

# Quantum of Spacetime: Zenon Connection

D. Chakalov<sup>‡</sup>  
[chakalov.net](http://chakalov.net)

## Abstract

The origin of Time and Continuum is addressed with the so-called Zenon Connection ([Sec. 4](#) and [p. 7](#)), with emphasis on (i) the [infinitesimal displacement](#) of physical objects in 4D spacetime, (ii) Planck's [quantum of action](#), and (iii) the quantum of Time interpreted as the [atom of geometry](#) (p. 4 in [test.pdf](#)).

Dedicated to the 163rd birthday of [Max Planck](#), 23 April 1858.

## 1. Introduction

To the origin of Time and Continuum (outline at [p. 5](#)): what binds matter to matter is *not* matter, but a new form of reality, which is [neither matter nor mind](#). **It** (not “He”) is called here *Res potentia* or **Platonic** reality. Which means that Fig. 1 below, depicting matter being “connected” to matter *exclusively* (Sic!) *by* matter, is in fact **false**. If the origin of Time were any [physical phenomenon](#) (like the [mainspring](#) in your old clock), it can introduce energy to run the movie reel (Fig. 1) along ‘the time read with a clock’ **iff** it is empowered by yet *another* [physical phenomenon](#) to get energy from, [ad infinitum](#).

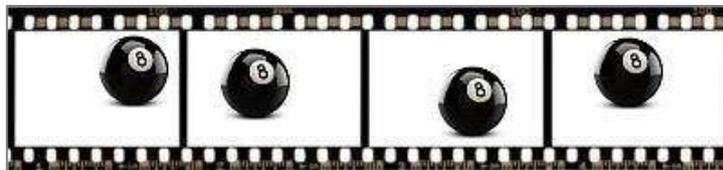


Fig. 1. Four *gravitalized* “jackets”. See Fig. M and Fig. N in [test.pdf](#), pp. 10-13.

I will again introduce the [atom of geometry](#) (p. 4 in [test.pdf](#)) shown in Fig. 2 below.

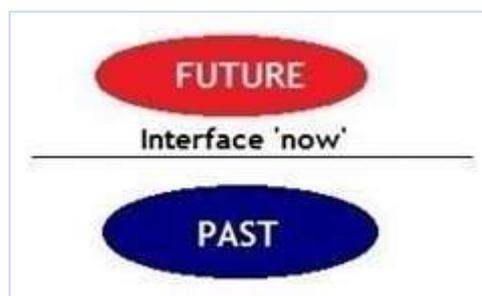


Fig. 2

Let me explain the so-called Zenon Connection (ZC), introduced previously at p. 5 in [gr\\_energy.pdf](#). See Escher's ‘[drawing hands](#)’ and the global **nullified** Heraclitean Time in [4+0](#) spacetime depicted in [Slide 1](#) and [Slide 2](#), and empowered by the [Unmoved Mover](#).

Notice that the **4D** physical world enjoys *perfect* continuum: unlike the inevitable **dark strips** between the consecutive snapshots in Fig. 1, the snapshots along the Heraclitean Time are created exclusively by the *physicalized* states in the *irreversible past* (Fig. 2). These consecutive snapshots are “separated” by the global **nullified** Heraclitean Time, which does *not* exist (Sic!) in the physical, **4D** world: *perfect* Continuum. Again, what binds matter to matter is *not* matter, but the global **nullified atemporal** pregeometric **Platonic** world, which is *neither matter nor mind*. This is the Zenon Connection (ZC).

I will elaborate on ZC by zooming on the **infinitesimal displacement** of physical objects in **4+0** spacetime (Fig. 2), and later on Planck’s **quantum of action** (Sec. 3). Then I will use the **atom of geometry** (Fig. 2) to elaborate on the new Zenon Connection (Sec. 4). Finally, I will offer in Sec. 5 my solution to the problem of time in canonical quantum gravity (J.D. Brown and K.V. Kuchar) and suggest a new *reference fluid* created by the **atom of geometry** (Fig. 2). The latter identifies the fleeting physical content of points of space and their *transient* local instants ‘here and now’, by *negotiating* them with the **Platonic** state of the Universe (cf. Escher’s ‘drawing hands’): think globally act locally.

## 2. The Infinitesimal

According to Wolfram, “an infinitesimal is some quantity that is explicitly nonzero and yet smaller in absolute value than any real quantity”: the running guys shown in Fig. 3. To understand the **Platonic** axis **W** in Fig. 3 and Fig. 6 below, read p. 11 in [test.pdf](#).

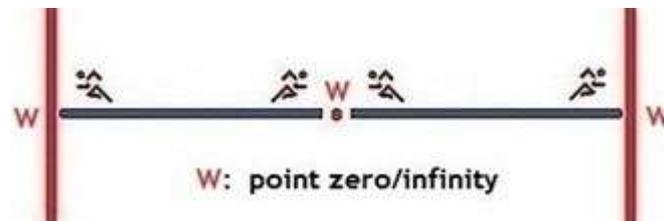


Fig. 3

We may *not* imagine the “size” of the infinitesimal as a dimensionless geometric point — “that which has no part” (Euclid). Zeno was the first to reveal **the paradox of motion**: the limit of the sequence in Fig. 4 below is “obviously” **zero**, but the expression  $0 \times \infty$  makes no sense, because it cannot recover the initial *finite* size (AB) of physical objects.

