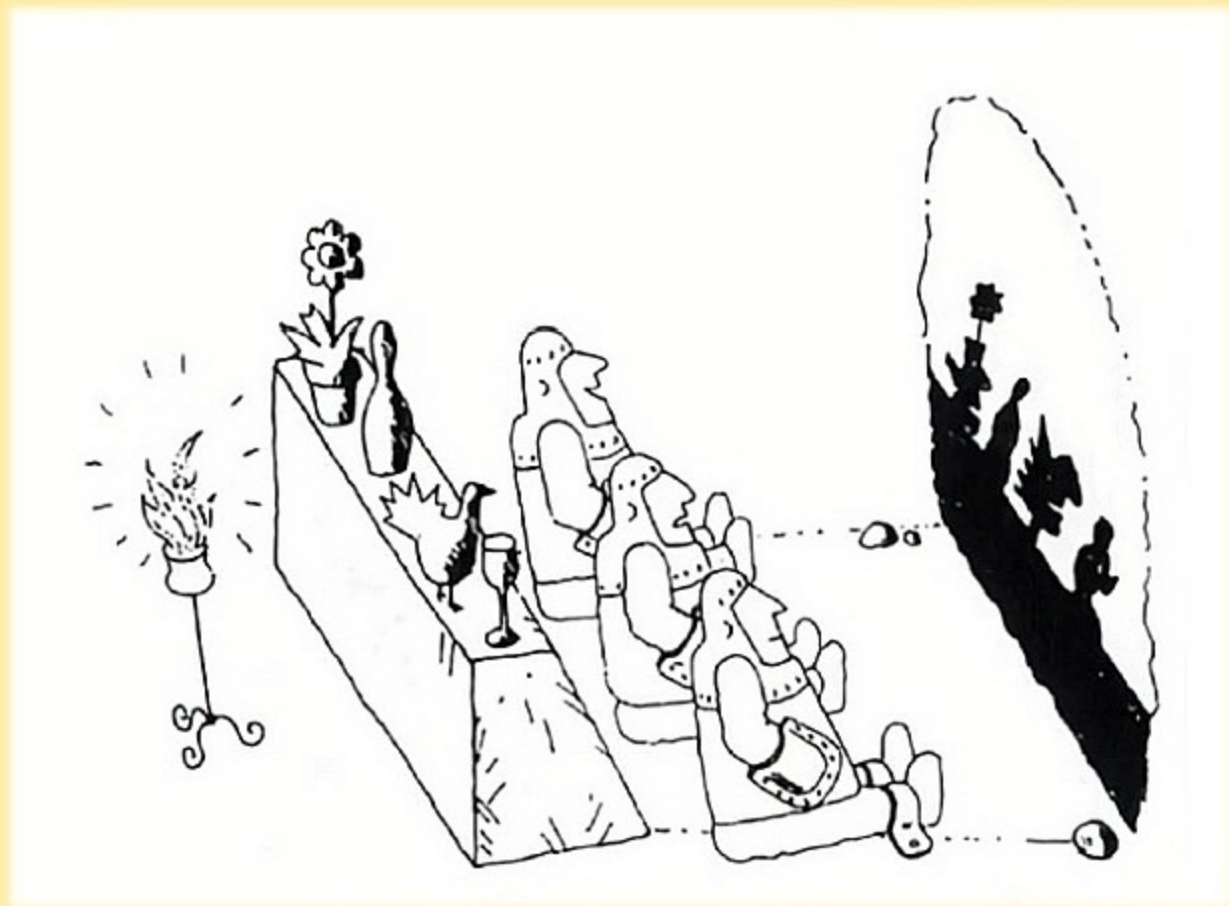


Notes on Spacetime Engineering



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Abstract

Brief and [biased](#) notes on spacetime engineering, for open-minded people with little knowledge in physics and math. For details, RDFM¹.

1. Introduction

Many years ago, I read a fascinating crime novel by Agatha Christie. It was about a noble (also very rich) owner of an old mansion in England (probably in Cambridgeshire), who was brutally murdered at his 50th birthday party. I suspected the killer was either the old butler or the gardener, as they looked very suspicious to me. But I was wrong. As [Hercule Poirot](#) explained at the end, the killer was the maid — a young and pretty lady, who was actually the illegitimate daughter of the noble owner of the mansion (he apparently knew nothing about her), after a brief spell he had many years ago with her mother (also a noble but very poor lady), who happened to be his second cousin. So, the young pretty maid was seeking revenge. Now it was all obvious, but I had to read the entire novel to connect the dots at the very last page.

This is an example of how *not* to write about complicated issues, such as the [spacetime of the Universe](#) and the physics¹ of the [human brain](#).

The reader should know the crux of spacetime engineering right from the start (Fig. 1): swing the “carrot” (*potential* future) toward your desired destination, and the donkey will carry you and the cart there. Notice the Law of Reversed Effort: “To the mind that is still, the whole universe surrenders” (Lao Tzu).



The main task is to develop feedback from the **matrix** (Ch. 2) shown as “carrot”: follow the Law of Reversed Effort. There is no *physical* interaction between you and the **matrix** — you may only notice that your ability to perform **self-action** has *increased*. It is not like **Baron Munchausen**. Where does the **self-energy** come from?

Fig. 1

In the next chapter, I will highlight some of the new concepts above and will explain them like a Husserlian *noema* — an indefinite whole, which becomes gradually filled with concrete content. In Ch. 3, I will explain the ‘engine’ of spacetime engineering — the arrow of Time depicted in the left (vertical) section of Fig. 2 below. In Ch. 4, I will elaborate on the matter-psyche relations (after Gottfried Leibniz²) shown in the upper (horizontal) section of Fig. 2. Needless to say, I will have to introduce many more ideas¹, which also require explanation.

As **Friedrich Schiller** famously noted, only the fullness leads to clarity, and the truth dwells into the abyss (*Nur die Fülle führt zur Klarheit, und im Abgrund wohnt die Wahrheit*).

2. What is spacetime engineering?

Spacetime engineering studies and explores¹² our ability to change the state of a physical system (e.g., the human body) by changing its next *future* states through the ‘carrot’ in Fig. 1 viz. *Res potentia* in Fig. 2. Notice the total absence of “windows” toward *Res potentia* below:

“The monads have no windows through which something can enter or leave.” (Leibniz, *Monadology* §7.) Thus, *Res potentia* is *not* directly accessible, not even with thought experiments. Read the doctrine of *trialism* at p. 3 in *The Physics of Life*¹. It resembles the *wave-particle duality* in quantum mechanics, in the sense that the *intact* quantum state (p. 4 in *The Physics of Life*¹) is not directly observable either.

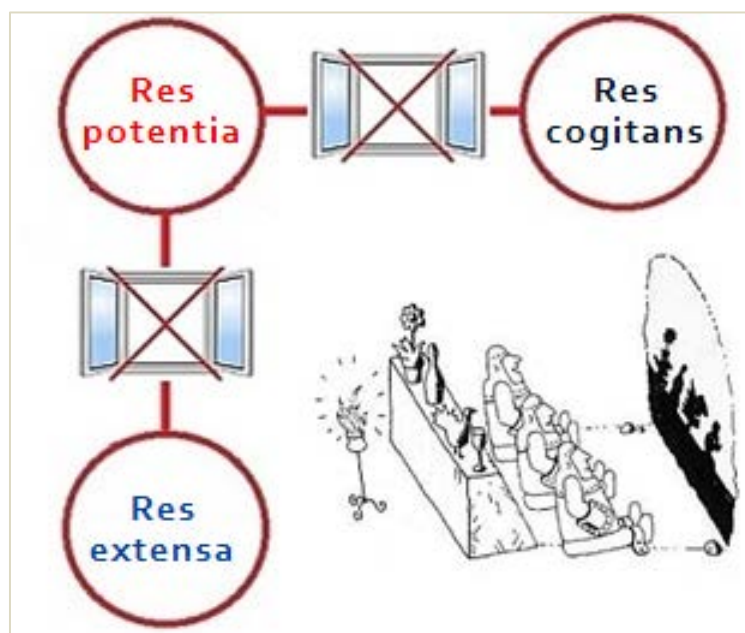


Fig. 2. See Fig. E and Fig. 5 in *The Physics of Life*¹.