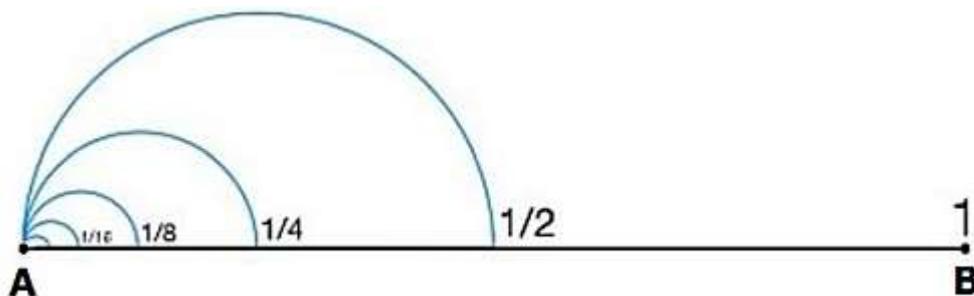


Fig. 4

Some mathematicians may argue that, with *potential* infinity, the ultimate limit *exactly* at point A in Fig. 4 does *not* belong to the sequence, yet the ‘running guys’ in Fig. 3 can try to approach it ‘as closely as desired’, which leads to George Berkeley’s “Ghosts of departed Quantities”. If we instead use *actual/completed* infinity, the limit at point A is *perhaps* included in the sequence (as we know from *calculus*). Recall the two pint beer:

An infinite (*actual* infinity) crowd of mathematicians enters a pub.  
The first one orders a pint, the second one a half pint, the third one a quarter pint... “I understand”, says the bartender – and pours two pints.



Fig. 5

Notice, however, that the [two pint beer] is *embedded in the pub*, and therefore the two endpoints, fixing beer’s *boundaries*, belong to the pub *as well*. Can we pin down the infinitesimal on the *number line*? Yes we can, but only with the atom of geometry (Fig. 2), which works with the absolute precision of *one single* geometric point.

### 3. Planck’s quantum of action

On 14 December 1900, Max Planck *postulated* the *quantum of action*  $h$ . Just like the *atom of Democritus*,  $h$  has finite size but is *not* divisible anymore. Initially, Max Planck considered that the suggested ‘quantisation’ was merely “a purely formal assumption” and did not think much about it, but he opened the door to a new world. Does the atom of geometry (Fig. 2) resemble Planck’s *quantum of action* and the *atom of Democritus*?

If we denote two consecutive *physicalized* states in the *irreversible* past with  $Q_1$  and  $Q_2$ , the *atom of geometry* will create the *infinitesimal*  $Q_2 - Q_1 > 0$  (Slide 1), which now has a finite (not zeroth) size, yet it is *not* divisible anymore: no *physical* stuff can be inserted “between”  $Q_1$  and  $Q_2$ . And the *atemporal* transition from  $Q_1$  to  $Q_2$  is made by ZC (p. 2).

### 4. The Zenon Connection (ZC)

The Zenon Connection is a *pregeometric* (p. 2) connection “between” two 4D events ‘here and now’ (Slide 1) in the *irreversible* past of the atom of geometry (Fig. 2). Due to the “speed” of light, it is impossible *in principle* to detect the *future* state in ZC with *physical* observation (p. 20 and p. 9 in GR\_textbook.pdf). The *infinitesimal* shift along the global Heraclitean Time,  $Q_2 - Q_1 > 0$  (Slide 1), will be called ‘quantum of Time’ or chronon (Wikipedia). Unlike the discrete structure of the movie reel in Fig. 1, both the quantum of Time and Planck’s *quantum of action* are *perfectly* continual phenomena: no *physical* stuff whatsoever can be inserted “between” two *consecutive*, along the global Heraclitean Time, 4D events ‘here and now’ (Slide 1). Although the quantum of Time and Planck’s *quantum of action* have *finite* sizes, the physicalized world, examined as 4D partition of *the Universe*, enjoys *perfect* Continuum: the gaps between the frames in Fig. 1 do *not* exist in 4D spacetime. Their *separation* is in the Heraclitean Time (Fig. 2).

Why? Because of the “speed” of light: read again p. 20 and p. 9 in [GR\\_textbook.pdf](#). For the same reason, no *physical* stuff can be inserted “between” the infinitesimal (Sec. 2), which is also neither ‘zeroth’ nor ‘finite’. Going back to the [atom of Democritus](#): he was suggesting a gedankenexperiment. Take an apple and cut it with a very sharp sword into two pieces, then take one of the pieces and cut it in half, *etc.* Is there a point at which you will *not* be able to cut the piece of apple anymore? Yes, because it will *not* be an ‘apple’ anymore (compare it to [Thomson’s lamp paradox](#)). This is the ultimate ‘limit’ at which we reach the [atom of Democritus](#) and every [bartender](#) will **have to stop there**. Why? Because the ‘atom’ is *not* an ‘apple’ anymore. It is a *different* form of reality, as Plato suggested [many centuries ago](#). I only added the condition under which the **Platonic** reality in the atom of geometry (Fig. 2) is hidden *by* the speed of light (p. 5 in [test.pdf](#)).

Now let me explain the **Platonic** axis **W** in Fig. 3 above. I will refer to the irreversible (at least in the past [13.8 billion years](#)) arrow of [cosmological time](#) following the purported “[expansion](#)” of the *physicalized* 4D universe (S. Hawking & G.F.R. Ellis).

Why is the axis **W** (Fig. 3 and Slide 2) unobservable (Ned Wright) with light? I can use 1D Euclidean space only (Fig. I), to show two consecutive instants along the ladder below. The imaginary Time (Arthur Eddington) is omitted here, being orthogonal to your screen.

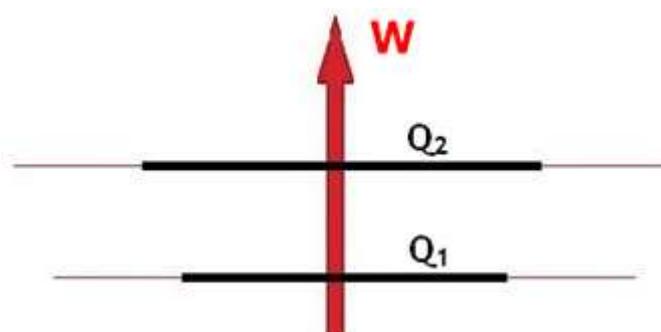


Fig. 6. Consecutive [Cauchy surfaces](#): see Fig. I and read p. 12 in [test.pdf](#).

Imagine we raise the dimensions to 2D space:  $Q_1$  and  $Q_2$  will be solid **black** 2D circles, yet we can imagine in 3D the axis **W**: the *thickness* of the two solid **black** 2D circles along the **Platonic** axis **W**. But if we switch to 3D space,  $Q_1$  and  $Q_2$  will be solid **black** spheres, and the axis **W** will **completely** disappear in 4D spacetime, being *both* “inside” the atom of geometry and “outside” the expanding 4D universe (Fig. 3 and Slide 2). In this sense, the global Heraclitean Time is going both **up↑** and “[sideways](#)” (Fig. B, p. 21 in [BCCP.pdf](#)) along the “ladder” in Fig. 6. Not along the movie reel in Fig. 1 above. This is why I suggested on 21 September 2008 two *modes* of spacetime: local (physical) mode pertaining to ‘change in space’ (coordinate time, as read with a clock) and *atemporal* global (**Platonic**) mode pertaining to ‘change **of** space’ (p. 10 in [test.pdf](#)). This is the crux of so-called *quantum of spacetime* made by the Zenon Connection (Sec. 4). Back in February 1987 (p. 4 in [Penrose\\_diagram.pdf](#)), I suggested the old idea of *two* types of distances in spacetime (p. 12 in [test.pdf](#)), which now can be explained as (i) [metric distance](#) (local mode of spacetime) and (ii) [pregeometric Platonic](#) “distance” (global mode). The latter is **zero**: see the *atemporal* “**vertical**” shift in Heraclitean Time along the “ladder” in Fig. 6 and read pp. 11-12 below. Questions? Please check out [M4](#) below.

This is how photons (p. 9 in [GR\\_textbook.pdf](#) and p. 5 in [test.pdf](#)) travel in spacetime, via the **Platonic** Ether (p. 6). The end result is a *perfectly* continual “lattice” of 4+0 D spacetime (p. 20 in [GR\\_textbook.pdf](#)) with *two* types of distances, as explained above. This is the crux of [Quantum Spacetime](#). I will be happy to elaborate with the [proton](#).

Let me briefly repeat what has been written above. First, we start with Zeno’s [paradox of motion](#) (Fig. 4): the elementary chunk of spacetime, called *quantum of spacetime*, is neither ‘zero’ nor some *finite viz. divisible entity*. Secondly, we suggest a new type of ‘quantum jump’ connecting two consecutive *physicalized* states in the *irreversible* past, denoted  $Q_1$  and  $Q_2$  (Sec. 3) in the ‘atom of geometry’ (Fig. 2). This new *quantum jump*, called Zenon Connection (ZC), builds up the *perfect Continuum* of 4D spacetime along the global Heraclitean Time (Sec. 4 and Fig. 6). And thirdly, we suggest that the new **future** potential state in the *atom of geometry* (Fig. 2) is (i) the **Platonic pregeometric** state of the [entire Universe as ONE](#), which (ii) *cannot* be observed with light (p. 4 and p. 5 in [test.pdf](#)). The theory has unique predictions, one of which is [spacetime engineering](#). It is not “magic”. If I am on the right track, [you](#) could make a *revolutionary* discovery!

Next, I will offer my solution to the problem of physical time read with a clock (Sec. 1). Physically, we can see (with [light](#)) only the perpetual sequence (Fig. 1) of *physicalized* 4D “jackets” from the underlying *atemporal Platonic* reality called ‘John’, explained at p. 20 in [facts.pdf](#). It is like an invisible (with [light](#)) **Platonic** hand in a physical 4D glove: read p. 3 in [gr\\_energy.pdf](#), p. 10 in [test.pdf](#), and p. 7 and pp. 18-19 in [facts.pdf](#).

This is [Physical Theology 101](#). The problem of Time can be resolved only and exclusively only by including its Aristotelian “engine”, the [Unmoved Mover](#) (p. 1) – the *atemporal Platonic* hand in a 4D glove. It is impossible to explain the origin of Time by examining the ‘glove’ alone. As Max Planck stressed in his 1944 speech [Das Wesen der Materie](#):

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.

## 5. The problem of Time

Quote from [J.D. Brown and K.V. Kuchar](#): “Unfortunately, there is no natural candidate for the intrinsic time, and the procedure is beset by a number of conceptual and technical difficulties [5]. (...) The particles of the reference fluid identify the points of space, and clocks carried by these particles identify the instants of time. In this way, the fluid fixes the reference frame (the space) and the time foliation (the time).”

In the first place, there is no candidate for the intrinsic time in QM ([Charles Wilson](#)), nor in classical GR ([Carlo Rovelli](#) and [J. Butterfield & C.J. Isham](#)). Physicists will need a new ‘reference fluid’ endowed with “nondynamical time parameter” ([W. Unruh & R. Wald](#)).

Again, the Heraclitean Time is always and *inevitably nullified* (R. Wald). To incorporate the Heraclitean Time in [quantum gravity](#) and apply its variable *rate* (Sic!) to *create* gravity (forget spacetime “*curvature*”: read p. 10 in [gr\\_energy.pdf](#)), you will need new numbers called hyperimaginary numbers – see Fig. 7 and my endnote at [this http URL](#).

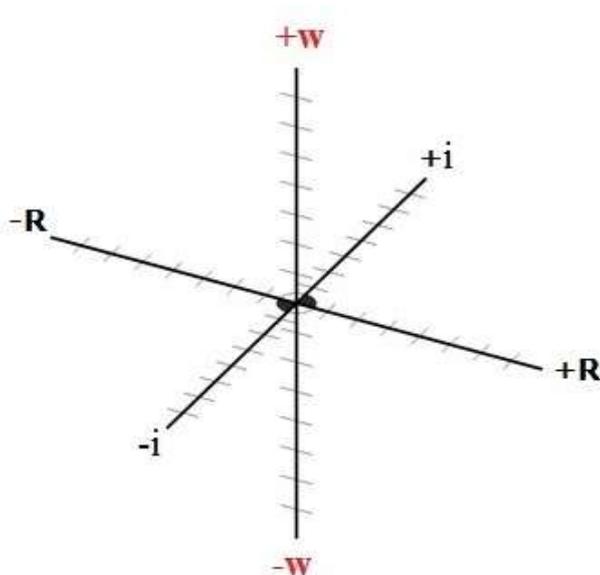


Fig. 7. In the physical world,  $|\mathbf{w}|^2 = 0$ .  
Read [Sec. 4](#) and p. 12 in [test.pdf](#).