Now, the spacetime is modeled with *geometry*³. Not with some physical field, which has energy and can perform work. There is no ‘geometric energy’ that can spring from ‘pure geometry’, namely, from the bare grin of the *Cheshire cat*, *without* the cat (Fig. 3). The second puzzle is that there is no ‘*potential* future’ in the current models of spacetime, and hence no dynamics of the spacetime *itself*¹¹.

Theoretical physicists⁴ picture the world as a [dead frozen block](#) of matter: “There is no dynamics within spacetime itself: nothing ever moves therein; nothing happens; nothing changes.”⁵ If true, how can the spacetime – the grin of the Cheshire cat *without* the cat (Fig. 3) – ‘talk back’ to matter⁶? If it can, it must be a brand new *physical* field.

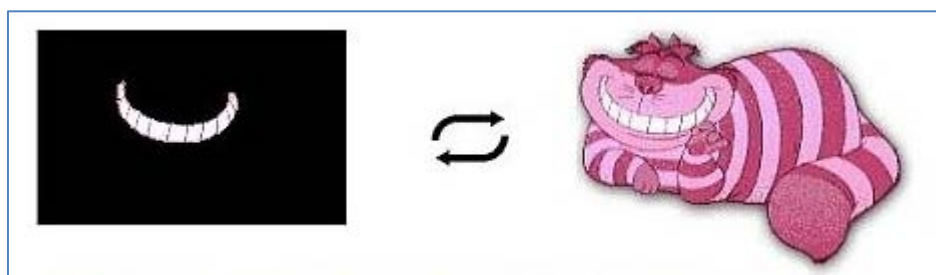


Fig. 3. Symbolic presentation of [Einstein's equations](#).

In 1976, Hans Ohanian wrote⁶: “matter (the Cheshire cat - D.C.) acts on the gravitational field (changes the fields), but there is no mutual action of [gravitational fields on matter](#); that is, the gravitational field (the grin of the cat *without* the cat - D.C.) can acquire energy-momentum from matter, but nevertheless the energy-momentum of matter is conserved ($\partial_\nu T^{\mu\nu} = 0$). This is an inconsistency.” I think it is more than “inconsistency”. It is sheer parapsychology, like saying ‘[abracadabra](#) – [voila!](#)’. Read Matt Visser¹⁷ and [pp. 22 ff.](#)

As Zhao-Yan Wu rigorously demonstrated, “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.”⁷ Read Albert Einstein²³.

Can we make gravity a natural force^{6,9}? Yes we can, but the solution is counter-intuitive: we introduce a **Platonic** state of the entire Universe as ONE, called here **Res potentia** (Fig. 2), which is the *source* of both geometry and matter. It (not “He”) is their common cause⁸ accessible via **Res potentia** (Fig. 2) viz. via the **carrot** in Fig. 1. Now, replace the carrot with the so-called **matrix** (p. 4 and p. 6 in *The Physics of Life*¹).

Think of the **matrix** as a virtual pool of infinitely many instructions of the type ‘if **P**, then **Q**’, which create and sustain all living organisms and quantum-gravitational systems (p. 19 in *Quantum of Spacetime*¹), such as the **brain**, the **protons and photons**, and the 4D **physical world**.

NB: Spacetime engineering works by tweaking the Platonic **matrix** placed in the *potential* future (Fig. 4): see Fig. 4 in *The Physics of Life*¹. It is the blueprint of the arrow of Time¹¹.

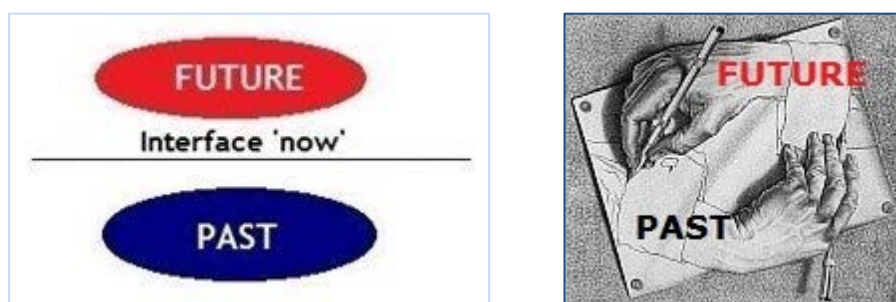


Fig. 4. See also [Slide 1](#) and [Side 2](#), and [Heraclitus.pdf](#).

The **matrix** is neither matter nor psyche. It is the *pre-geometric Res potentia* (Fig. 2): a Platonic form of reality, “just in the middle between possibility and reality” (Werner Heisenberg¹⁰). There is no **metric** in the **matrix**. It is *exactly nullified* in the physical 4D world: see Fig. 10 and pp. 9-10 in *The Physics of Life*¹. The **matrix** inhabits

only the *potential* future of the Heraclitean arrow of Time¹¹, hence it cannot be observed with light. But it is not some “mystery matter”.

Forget “dark energy” and “dark matter”. GR is *essentially* incomplete (Fig. 3). Are the Earth tides⁹ caused by some mythical “dark energy”?

Now we have to dive into *the abyss*: the arrow of Time¹¹. With light, we can see only the irreversible *past*, e.g., the state of the Sun 500 sec ago (p. 4 in Time.pdf). What if Time is *perfectly* hidden by light?

3. The arrow of Time

The Heraclitean arrow of Time¹¹ is *not* relational phenomenon: there is no ‘absolute space’, like the river banks at absolute rest, with respect to which we could define the ‘flow of water’¹¹. We cannot define the *rate* of Time^{13,14} either — ‘one second per second’ makes no sense. We cannot observe with light the elementary transitions of Time (Fig. 7), “separating” the *potential future* from the *past* (Fig. 4), either. Matter and fields have *positive energy* density, and they live *only* in the *past*.

On 21 September 2008¹⁶, commemorating Hermann Minkowski’s *Raum und Zeit* (21 September 1908), I suggested two *modes* of spacetime: local (physical) mode, and global (Platonic) mode. The local mode is what physicists call ‘time as read with a clock’. This local time is from ‘change *in* space’, such as the coordinate time, whereas the global (Platonic) mode of spacetime pertains to ‘change *of* space’¹⁶. Every 4D point/event in spacetime is endowed with the *two* modes (Side 2), but the elementary ‘change *of* space’ (Slide 1) is *unobservable* with light¹⁸.

Why is this important? Because of the indisputable [blueprints](#) of the global (Platonic) mode of the entire Universe as ONE, embedded in the local (physical) mode¹⁷, like a Platonic **hand** perfectly embedded in its 4D glove (p. 5 in *Quantum of Spacetime*¹). Don't trust [GR textbooks](#).

NB: The Platonic **hand** makes the '4D glove' **self-acting** ([Fig. 1](#)). Any effort to derive the **self-action** of gravity from *physical* fields leads to fictitious "[dark energy](#)" and "[black holes](#)". Check out the so-called *evolution equation* at p. 28 (last) in *The Physics of Life*¹. Bottom line is to move at *pre-geometric* level and **split** ([Fig. 4](#)) the geometric point 'here and now'¹⁸, in order to "insert" the *atemporal* 'change **of** space' mentioned [above](#). Complicated? Let's go to the "speed" of light¹⁸.

Suppose you are tossing a ball toward a wall and are monitoring ball's trajectory. You have recorded four consecutive instantaneous states of the ball, at which it has come back to you ([Fig. 5](#)).



Fig. 5. See [Fig. E](#) and [Fig. 11](#) at p. 12 in *The Physics of Life*¹.