The intrinsic Heraclitean Time has an **imaginary component** (p. 5 and p. 12 in [test.pdf](#)) left from the **nullified** hyperimaginary axis **W** in Fig. 7 above. This component has to be **squared** in order to enter the physical 4D world (local mode of spacetime), hence we can see with **light** only the physical (**local**) time (physical “glove”, p. 5) with **negative** sign in the **squared invariant spacetime interval**. Needless to say, there can be no **flow** of events in the **time-symmetric** 4D world: you can’t derive the **Platonic** “hand” from its 4D “glove”. In order to observe the **flow** of Heraclitean Time (Fig. 6), the latter must be **relational**, but then the **Ether** (p. 3 and pp. 11-12 in [test.pdf](#)) will become a physical observable, which will demolish the Theory of Relativity (*ibid.*, p. 3) and the doctrine of **trialism**.

Thus, the intrinsic global Heraclitean Time – *Die lebendige Kraft* or Leibniz’s *vis viva* – is **completely nullified** in the physical world (p. 5). Read my gedankenexperiment from September 2011 at [this http URL](#). You will only need **Mathematics**. Got your interest? Read closely p. 13 in [test.pdf](#). As **Max Planck** pointed out in 1936:

An important scientific innovation rarely makes its way by gradually winning over and converting its opponents: it rarely happens that Saul becomes Paul. What does happen is that its opponents gradually die out and that the growing generation is familiarized with the idea from the beginning: another instance of the fact that the future lies with youth.

## 6. Acknowledgements

This report, aimed at understanding Planck's [quantum of action](#), is rooted on the speech *Das Wesen der Materie* by [Geheimrat Max Planck](#) in 1944. His "intelligent Geist" (p. 5) is the [Unmoved Mover](#) (p. 1), pictured in the [ZC](#) (Sec. 4) as an *atemporal Platonic* 'hand' in 4D 'glove' (p. 5). I dedicate my efforts to Planck's 163rd birthday. God bless his Soul.

23 April 2021, 10:30 GMT

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†Independent researcher

[chakalov.net](http://chakalov.net)

Email <dchakalov@gmail.com>

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## Addendum 1

What is the *origin* of [gravitational energy](#) (p. 2 in [gr\\_energy.pdf](#))? Can geometry produce [work](#)? If yes, it must be some physical field, so the answer is a resolute 'no'. But it is not some [ghost](#) either. Is there anything about [gravity](#) that we *know* that *we do not know*?

The alleged spacetime "[curvature](#)" (Fig. A) cannot *in principle* explain the [gravitational rotation](#) and Earth tides (Fig. B). How can the spacetime metric [rotate](#) and pull up [rocks](#)?

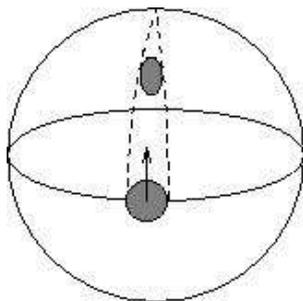


Fig. A

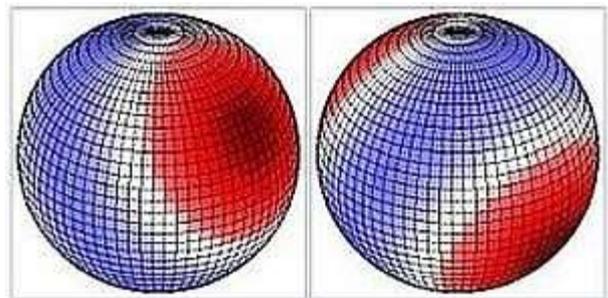


Fig. B. Read [p. 23](#).

NB: What if the *origin* of "gravitational" energy is the [Platonic Universe as ONE](#) (p. 5) living along the hyperimaginary axis [W](#) (Fig. 6 and Fig. 7)? Let me try [Slide 2](#) and Fig. C.

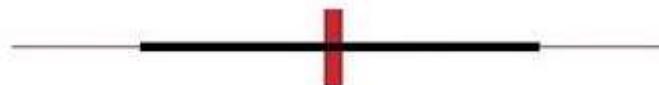


Fig. C. Read [M4](#) and compare it to Fig. 6 [above](#).

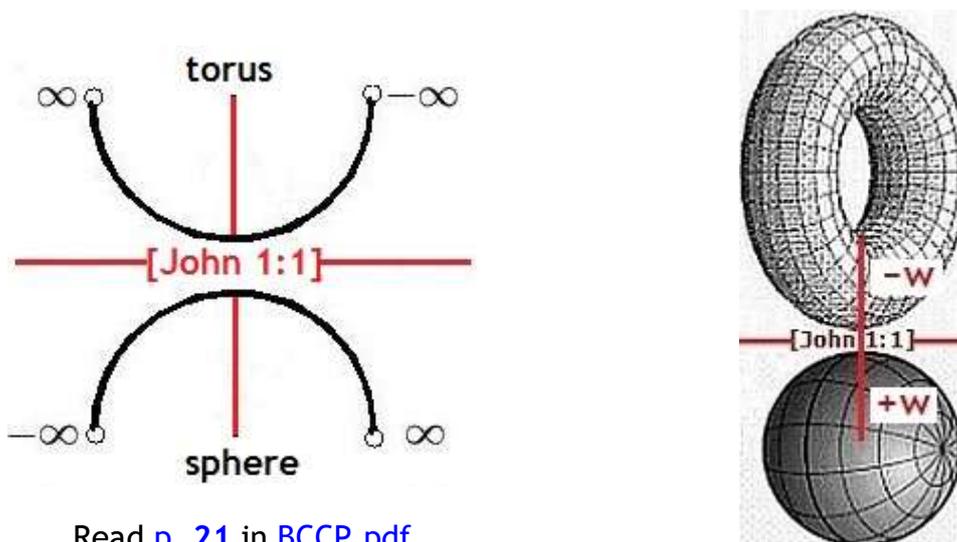
Imagine that ‘3D space’ is the set of all possible [world lines](#) tracing your *history* along your 1D [proper time](#)  $\tau$  matching the [cosmological time](#). (This thought experiment will be impossible in [GR \(p. 9\)](#), so I will ask you to postpone the issue of [gravity](#).) Here comes the first off question: If you can travel indefinitely in arbitrary direction in the 3D space above, will you come back at *the same* place but in the **past** ([closed timelike curve](#))?

Suppose you were a Flatlander, meaning a 2D creature living in “inflating” 2D space ([Ned Wright](#)) endowed with *positive* curvature, like the surface of a **3-sphere**. Locally, in the infinitesimal neighborhood of your instant ‘here and now’, your 2D space may look effectively flat ([Fig. C](#)), so you cannot determine whether your 2D space has actually *negative* curvature, like a [saddle](#) (p. 8 in [GR\\_textbook.pdf](#)). I suggest **both** ([Fig. D](#)).



Fig. D. See Fig. I at [p. 15](#).

Let me explain the hyperimaginary axis ([Fig. 7](#)) of sphere  $\Leftrightarrow$  torus transitions ([Fig. E](#)). I will argue that if you start from  $Q_1$  ([Fig. 6](#)) and complete the sphere  $\Leftrightarrow$  torus transitions below, you will *not* wind up at the same initial point (like circling the Earth along the equator), but will reach the **next** point ‘here and now’ at  $Q_2$ , such that  $(Q_2 - Q_1)$  will define the *infinitesimal* displacement ([Wolfram](#)) in *asymptotically flat 4D spacetime* depicted with the area “around” the horizontal **red** line in [Fig. D](#). In Quantum Theory, the *infinitesimal* is called ‘[quantum of action](#)’ ([Max Planck](#)) – read the last paragraph in [p. 12](#) in [test.pdf](#) and my thought experiment from September 2011 at [this http URL](#).



Read [p. 21](#) in [BCCP.pdf](#)

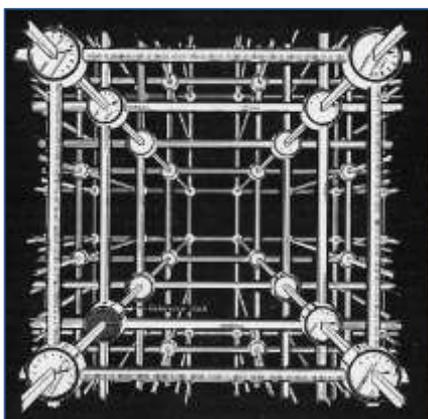
Fig. E. See Fig. I at [p. 15](#) and Fig. M at [p. 23](#).

Later I will come back to the ideas at [p. 12](#) in [test.pdf](#), and will mention the major [unclear issues](#) in this exercise. Perhaps one day we will find out many more unclear points, but at this moment I can say nothing about them, as they are residing in the ‘unknown unknown’.

Before making any further steps, let me put my cards on the table and declare the conditions under which the reader can *immediately* reject my theory of spacetime: all you have to do is to **refute** my statement about spacetime “[curvature](#)” (Fig. A) in [p. 7](#).

Namely, I claim that there is **nothing** in the mathematical formalism of GR, which could (i) recover the [proper time](#)  $\tau$  read with a clock ([Carlo Rovelli](#) and [Butterfield & Isham](#)), (ii) define the [flexible rate of Time](#) creating gravity (pp. 4-6 in [GR\\_textbook.pdf](#)), and (iii) fix the *boundaries* of 4D spacetime ([Hawking & Ellis](#)). **Nothing**. Forget “[curvature](#)”.

Is any of the claims (i) - (iii) true or false? Please go ahead. Here is an example of the hidden, by the “speed” of [light](#), hyperimaginary axis **W** ([p. 6](#)): see Fig. 9 in *Spacetime Physics* by E.F. Taylor and J.A. Wheeler (1965, [p. 18](#)), reproduced in Fig. F below.



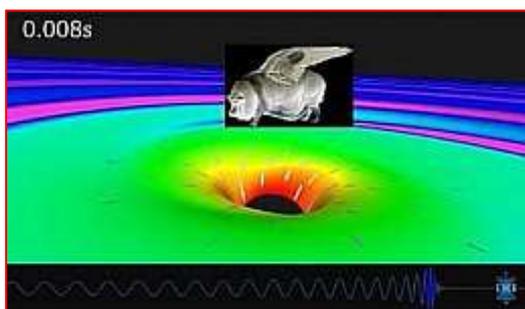
What phenomenon could possibly “calibrate” the **ideal** rods and clocks ([MTW p. 397](#)) pre-built in spacetime?

As the authors acknowledged: “We assume that *every* clock in the latticework, whatever its construction, has been calibrated in meters of light-travel time.”

[Calibrated?](#) Based on *what?* And *by what?*

Fig. F

If you prefer unquestionable and widely known [GR texts](#), here’s a dead simple task:



Analyze the statement on [11.02.2016](#) by [Kip Thorne](#) and his [LIGO collaborators](#).

Have you seen [pink unicorns](#) dancing with [red herrings](#)? This is the so-called [GW150914](#): read pp. 1-6 in [facts.pdf](#). These are the bold **facts**. You can’t argue with **facts**. Nobody can. Period.

Fig. G

I will patiently wait for the feedback from any [academic scholar](#). Once received, I will proceed to the explanation of Fig. D and Fig. E [above](#) and to the *dynamics* of spacetime topology (Fig. E) – the “[gimbal](#)” creating gravitational rotation & inertia. It’s a [bundle](#).

Again, the *only* way to [modify gravity](#) is by tweaking the underlying *atemporal* **Platonic** world ([p. 5](#)) “**before**” it enters the physical spacetime, as explained in [September 2011](#). This is why I suggested [4+0 D spacetime](#) ([p. 1](#)). Could you please prove me wrong ([p. 9](#))?