But if you are shooting a *photon* toward a mirror, you will see only a *perfectly* continual trajectory of four photons ([Fig. 5](#)). You can never see the photons going toward the mirror, bouncing back, and hitting your eyes. With light¹⁸, we see the physical world only *post factum*, and only once-at-a-time, as recorder with a clock ([local mode](#)). With

light, we cannot see the so-called negative mass¹⁵, dubbed Macavity¹⁹. No region Δt of “*total* negative energy” (Adam Helfer¹⁹) can live on the [light cone](#). In summary, the phenomena of [causality](#) and [locality](#) are indissolubly linked to the [perfect continuum](#) of Time^{11,13}. Check out again the so-called *evolution equation* (p. 28 in *The Physics of Life*¹), driven by the [self-energy](#) of the Unmoved Mover²¹ – the [Final Cause](#).

Everything said above pertains to the question of how to bind [matter to matter](#) with the ‘engine’ of spacetime engineering – the arrow of Time depicted in the left (vertical) section of [Fig. 2](#). The next question is how to bind *mind* to matter, depicted with the upper (horizontal) section of [Fig. 2](#): the doctrine of [trialism](#) (p. 3 in *The Physics of Life*¹).

4. How to bind mind to matter?

Thirty-two years ago, in January 1990²⁰, the task was looking doable. Not anymore²². Why making these efforts? A friend of mine¹⁸ asked recently whether he could learn spacetime engineering without the hassle of reading “your crazy stuff”. Suppose you wish to learn how to juggle three balls: watch the manual at [YouTube](#). However, suppose you cannot see the balls, and actually have three spoons at your disposal. You only believe that you’re dealing with balls, but they are in fact spoons. Then suppose you believe that you will be tossing balls (not spoons) in the air, but you have feedback from your legs only, because you are blindfolded and can’t see anything. You try to move your arms and toss the balls in the air, but in fact you’re moving your legs and kicking the three spoons on the floor. What skill could you learn without that “crazy stuff”? Try [meditating on a rock](#) instead.

Let me explain the **matrix** above. Suppose you are slicing onion with a kitchen knife and accidentally cut your finger: you put a plaster on it to heal faster and on the next day your skin will recover completely. Trivial, you may say, but recall that there is no custom-made software application, which can be inserted in every **skin cell** to execute such process, *just in case* you cut your finger²². This is how the biological **matrix** works. The second quantum-gravitational **matrix** is even more effective, as it creates the **protons and photons**, and the 4D **physical world**. Last but not least, the **brain** has access to the third cognitive **matrix**, as demonstrated with the experiment below.

Imagine a cube made of some white plastic material, with 3 cm rib, painted blue, which you cut into 27 little cubes, 1 cm each, and ask yourself the question: how many little cubes have 3 painted sides, 2, 1, and zero?

Compare this exercise to the demonstration by **Flavian Glont**, who can arrange approximately 43 quintillion ($43 \cdot 10^{30}$) permutations of the Rubik Cube blindfolded: watch **6:33 to 6:38** at YouTube (Fig. 6) and noticed that at the end he was “looking” at cube’s cognitive **matrix** for nearly 2 sec. What was he “looking” at? Read my mind☺.



Fig. 6

Now you have to apply the doctrine of [trialism](#) (p. 3 in *The Physics of Life*¹) to *merge* all types of [matrixes](#), and use your brain to practice spacetime engineering ([Ch. 2](#)). It works better than a Swiss watch¹², but perhaps it will be more difficult than learning to [juggle three balls](#). As Henry Ford famously noted, whether you believe you can do a thing or believe you can't, you are right. The corollary in German: *Die beste Art die Zukunft vorauszusagen ist, sie selbst zu erschaffen*. Good luck.

5. Criticism

As stated in the [abstract](#), my notes are [biased](#). The best I can do is to examine critically every piece of the theory and try to prove it wrong, or at least redundant. I will list here my efforts to demolish my theory. The reason is very simple. Every theory is like a map that is supposed to pinpoint the location of a hidden treasure. Any error, no matter how small, in the map can make it unusable to find the treasure. It will be like 'kicking spoons on the floor' [above](#). I don't care at all about my 'map'. It is [just a tool](#). You will be the judge. Read also [Ch. 7 below](#).

Let me start with criticizing the arrow of Time¹¹ in Nature, and then I will focus on its presentation in my 'map': the left (vertical) section of [Fig. 2](#). Later, I will critically examine the upper (horizontal) section of [Fig. 2](#) (the doctrine of [trialism](#), p. 3 in *The Physics of Life*¹). Hopefully, this can make my 'map' [falsifiable](#), to some extent at least.

5.1. The arrow of Time is *not* physical phenomenon. In physics⁵, one can only suggest [global hyperbolicity](#) from the '[block universe](#)' (p. 4).

5.1.1. Agree. The arrow of Time is not *physical* phenomenon, because it cannot be a *relational* phenomenon. Otherwise the river banks¹¹ at “absolute rest” could be detected with light and the *Ether* will become physical stuff providing *absolute coordinates*, which will demolish the Theory of Relativity. See Fig. 14 at p. 15 in *The Physics of Life*¹.

5.2. The arrow of Time, shown in the left (vertical) section of Fig. 2, is not backed by *physical* evidence.

5.2.1. See 5.1.1. The arrow of Time is empowered by the *self-energy* of the Unmoved Mover²¹ – the *Final Cause*. This is the *fifth force*. Let me zoom on the elementary step (a.k.a. *chronon*) of ‘change of space’ mentioned in Ch. 3: the *quantum of spacetime*. Is it *falsifiable* ?

First, a thought experiment. Fig. 7 shows two of the *photons* in Fig. 5.

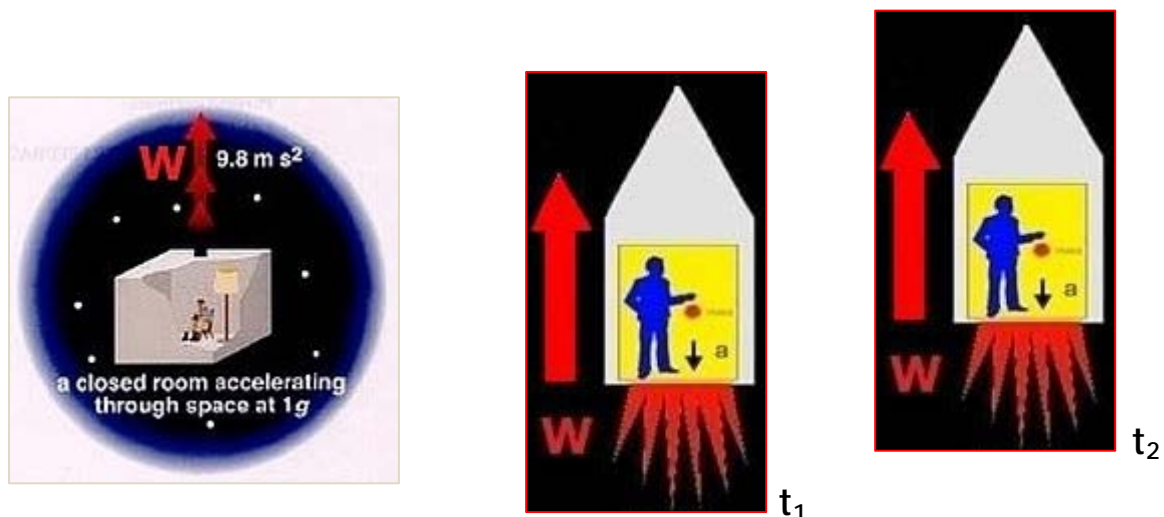


Fig. 7. Adapted from Fig. K on p. 21 in *Quantum of Spacetime*¹.

Your good old clock reads ($t_2 - t_1 > 0$) as the *infinitesimal* (ϵ) temporal interval along the *local* (physical) time mentioned in Ch. 3. Your clock

cannot read the “vertical” shift in Fig. 7 viz. the dark strips in Fig. 5, separating the consecutive snapshots from the movie reel. In ADM hypothesis, however, the “vertical” shift in Fig. 7 *above* is part and parcel from the spacetime (Fig. 8).

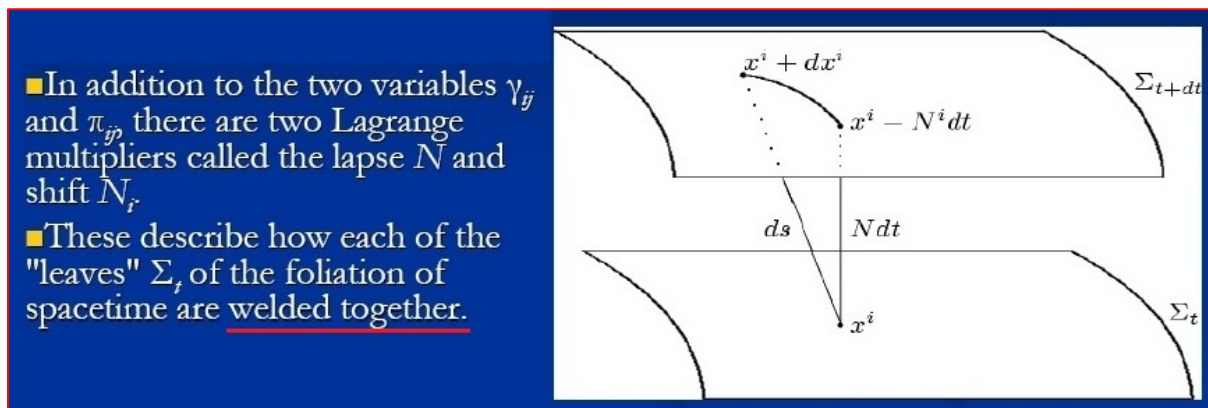


Fig. 8

In Fig. 8, the “leaves” (shown with balls in Fig. 5) are welded together by *themselves*. In Fig. 7, the two “leaves” are welded together in a *perfect* (Sic!) continuum, and are empowered by the Unmoved Mover²¹ – the *Final Cause* (5.2.1). Which of the two ‘maps’ matches Nature? The answer is very simple: without the vertical dark strips in Fig. 5, there will be only *one single* ‘snapshot’ of Nature. As John A. Wheeler put it, Time is Nature’s way of keeping everything from happening at once. Ergo, Fig. 8 is **false**. Forget GR⁵ (p. 4).

In general, the notion of spacetime (the left-hand side in Fig. 3) should be treated as an *adjective*. If we say ‘this is *blue*’, we have to explain *what* is ‘*blue*’ (say, blue Cheshire cat at the right-hand side in Fig. 3). But the spacetime itself (the left-hand side in Fig. 3) does *not* have its own energy to ‘act back’ on its source: “there is no mutual action of

gravitational fields *on* matter” (H. Ohanian). The only possible solution is to empower the Cheshire cat (the right-hand side in Fig. 3) with the **self-action** of gravity: read NB at p. 7 and 5.2.1. With GR, physicists cannot explain even the Earth tides⁹. Forget GR (p. 4).

5.3. Influence from the future (Fig. 4) can change the past: the **grandfather paradox**.

5.3.1. Nothing can change the *irreversible* past in Heraclitean Time: you cannot step twice into the same stream¹¹. With light, we observe the past only *post factum*, only *after* the cat Macavity¹⁹ has *already* finished its job. The **Platonic** state of the world “outside the train”¹⁸ corresponds to the *atemporal* “gaps” of ‘change **of** space’ (Ch. 3) viz. the “gaps” between the two consecutive states of the rocket in Fig. 7.

Let’s move to the upper (horizontal) section of Fig. 2 and the doctrine of **trialism** (p. 3 in *The Physics of Life*¹). I will critically examine the **self-action** of the **human brain** — only matter can interact with matter — exhibited in the **binding phenomenon**, which acts as “mediator” of the human mind and volition (*Res cogitans*) *via* the common source of matter & psyche², dubbed *Res potentia* (Fig. 2). The latter lives only in the *potential* future of the arrow of Time (Fig. 4). Thus, the matter & psyche² are not *directly* linked — the psyche (*Res cogitans*) does not have energy to interact with its physical correlate (*Res extensa*) **above your neck**, just as there is no generic “gravitational energy” (Zhao-Yan Wu). To explain this counter-intuitive puzzle, I suggested in January 1990 the idea of fundamental dualism²⁰, which was later (April 2000) upgraded to the doctrine of **trialism** (Slide 14). The idea is as follows.

Suppose you are an Eskimo, who has never seen and will never see an elephant in his life. Yet you can make observations on elephant's **trunk** with 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'. You may only suggest that what *you* see as an arm (*Res cogitans*) is *pre-correlated* with what *you* see as a nose (*Res extensa*) by pre-established harmony². But again, you're an Eskimo and cannot even imagine the '**trunk**' (*Res potentia*).

For example, recall the experiment with your brain in **Ch. 4**: your brain (nose) interacted with your mind (arm) *via* their "hub" called **trunk** or *Res potentia* in **Fig. 2**. There is no *direct* "arm-nose" connection.

Thus, the spacetime engineering (**Fig. 1**) is based on three **matrixes**: read closely **pp. 9-10** and the explanation of **Fig. 4**. However, there are many objections to the doctrine of *trialism*.

5.4. The so-called **trunk** is utterly controversial, like apples&oranges.

5.4.1. Agree. But the alternative that the psyche emerged from psyche, and matter emerged from matter, leads to **infinite regress**: '**turtles all the way down**'. There should be a **cutoff** in Nature, which, for example, prompted Aristotle to suggest the Unmoved Mover²¹.

5.5. The so-called **trunk** (p. 14) is inherently incomprehensible.

5.5.1. True. Our cognition works with a set of objects, call it **A**, which can be defined only relationally, with respect to another set **non-A**.

The 'set of all sets', pertaining to 'the entire Universe as **ONE**', is not a 'set'. It is inherently incomprehensible to us. But Nature is smarter.

The latter may be an **undecidable proposition**. Ultimately, the **trunk** is **ONE** incomprehensible entity, resembling the **Noumenon**. *Nur die Fülle führt zur Klarheit, und im Abgrund wohnt die Wahrheit* (Fr. Schiller).

6. References and Notes

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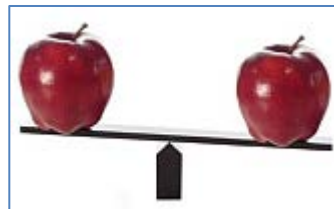
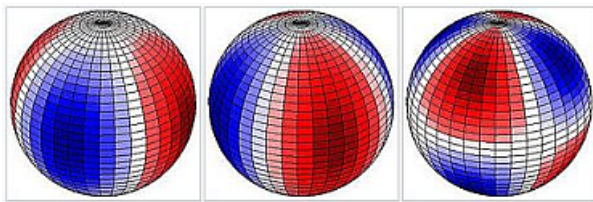
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Everything changes and nothing remains still —
you cannot step twice into the same stream.

12. D. Chakalov (2022), *Spacetime Engineering 201*. Video lecture, app. 20 min; see ref. [53] on p. 24 in *The Physics of Life*¹.

13. W.G. Unruh (17 Dec 1993), Time, Gravity, and Quantum Mechanics, arXiv:gr-qc/9312027v2. <https://arxiv.org/abs/gr-qc/9312027v2>

p. 4: "The lesson of these experiments would appear to be that gravity alters the way clocks run. Such a dependence of time on gravity would have been strange enough for the Newtonian view, but General Relativity is actually much more radical than that. A more accurate way of summarizing the lessons of General Relativity is that gravity does not cause time to run differently in different places (e.g., [faster far from the earth than near it](#)).

"Gravity *is* the unequable flow of time from place to place. It is not that there are two separate phenomena, namely gravity and time and that the one, gravity, affects the other. Rather the theory states that the phenomena we usually ascribe to gravity are actually caused by time's flowing unequally from place to place."