D. Chakalov<sup>‡</sup>

[chakalov.net](#)

23 April 2021, 10:30 GMT

## Discussion

The last time I had a meaningful discussion of my theory was in October 2002 (no typo). The subject was the problem of time in classical GR – read (i) at [p. 9](#) and recall the verdict by Albert Einstein from 1916: “The requirement of general covariance takes away from space and time the last remnant of physical objectivity.” Let me reproduce my question to [Britain’s greatest quantum gravity expert](#) (C.J. Isham) and his answer.

DC: “To prove me wrong, please explain to me what kind of time is implied by ‘moving points around’ in Diff(M)-invariance, and how can your wristwatch read it.” (Email from Thu, 24 Oct 2002 20:34:51 +0300.)

CJI: “As for time, wrist-watches and Diff(M), one of the key things that emerged from all the discussions on the problem of time was that although it is true that, because of the Diff(M) action, no physical meaning could be attached to a point on the space-time manifold, a physical meaning *can* be attached to specifying a space-time location by the values of various physical quantities. [Karel Kuchar](#) is probably the person who has done most work on this, but it is something that number of people have remarked on in recent years. For example,  $\phi$  is a scalar field on the manifold and  $X$  represents the space-time coordinate of a particle, then although  $\phi(x)$  has no physical meaning (if  $x$  is a point in the space-time manifold) nevertheless  $\phi(X)$  *does* have a meaning: ie you can talk in a Diff(M)-invariant way about the value of a field where a particle ‘is’, and similarly for a trajectory (read [p. 5](#) - D.C.). And, after all, [general relativity](#) does seem to work well as a theory, and yet I can certainly read the time on my wrist watch!” (Email from Fri, 25 Oct 2002 16:46:34 +0100.)

The problem is not trivial ([Hermann Bondi](#), 1957). Surely we can “read the time” on our clocks, but this simple fact explains **nothing**. As Hermann Bondi noted in 1990 (p. 249): “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.” But [how](#)?

NB: The puzzle (i) at [p. 9](#) is how the “*intangible* energy” ([Hermann Bondi](#)) transforms into [localizable](#) 4D “[jacket](#)” with [self-acting](#) (pp. 5-6 in [GR\\_textbook.pdf](#)) **positive** mass: see again [Fig. F](#) and [Hawking & Ellis](#). This is the *atemporal feedback* from the whole Universe ([Dennis Sciama](#)), encoded in the Zenon Connection ([Sec. 4](#) and [Fig. 2](#)).

Regrettably, I have not received so far any meaningful reaction from [Britain’s greatest quantum gravity expert](#). He declared his opinion of my project two days prior to his last email from 25 October 2002 – “You do not know enough theoretical physics to help with any research in that area” (Wed, 23 Oct 2002 19:24:15 +0100) – and *repeatedly* refused to correct his error about some “background Newtonian time” (p. 14 in [gr-qc/9310031](#)). I was only trying to help him, as no clock can read such “background Newtonian time”.

If the reader is fluent in [mathematical physics](#), I will be happy to elaborate on (i) - (iii) ([p. 9](#)) and discuss [open questions in physics](#) ([p. 7](#)), starting from [Charles Wilson](#) and the creation of [protons](#) – the [indisputable proof](#) of the **matrix** of all matter ([Max Planck](#)). To paraphrase Einstein, God ([Fig. E](#)) casts the **matrix** ([p. 19](#)), not the dice. Simple, isn’t it?

But where is the **matrix**? It is *not* in your **brain**, because it is *not* on the **light cone**: read **Erwin Schrödinger** and **Werner Heisenberg**. At the *instant* we try to look at the **matrix** with **light**, it has *already* (**Fig. 2**) disappeared (**Macavity**) – read **NB** at p. **10** above.

Do you believe that “there is no dynamics within spacetime itself: nothing ever moves therein; nothing happens; nothing changes” (p. **12** in **test.pdf**)? Or do you believe that time as read with clocks could be a new **vector field** endowed with **divergence** and **curl**?

If you answer the questions with ‘**no**’, read p. **1** and the initial questions about GR **here**, and raise your voice loud and clear: the so-called **GW150914** (**Fig. G**) is **FRAUD**. Period.

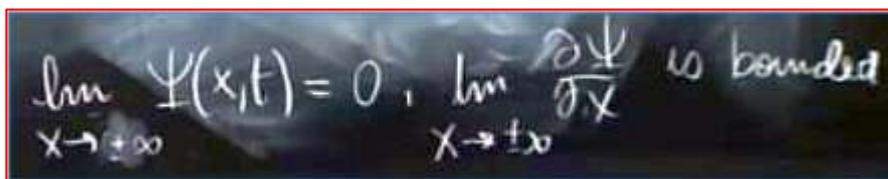
D. Chakalov<sup>‡</sup>

[chakalov.net](http://chakalov.net)

23 April 2021, 10:30 GMT

## Addendum 2

I wrote about the *origin* of gravitational energy in Addendum 1 (p. **7**) and mentioned one of the predictions of the theory at p. **5**, called **spacetime engineering**. It is based on the assumption (still not proven or disproven by mathematicians) that the “set” (if any) of potential **future** events is *not* normalizable, therefore the statement below is false.



$$\lim_{x \rightarrow +\infty} \Psi(x,t) = 0, \lim_{x \rightarrow \pm\infty} \frac{\partial \Psi}{\partial x} \text{ is bounded}$$

Fig. H. Barton Zwiebach at **YouTube**, 9:12/16:48.

Once we include the quantum vacuum (**Peter Milonni**), no parameter can be normalized: we do not deal with the *probabilities* (**Erwin Schrödinger**). Read about the ‘general rule’  $1 + 0 = 1$  at p. **2** in **wegtransformierbar.pdf**; explanation at p. **23** in **GR\_textbook.pdf**.

In plain words, the potential **future** is ‘open’ to *propensities* (Sic!) for entirely new events, including the potential ‘unknown unknown’. 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.

Can we **modify gravity** with **spacetime engineering** (p. **9**)? Yes we can, with **REIM**: read p. **8** in **test.pdf**. It is not some Chinese “**magic**” – any sufficiently advanced technology is indistinguishable from magic (**Clarke’s Third Law**).