14. Time along the axis **W** in [Fig. 7](#) is **imaginary**: Arthur S. Eddington, *Space, Time and Gravitation*, 1920, [pp. 48-51](#); see also [Ethan Siegel](#).

15. H. Bondi, [Negative Mass in General Relativity](#). *Rev. Mod. Phys.* **29**, 423 (1957); Negative mass. *Wikipedia*, 2021.
https://en.wikipedia.org/wiki/Negative_mass#Runaway_motion



16. D. Chakalov (2 June 2008), [The Arrow of Spacetime](#) (21.09.2008, 10-10:45 AM).

17. Matt Visser (17 Apr 2002), The quantum physics of chronology protection, [arXiv:gr-qc/0204022v2](#).

p. 3: "The essence of the problem lies in the fact that the [Einstein equations](#) of general relativity are [local equations](#), relating some aspects of the spacetime curvature at a point to the presence of stress-energy at that point. (...) What general relativity does *not* do is to provide any natural way of imposing [global constraints on the spacetime](#) – certainly the Einstein equations provide no such nonlocal constraint. In [cosmology](#) this leads to the observation that the global topology of space is *not* constrained by the Einstein equations; [spatial topology](#) is an independent discrete variable that has to be decided by observation."

Note: The Einstein equations²³ (Fig. 3) should be *quasi-local* equations, relating the *local* properties of matter and fields to the nonlocal *global* properties of the entire spacetime *en bloc*. Which is why I suggested the so-called *global mode* of spacetime (Ch. 3). The latter inserts *nonlocal* constraints into every 4D point/event, *perfectly* embedded: think globally (Fig. E), act locally. The end results produce *inertia* and *Killing field*, and *causality* and *time-orientability* in general. Forget GR.

18. D. Chakalov (2019), *Platonic Theory of Spacetime*, p. 31.
http://www.god-does-not-play-dice.net/p_31.jpg

19. Adam D. Helfer (18 Sep 1997), Are Negative Energy Densities Detectable? [arXiv:gr-qc/9709047v1](https://arxiv.org/abs/gr-qc/9709047v1).

p. 1: "T. S. Eliot described a 'mystery cat,' *Macavity*, responsible for all sorts of mischief. But when the crime's discovered, *Macavity's* not there!"

20. D. Chakalov (15 January 1990), *How to Bind Mind to Matter?*
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21. Unmoved mover. *Wikipedia*, 2021.
https://en.wikipedia.org/wiki/Unmoved_mover

22. D. Chakalov (2019), *The Physics of Life: Flipping a Quantum Coin*, pp. 8-9. http://www.god-does-not-play-dice.net/q_coin.pdf

"Finally, I wish to explain why I wrote this paper. Back in November 1989, I completed my first manuscript on the physics of life, entitled: 'How to Bind Mind to Matter?'. It was dated 15 January 1990, to mark eighteen years of study and research, which I started in January 1972, at age 19. I am old and probably won't be around to witness the devastating climate catastrophe, but many younger people, including my loved ones, will. I feel like being brutally forced, along with my children and grandchildren, to take a seat in a rubber boat, surrounded by a bunch of crazy idiots, who enjoy rafting on a mountain river toward a gigantic waterfall a few kilometers ahead (p. 38). I can only shout at these morons to stop immediately our boat, before it is too late. For if we pass the *tipping point*, we will be dead close to *Climageddon* and *WWIII*. Don't even think that *WWIII* cannot happen because governments were "smart". They are **not**."

23. *Albert Einstein, Philosopher-Scientist*, ed. by Paul Arthur Schilpp. Tudor Publishing Company, New York, 1951.

p. 75: "The right side is a formal condensation of all things whose comprehension in the sense of a field-theory is still problematic. Not for a moment, of course, did I doubt that this formulation was merely a makeshift in order to give the general principle of relativity a preliminary closed expression. For it was essentially not anything more than a theory of the gravitational field, which was somewhat artificially isolated from a total field of [as yet unknown structure](#)."

7. Questions & Answers

Q1. You said that you have an [equation](#). What do you mean?

A1. Equations show particular patterns ([Gesetzmäßigkeiten](#)) in Nature. Please see the so-called *evolution equation* at p. 28 in *The Physics of Life*¹ and read Sec. 8 at pp. 18-19 therein. However, my equation is still in symbolic form, firstly because we need new Mathematics (the so-called [hyperimaginary numbers](#)) to develop quantum gravity based on the [three types of mass](#) (positive, negative¹⁵, and imaginary). Thus, my equation is rather an invitation (Q2) for comprehensive research by mathematicians and theoretical physicists with professional knowledge in [topology](#) and [differential geometry](#). In my (probably [biased](#)) opinion, we have a chance to develop, with industrial spacetime engineering, a new and perfectly clean energy source, which could solve the climate crisis²². We may also learn how to modify [gravity](#) to fly like a 'gimbal'.



The 'gimbal' is driven only by gravitational radiation reaction, with no external forces. Pity the theory by [Ezra T. Newman et al.](#) (*J. Math. Phys.* 13 (1972) 1884-1891) is [wrong](#). Do you know how to take surface integrals at infinity ([Fig. E](#))? Do you know the origin of gravitational radiation? The [fifth force](#). It is an *immensely* powerful phenomenon ([p. 25](#)).

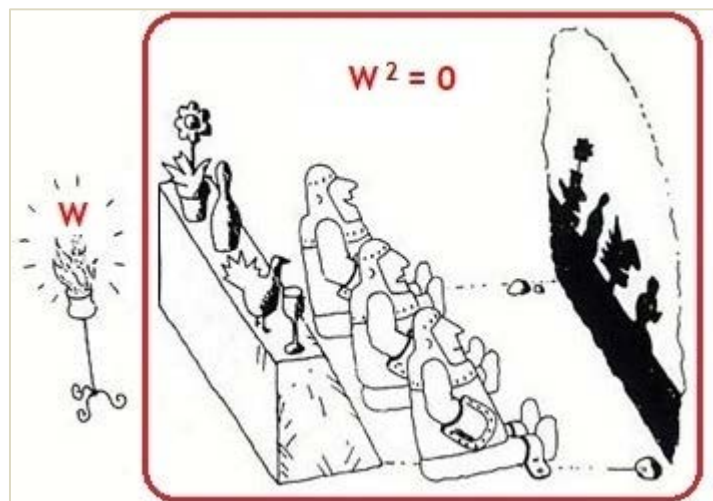
All this is for *you*, my dear reader. I personally don't need industrial spacetime engineering viz. new energy sources or new flying machines. [I'm fine](#).

Q4. How can I learn spacetime engineering?

A4. Read Henry Ford [above](#), pp. 15-25 and C2 (p. 13) in *Quantum of Spacetime*¹, and also pp. iii - vi in Sec. Q&A in *The Physics of Life*¹. However, everything you can learn from me is only half of what you need to practice spacetime engineering – I can only help you get on [the right track](#), so that you are not kicking spoons on the floor ([p. 8](#)). The rest you can do *only* by yourself: ask God ([Matthew 7:7](#)) for help, in order to help the people around you. Otherwise it won't work.

Q5. Can you explain your ideas in simple terms?

A5. Let me use Plato's allegory of the cave ([Wikipedia](#)). Unlike the 4D physical world (e.g., the Sun, see p. 4 in [Time.pdf](#)), the Platonic world cannot be observed with light¹⁸. But it is not a *physical* stiff, so do not call it "[dark](#)" ([p. 6](#)). We are mental "shadows" watching *physicalized* 4D "shadows", like the Eskimos ([p. 14](#)) pictured below. See also [Fig. E](#).



We apply the Heraclitean arrow of Time¹¹ to introduce dynamics to the "shadows" above, and suggest [three](#) Platonic *remnants* – "just in the middle between possibility and reality", Werner Heisenberg¹⁰ – called **matrixes** ([p. 5](#) and [p. 9](#)). There is no [metric](#) in the **matrixes**, just as there is no distance between the concept of a tree and the concept of a mountain in your memory. We interpret the Platonic **matrixes** as an *atemporal luxonic* memory of the Universe: "A photon arriving in our eye from a distant star will not have aged" ([Q2](#)). Once created, it does not decay ([p. 5](#)), and cannot be eaten by worms. Once we drop our old deteriorating "jackets", we simply go back home¹⁸, *ad infinitum*. Only the math ([Q2](#)) is still unknown. Help is needed, time is running out!²²

Addendum 1

What is spacetime? Why is the Heraclitean Time¹¹ imaginary¹⁴? Good questions. I can only try to offer my (probably **biased**) opinion. At the end of the day, I hope you will grasp the doctrine of *trialism* (p. 13), the “carrot” in Fig. 1, and the issues in Fig. E. But first, what is **light**?

Rest assured that light itself does not travel *anywhere*, because it is *everywhere* (Fig. E). Only the *photon* travels with the **invariant speed** denoted c . If we try to “look” at 4D spacetime with the physical time read with a clock, we may picture the *nodes* in Fig. A like “sandbags” (photons) being passed from one node to the neighboring one, thereby creating EM waves. These sandbags (photons) **oscillate** back and forth to the neighboring nodes, but one cannot time **the elementary shift** of sandbags/photons between the different nodes in Fig. A. Why? Because **the elementary shift** of Time (Fig. 7) is *atemporal*¹⁴. With light, we see *only* the irreversible past (Fig. 4), and with *squared* physical time (Q2).

Let me try to explain the omnipresent *atemporal* Ether, depicted with black background in Fig. A and Fig. B. It (not “He”) is the *atemporal* Platonic world as well (Q5), shown in Fig. E **below**.



Fig. A. Watch it at [YouTube](#).

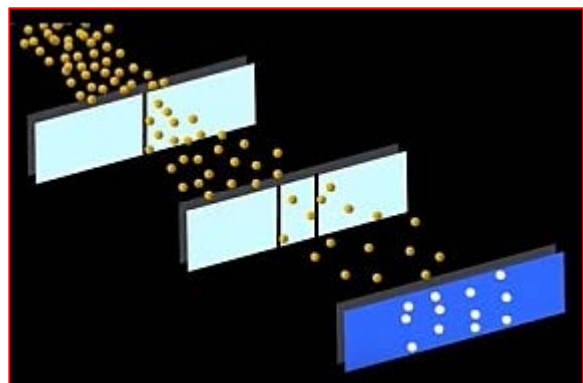


Fig. B. Watch it at [YouTube](#).

As I mentioned previously, the notion of spacetime (the left-hand side in Fig. 3) should be treated as an adjective (p. 12): spacetime of *what*? The current theory of relativity, however, cannot include the **intact** quantum world — read Erwin Schrödinger from 1935 at p. 4, p. 9, and p. 26, and also NB at p. 17 in *The Physics of Life*¹. The **intact** quantum world exists as Platonic reality “just in the middle between possibility and reality” (Werner Heisenberg¹⁰). Question is, can we talk about an **intact quantum-gravitational** Platonic world? Yes we can and we must,

because there is **no other choice** – the current theory of spacetime^{4,5} desperately needs the **intact** quantum-gravitational Platonic world.

When we talk about 'space', we usually imagine something like a vast warehouse that keeps all kinds of objects in it, like planets, stars, etc. We may see the roof of the warehouse with telescopes, but it is like a **horizon at sea**. Every point in the warehouse is also its legitimate "center", meaning that even if you travel arbitrarily far away in any direction, you will never get "closer" to the "edge" of the warehouse.

Is the space **unlimited**? Physicists **do not know**, because there is too much "**mystery matter**" to speculate about the **shape of the universe**.

Let's start with something we can clearly define locally, such as the dimensions of 3D space (Fig. C), and then will try to increase its size by shooting light beams from the center toward the "edge" of 3D space.

Can light reach the endpoints/edges (if any) of space and stop there? Or perhaps light will bounce back and hit the center of Fig. C **below**, much like **Chuck Norris** counted to **null infinity** and back? No way José.

But is there anything that can **wrap** the 3D space *en bloc*? As **Stephen Leacock** explained: "We cannot imagine that the stars go on forever. It's unthinkable. But we equally cannot imagine that they come to a stop and that beyond them is nothing, and then *more* nothing. Unending nothing is as incomprehensible as unending something."

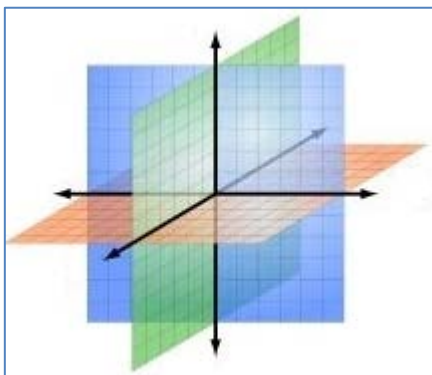
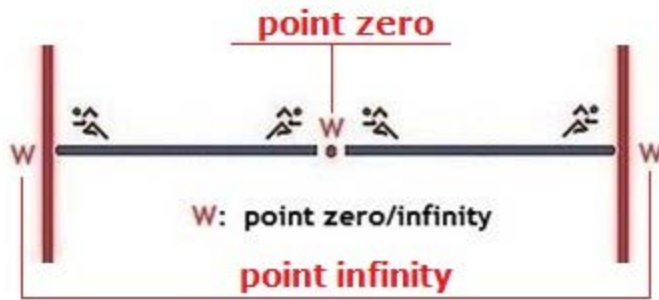


Fig. C



Fig. D

Yes, space is indeed bounded, but *not* by 'outer space' (**Ned Wright**). The *pre-geometric* **Platonic** world (Fig. E) is a **different type of reality**.



The Universe is like an unbroken ring with no circumference, for the circumference **W** is nowhere, and the center **W** is everywhere.

Fig. E. Read closely p. 18.

No “spacetime curvature”.

It **wraps** the spacetime both “beyond” future null infinity and “inside” every 4D instant here-and-now: split the photon to “see” it (Fig. 4).

Let me try to explain how the *pre-geometric Platonic* world (Fig. E) works with the ‘time of light’, by *assembling* the invariant spacetime interval along the *perfectly* continual physical time, as read with a clock within every finite interval ($t_2 - t_1 > 0$) shown in Fig. 7.

We will convert ‘distances in space’ to ‘meters of light-travel time’, so that 1m equals app. 3.3 ns of light-travel time. To quote Edwin Taylor and John A. Wheeler (click Fig. D): “We assume that every clock in the latticework, whatever its construction, has been calibrated in meters of light-travel time.”

Calibrated? By *what*? By the *atemporal Platonic world*. It **wraps** every 4D spacetime point: see Fig. 4 and recall the invisible — with light — strips separating the instantaneous frames in the movie reel in Fig. 5. More on the *calibration* of the invariant spacetime interval at pp. iv - v in *The Physics of Life*¹. Notice also the ‘gimbal’ at p. 19. Simple, no?

Now you probably say — naah, there’s no such animal! But is there any **metric** in your memory, with which you could separate, for example, the notion of a tree from the notion of a mountain? They are different concepts and, unlike any physical stuff, they do not decay in time. The same tallies to the Platonic **matrix** (p. 5). The latter is like a Platonic **hand** perfectly embedded in its 4D **glove** (p. 7). With light, we see only a **self-acting** 4D **glove** (p. 7), and the Platonic **hand** enables the glove to “think” globally and act locally — read the note at p. 18. Which is why the spacetime — the bare grin of the cat *without* the cat, Fig. 3 — has *global* properties as well, defined by the *global* (Platonic) mode of spacetime (p. 6). Thus, the *local* properties of mater, defined by the local **physical cat**, and the *global* properties of 4D spacetime defined

by the **matrix** (p. 5) are inseparable and *perfectly* embedded into every spacetime point/event (Fig. 4) in the **self-acting** 4D glove (p. 7).