If you wish to learn more, you will have to write up a brief paper about **GW150914** and upload it at **arXiv.org**. Then the ball will start rolling, and soon **Kip Thorne** and his **LIGO collaborators** will be stripped of the **Nobel Prize in Physics 2017**. I am still waiting for the professional feedback from any **academic scholar** (p. **9**). The “gravitational” energy (p. **5**) is explained at pp. **2-3** in **gr\_energy.pdf** and at p. **12** below. Once I see your new paper at **arXiv.org**, I will explain the so-called “**GW 170817**” with math (p. **19**). **Promise**.

Very briefly, the total energy of the physical, 4D universe ([Hawking & Ellis](#)) is *always* “conserved”, at every [consecutive instant](#) ‘here and now’ along the [Heraclitean Time](#). Namely, the total energy is perpetually **re-nullified** (p. 4 in [gr\\_energy.pdf](#)). Let me offer a simple illustration. Suppose we denote the total energy of some “isolated system” ([Jürgen Ehlers](#)) with integers, like 4, 5, and 2, and consider the [Hulse-Taylor binary system](#). People claim that the shift from 5 to 2 is caused by some mythical [GW](#), but they are ‘not even wrong’: read p. 7 in [facts.pdf](#). The total energy is *always* “conserved” at the *individual* states 4, 5, and 2, being **re-nullified**. But the total energy is also *never* “conserved” at any state 4, 5, or 2, if they are taken as a *collection* of events from the time read with a clock, ever since the Beginning ([Slide 12](#)). Have your cake and eat it.

[Complicated?](#) Let me try again. Suppose you have a [weighing scale](#) with two plates, and a bunch of identical apples. You place 4 apples on the left plate and 4 apples on the right plate, so that the scale is perfectly balanced and the difference between the two plates is “nullified”. Now try with 5 apples on the left plate and 5 apples on the right plate, and finally with 2 apples on the left plate and 2 apples on the right plate. The scale will be always perfectly balanced and the difference will be always “re-nullified”. But suppose you can look (with [light](#)) at only *one* of the plates: you will see 4, 5, and 2 apples, and will conclude that there is some [non-conservation](#) of apples, correct? Well, the answer is **JAIN**. I suggested in 2015 the so-called evolution equation based on the re-interpretation of “negative mass” (Eq. 1 in [wegtransformierbar.pdf](#)), and will be happy to explain all types of “[apples](#)” in it, once I see the paper at arXiv.org mentioned [above](#).

To sum up, let me offer a brief historical remark about Planck’s hypothesis from 1900 ([Sec. 3](#)). The academic scholars at that time [bluntly rejected](#) such “ugly” hypothesis and scoffed at him by saying that, according to Herr Planck, a table can be either 1m long or 2m long, but never 1.5m. Why demolish the beautiful picture of classical physics, only to explain some purely academic “[ultraviolet catastrophe](#)” which has never happened in the first place? Now the same type of [academic scholars](#) are totally ignoring my theory of spacetime launched in [January 1990](#). In February 1943, Erwin Schrödinger 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?” (E. Schrödinger, *What Is Life?* 1944, p. 28.)

The new type of physical law is the physics of Life ([p. 1](#)) based on the **matrix** of all matter ([Max Planck](#)): read p. 10 [above](#). Moreover, the *only way* to save our planet from the approaching [climate catastrophe](#) is by developing new technologies for unlimited and clean energy sources with [spacetime engineering](#), for example, by harnessing the [gravitational rotation](#), explained at p. 1 in [test.pdf](#). As a bonus, we can build [quantum gravity](#) and [cosmology](#) and suggest a [brand new](#) interpretation of God ([Fig. E](#)) residing *inside* the 4D instant ‘here and now’ ([Luke 17:21](#); [1 John 4:8](#)). Ignore it at your peril.

D. Chakalov<sup>‡</sup>

23 April 2021, 10:30 GMT

## Common Misconceptions

Let me list some of the common misconceptions (M) and their corrections (C).

**M1.** You have no mathematical theory. We are physicists and our main job is to solve mathematical equations. Your ideas might be of interest to philosophers and priests.

**C1.** I will be happy if philosophers and priests also show interest in the interpretation of God (p. 12) based on doctrine of [trialism](#) (p. 6). My theory of [quantum gravity](#) is still at [conceptual level](#), ever since [January 1990](#). All equations are in symbolic form, because of the unsolved issues with the so-called hyperimaginary numbers ([Fig. 7](#)). My target audience are *mathematicians* with genuine interest in Mathematics. Read, for example, [Erwin Schrödinger](#) and [Werner Heisenberg](#): can you spot even a *trace* of mathematics? It is not my fault that [contemporary physicists](#) ignore my theory. We need Mathematics.

For the sake of argument, suppose that one day some [obscure guy](#) decides to fly over the [River Thames](#) in London. Surely many tourists there will be fascinated (tourists *love free entertainment*), but what will be the chance that the established mathematicians and mathematical physicists suddenly become interested in [spacetime topology](#) ([Fig. E](#)) and the [origin of gravity](#) viz. open questions in [general topology](#), [set theory](#), [number theory](#), and hyperimaginary numbers (pp. 22-23 in [BCCP](#))? [When pigs fly](#).

**M2.** You are talking [parapsychology](#).

**C2.** False. Parapsychology is for the birds. I propose [spacetime engineering](#) (p. 5), which is grounded on the Law of Reversed Effort: “To the mind that is still, the whole universe surrenders” ([Lao Tzu](#)). You have to keep your mind ‘still’, because the Zenon Connection ([Sec. 4](#)) has extremely small energy density, perhaps “ $6 \times 10^{-10}$  joules per cubic meter” ([John Baez](#)). Even the slightest voluntary intention *against ZC* will totally block it, and you will be on the *opposite* track toward parapsychology. Many parapsychologists have developed “amazing” skills to entertain people with “magic” (e.g., [Wang Yifeng](#)), which has perhaps sparked the interest by ‘the good guys with big guns’. But I don’t work for any government. Never did, never will. The so-called [moral relativism](#) is an oxymoron.