The **self-action** is the hallmark of the physics of Life. This is the **fifth force** empowering **gravity**, the **human brain**, and all living organisms and quantum-gravitational systems. Read p. iii in *The Physics of Life*¹ and recall Albert Einstein²³. The mythical **dark energy**, **dark matter**, and **black holes** are for the birds (p. 6). You will have to start **anew**.

To wrap up, let me go back to my announcement from January 1990²⁰. The so-called *biocausality* is the general form of retarded (**no faster than light** communication, see 5.3) **causality**: the cause belongs only and exclusively only to the *past* light cone of its effect. In all three types of **matrixes** (p. 5 and p. 9), the feedback from the *potential* future (Fig. 4) is *embedded* in the **infinitesimal** (ϵ) temporal interval ($t_2 - t_1 > 0$) along the **local** (physical) time, explained in Fig. 7. Thus, the feedback from the *potential* future (Fig. 4) is always inserted in the *past* light cone of its effect, like the cat Macavity¹⁹: read p. 10 in *The Physics of Life*¹.

This is the *atemporal* feedback from the entire **Platonic** world (for example, in **the origin of inertia**), encoded in the so-called Zenon Connection (Sec. 4 in *Quantum of Spacetime*¹). This is the **fifth force** (5.2.1). In the inanimate macroscopic world (say, your laptop), the feedback from the *potential* future (Fig. 4), carried out by Macavity¹⁹, is effectively zero, which is why every event 'here and now' is FAPP determined *only* by its past. Subsequently, your laptop cannot act on itself. In all living and quantum-gravitational systems, the **fifth force**, facilitated by the three **matrixes** (p. 9), makes them **self-acting** (p. 7). But only the **human brain** is equipped with biological and cognitive **matrixes** (p. 9) and can be trained in spacetime engineering (Fig. 1).

Sure enough, the **fifth force** (5.2.1) in the **human brain** is many orders of magnitudes weaker than the Earth tides⁹ and "dark energy" (p. 6), perhaps in the range of the **Casimir force**. What matters here is that the **fifth force** may spring from the "negative" energy¹⁵ stored in the **quantum vacuum**, with the ultimate precision of **geometric points**.

As an example of *biocausality* **above**, recall the correlation of two nuclear submarines, leading to their collision in the Atlantic Ocean in **February 2009**. If any of their captains was trained in spacetime engineering (Fig. 1), the "synchronicity" could have been avoided by

anticipating their dangerous correlation, much like your brain worked with the painted cube (p. 9). Keep in mind, however, that spacetime engineering (Q4) is *not* parapsychology: read C2 on p. 13 in *Quantum of Spacetime*¹. God as Love (1 John 4:8) may very well exist. Surely you can ignore it, but then you could only *entertain* people with your “magic”, say, with “bus levitation”. We have a different agenda^{12,22}.

On the theoretical side, we want to restore causality in the quantum world. To paraphrase Einstein, God casts the *matrix* (p. 5), not the dice. This is *quantum causality*, as the shift to the *next* future state (Slide 1) is performed with the *quantum of action* viz. the so-called Zenon Connection (Sec. 4 in *Quantum of Spacetime*¹). There is no fundamental “uncertainty” in the *intact* quantum world. Dead matter makes quantum jumps; the living and quantum matter is smarter.

Finally, let me again stress that everything at my *website* is just a map (Ch. 5). I don’t claim any discovery, firstly because my equation (p. 7) is still in symbolic form (Q2). Quote from p. 8 in *Gravitational Energy*:

There is a nice French saying: *une hirondelle ne fait pas le printemps*. (One swallow doesn’t make a spring.) In my case, I can modify it as follows: Une hirondelle ne fait pas le printemps. Deux hirondelles ne fait pas le printemps non plus. Mais cinq hirondelles ... well, that’s a whole new ball game!

I have so far developed five cases of spacetime engineering (Fig. 1). That’s a whole new ball game, in my opinion. But not “discovery”.

Should you wish to learn more (Q3), read my note on *physical theology* and follow the steps (1)-(2)-(3) at p. 5 in *explanation.pdf*. Good luck.

Addendum 2

The second demonstration of spacetime engineering, called brain-controlled quantum tunneling, is scheduled for March 2022¹². It must be recorded under tightly controlled laboratory conditions at some renowned technical institute or university, under the supervision of qualified physicists and technicians. If I record it alone at my home, people will ignore it and call it “magic”. But any sufficiently advanced technology is indistinguishable from “magic” (*Clarke’s Third Law*).

The macroscopic quantum tunneling – the first off mystery in quantum mechanics – is known since 1911, thanks to [Charles Wilson](#); read p. 27 in *The Physics of Life*¹. The case of brain-controlled quantum tunneling may be even more puzzling, as it involves the new *biocausality* (p. 25) and *quantum causality* (p. 26). To get you started, let me illustrate the metaphysical [principle of locality](#) (an object is directly influenced only by its *infinitesimal* surrounding) in the inanimate macroscopic world at the length scale of tables and chairs, e.g., in your laptop (p. 25). I will use four snapshots from the trajectory of the billiard ball in Fig. F.

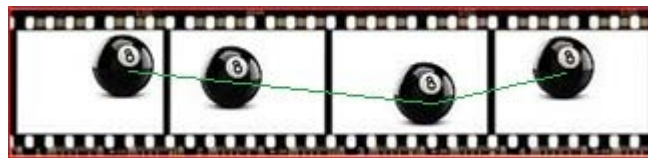


Fig. F. Compare it to [Fig. 5](#).

Obviously, the first state of the ball can reach its last state if and only if the ball passed through its intermediate states. But suppose that the same ball in Fig. F is *pre-correlated* with all billiard balls (not shown) *via* their common **potential** states, by their **intact**, *atemporal*, and *not-yet-physicalized* Platonic **matrix** (p. 5) depicted in Fig. G below.



Fig. G. Read Werner Heisenberg¹⁰, p. 43.

Then all billiard balls, including the one in Fig. F [above](#), will be **EPR**-like *pre-correlated* and will exhibit **holomovement** like a **school of fish**. The billiard balls will *always* follow the **principle of locality**, but now they will be “alive” and *pre-correlated* like the neurons in the **human brain**, participating in their fleeting **neural pathways**.

Who is playing the “billiard game” using the **fifth force** (p. 25)? **You**. Recall the experiment with your brain at p. 9. But to use spacetime engineering ([Q4](#)), you will have to *increase* the **fifth force** (p. 25) and gain control over the quantum tunneling. If we use the example with

the single billiard ball in Fig. F, now the ball can literally jump into *any* of its four physical states, *via* its **potential** Platonic states in the *global* mode of 4+0 D spacetime (p. 5 and Fig. E), depicted in Fig. G.

Again, the translocation of the ball between *any* of its physical states will *always* follow the **principle of locality**, only now the ball will face a continuous spectrum of equally-possible *physicalizable* states, which can be otherwise separated by large (including **space-like**) distances. In short, the exercise has two stages: (i) make *all* billiard balls EPR-like correlated or “alive” (p. 27), and (ii) increase further your **fifth force** (p. 25) to gain control over their **future** (Fig. G) **energy-momentum** and **angular momentum**, until all balls can be tunneled/teleported at the desired location, perhaps like the ‘gimbal’ shown at p. 19.

Now replace the ball in Fig. F with a grain of rice, and all rice in the left jar in Fig. H can “tunnel” into the empty jar at right, nice’n easy. This is brain-controlled quantum tunneling (p. 26). Not “magic”.



Fig. H. Read about balancing apples at p. 16.

As stated **earlier**, I have to perform the demonstration under strictly controlled conditions, at some technical institute or university in EU. How do we measure the gravitational energy (MTW p. 467) as “**apples**”?

If you wish to learn more (Q3), follow the steps (1)-(2)-(3) at p. 5 in [explanation.pdf](#). I will reply within five working days and will send you the link to my video presentation¹². The choice is yours (p. 19).

Addendum 3

Is there anything that can **wrap** the 3D space *en bloc* (p. 23)? Physicists like Ezra Newman (p. 19) disagreed with my proposal for the topology of spacetime, shown in Fig. E, as if they have any alternative solution.

Let’s see what they can offer. Where is ‘null infinity’ (**Chuck Norris**)?

Physicists cannot calculate its numerical value (if any), so they use the notion of '*sufficiently faraway*'. As an illustration, suppose you are having a BBQ on your terrace. It is a summer day, with air temperature 25 degrees Celsius. You bring your thermometer close to the BBQ and now it reads 50 degrees Celsius. Then you walk away and measure the temperature, until it reaches 25 degrees Celsius, say, 5m away from the BBQ. Likewise, 10^{90} km is '*sufficiently faraway*' (5m from the BBQ) from the Hulse-Taylor pulsar below, courtesy of [Bernard Schutz](#).

From a physical point of view, null infinity is *very* far away. A measure of how far one has to get from a source to be "near" infinity is to consider the divergence of the true curved-space light-cones from their flat-space approximations, which wind up at spatial infinity. Martin Walker first pointed out the enormous distance required to separate these cones by just one wavelength or period of the gravitational wave, a reasonable length scale for a radiation problem. The separation is something like $2M \ln(r/M)$. Setting this equal to λ for the Hulse-Taylor pulsar, we solve for r and find that it is a bit more than 10^{10^9} km! This is unimaginably bigger than the observable Universe, whose radius is a mere 10^{23} km.

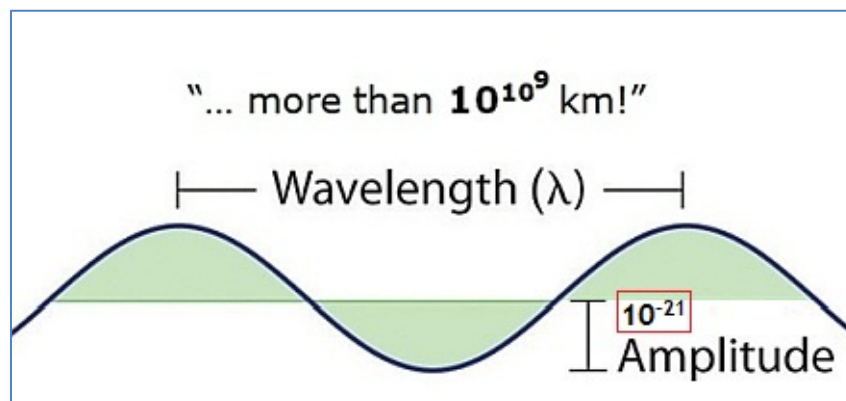


Fig. 1. For realistic astrophysical sources, read [M. Maggiore](#).

The experts in gravitational wave (GW) astronomy have not calculated the required separation of [GW150914](#) '*sufficiently faraway*' from the Earth to apply their [linearized approximation](#), after assuming that the dimensionless amplitude ([Fig. 1](#)) of their GWs is *already* vanishing small, e.g., " 10^{-21} or less" ([Lisa Goggin](#)). If GW150914 was "by far the most powerful explosion humans have ever detected except for the big bang" ([Kip Thorne](#)), one can expect that the '*sufficiently faraway*' distance between [GW150914](#) and Earth will be *much* greater than 10^{90}

km (Fig. I). Otherwise Kip Thorne and his collaborators may not use the linearized gravity and have to start from scratch – read Hans Ohanian at p. 4, and try to construct a “geodesic” under the perpetual energy non-conservation due to gravity⁶. More facts at pp. 1-6 in facts.pdf.

Bottom line here is the tantalizing problem of ‘unending something’: read Stephen Leacock on p. 23. The story with the BBQ on p. 29 cannot solve it. Can you suggest some numerical value of “near” infinity, after Roger Penrose? If you cannot, see the topology of spacetime in Fig. E. The *infinity* does exist in 4+0 D spacetime, as it provides numerically finite yet *physically* unattainable “boundaries” of the 4D partition of the Universe. Take for example the Beginning at Time zero, denoted A in the continuum of geometric points below (Fig. J).

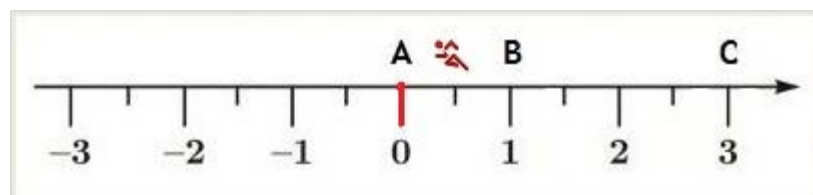


Fig. J. See Fig. E.

The closed interval [BC] has a numerically finite value matching the increasing cosmological age viz. the increasing radius of the inflating “balloon” (Slide 2). But to we define [BC], the Beginning at Time zero (A) must disappear: $BC = AC - AB$. If (AB) is an infinitesimally (🏃) “running” half-closed interval, B can *never* reach A and stop there. Hence the Beginning at Time zero and the End at Time infinity are *always* present in the Platonic world, which leads to physical theology.

If you wish to learn more about Time (Fig. 7), follow steps (1)-(2)-(3) at p. 5 in explanation.pdf. I will reply by suggesting new physics and new Mathematics (Q2). In one sentence, Nature is smarter (5.5.1).

Alternatively, you may wish to explore the current hypotheses of GWs, according to which the GW in Fig. I is made of hypothetical gravitons, as explained by Kip Thorne in his Slides 3 and 4. Nobody has detected them, nor has suggest some perturbative quantum gravity based on gravitons as ‘messenger particles’. Moreover, GW150914 – “the most powerful explosion humans have ever detected except for the big bang” (Kip Thorne) – was *totally silent*, because “a vacuum BBH merger does not produce any EM or particle emission whatsoever” (LIGO, p. 9 in arXiv:1602.08492v4). It just can’t. It’s a vacuum ghost.

We know *nothing* about the wave pattern of *very strong* GWs in the immediate vicinity ([M. Maggiore](#)) of GW150914, but the GW experts believe that the same *totally* unknown (Sic!) pattern was *absolutely not* (Sic!) altered due to non-linear interactions ([MTW p. 968](#)) for one billion years, before being detected on [14 September 2015](#). Otherwise LIGO will be totally useless, as it cannot detect *any non-linear GW*.

The only thing GW experts know for sure is that GW [gravitons](#) are *very* easy to produce, as explained eloquently by the [Nobel Laureate](#) Kip Thorne and father of [GW astronomy](#) in his 'Gravitational Waves and Experimental Tests of General Relativity' from 7.09.2012, [pp. 31-32](#):

Exercise 27.8 Problem: Gravitational waves from arm waving

Wave your arms rapidly and thereby try to generate gravitational waves.

(a) Compute in order of magnitude, using classical general relativity, the wavelength of the waves you generate and their dimensionless amplitude at a distance of [one wavelength](#) away from you.

(b) How many gravitons do you produce per second?

Fascinating experiment, straight from the horse's mouth. I strongly recommended it to all GW experts in [arXiv:2103.08520 \[gr-qc\]](#). If they are too lazy to wave their arms "rapidly" and "generate gravitational waves", surely they can compute, using "classical general relativity", how many "gravitons" are produced by an average [Hummingbird](#).

Anyway. The only merit of GW parapsychology is to show how careless are today's theoretical physicists about the [self-acting](#) origin of gravity ([Fig. 3](#)). Will leave them and [Kip Thorne](#) to simmer in their own sauce.

Acknowledgements

I am grateful to many [theoretical physicists](#) for their invaluable (albeit [unintended](#)) support, most notably to [Ezra Newman](#) and his colleagues for showing in [June 1972](#) the [wrong theory](#) of [gravitational radiation](#).

24 September 2021, 15:25 GMT



Dimi Chakalov <dchakalov@gmail.com>

How many gravitons are produced by an average Hummingbird?

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Read the experiment by Kip Thorne at p. 31 (last) in
<http://www.god-does-not-play-dice.net/SE.pdf>

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