The question whether one can misuse [spacetime engineering](#) (p. 5) for military purposes or spying, boils down to whether one can in principle weaponize the Gospel ([1 John 4:8](#)). For example, [Mark 5:34](#): “Daughter, your faith has healed you. Go in peace and be freed from your suffering.” Jesus could not even think of [gathering additional information](#) about this woman. Or recall the conversion of water into wine at the [Wedding at Cana](#): can you weaponize it to assassinate ‘the bad guys’ by flooding their brains with alcohol?

With [parapsychology](#), you can only make “magic” and money. [Tons of money](#). Good luck.

**M3.** You are offering only [thought experiments](#).

**C3.** Maybe a bit more: read pp. 6-9 in [test.pdf](#). For comparison, read [R. Penrose](#) below.

Let  $\tilde{\mathcal{M}}$  denote physical space-time with metric  $d\tilde{s}$ . The idea is to construct another “unphysical” manifold  $\mathcal{M}$  with a boundary  $\mathcal{I}$  and metric  $ds$ , such that  $\tilde{\mathcal{M}}$  is conformal to the interior of  $\mathcal{M}$  with  $ds = \Omega d\tilde{s}$ , and so that the “infinity” of  $\tilde{\mathcal{M}}$  is represented by the “finite” hypersurface  $\mathcal{I}$  (see Fig. 1). This last property is expressed by the condition that  $\Omega = 0$  on  $\mathcal{I}$ ; that is to say, the metric at  $\mathcal{I}$  is stretched by an infinite factor in the passage from  $\mathcal{M}$  to  $\tilde{\mathcal{M}}$  so  $\mathcal{I}$  gets mapped to infinity. *Asymptotic* properties of  $\tilde{\mathcal{M}}$  and of fields in  $\tilde{\mathcal{M}}$  can now be investigated by studying  $\mathcal{I}$ , and the *local* behaviour of the fields at  $\mathcal{I}$ —provided that all the relevant concepts can be put into a conformally invariant form.

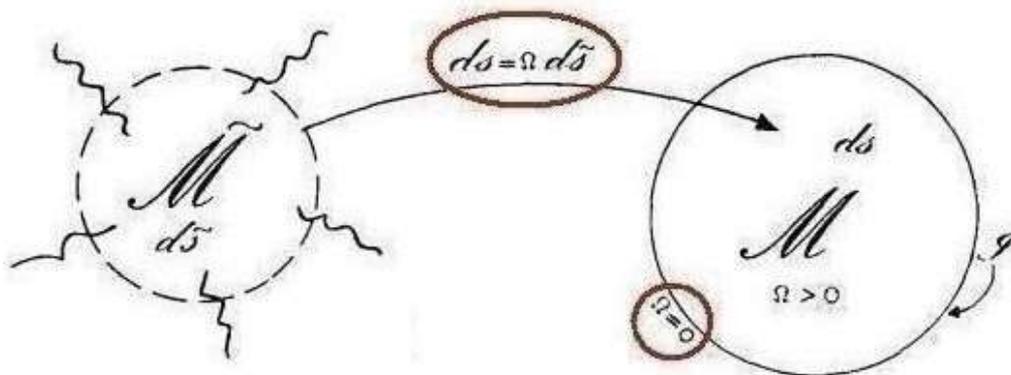


FIG. 1. The infinite physical space-time  $\tilde{\mathcal{M}}$  is mapped into an unphysical “finite” conformally equivalent manifold  $\mathcal{M}$ , with boundary  $\mathcal{I}$  corresponding to the “infinity” of  $\tilde{\mathcal{M}}$ .

The *unphysical* manifold with *unphysical* boundary and *unphysical* metric, suggested as a thought experiment by R. Penrose in [January 1963](#), is plain parapsychology. Penrose was mathematician by training, and he must be fully aware that it is impossible *in principle* to [define  \$\Omega = 0\$  on any manifold](#), no matter [physical](#) or “unphysical”: read closely [Sec. 4](#) and [S. Hawking & G.F.R. Ellis](#); more at [p. 2 above](#). Unlike any [thought experiment](#), you cannot calculate “the grip of spacetime *here* on mass *here*” ([John Wheeler](#)) determined by [the whole universe](#) ([Dennis Sciama](#)) “at infinity” ([Jörg Frauendiener](#)): **NB** at [p. 10](#). Even in some “vacuum” filled *only* with “the well known zero rest-mass fields” (*idem*), you cannot calculate *anything* with Penrose’s recipe above ([Helmut Friedrich](#)). There is no rigorous mathematical proof of the so-called “event horizon” ([Dieter Brill](#)). **None**. People calculate *only* like bartenders ([Fig. 5](#)). My ‘thought experiment’ ([Fig. 2](#)) cannot be used to calculate anything either, but there’s hope on the horizon ([p. 11](#)): we need the so-called hyperimaginary numbers ([Fig. 7](#)) to calculate the genuine cosmological “constant” ([p. 1](#) and [Slide 2](#)) emerging from the vacuum ([John Baez](#)). And in my theory of Finite Infinity ([p. 33](#) in [GR\\_textbook.pdf](#)), the **cutoff** by FI is the axis **W** in [Fig. 1](#).

Strangely enough, [Roger Penrose](#) got the [Nobel Prize in Physics 2020](#) (plus €484,000) for the “discovery” that [black hole formation](#) were some “robust prediction” (notice the poetry) of the [general theory of relativity](#). What a joke! Where’s my [Nobel Prize](#)? ☺

M4. You are suggesting [extra dimensions](#).

C4. False. I proposed  $4+0$  D spacetime: read pp. [27-44](#) in [GR\\_textbook.pdf](#).

*L'essentiel est invisible pour les yeux*, Antoine de Saint-Exupéry. Literally, because the **Platonic** world is *not* accessible with light (p. 20 in [GR\\_textbook.pdf](#)). Let me explain Fig. 6 with Fig. I below, depicting 1D Euclidean space (**S**) and **imaginary** (p. 6) time (**T**) orthogonal to the **Platonic** world (**W**). Read the explanation at p. 22 below.

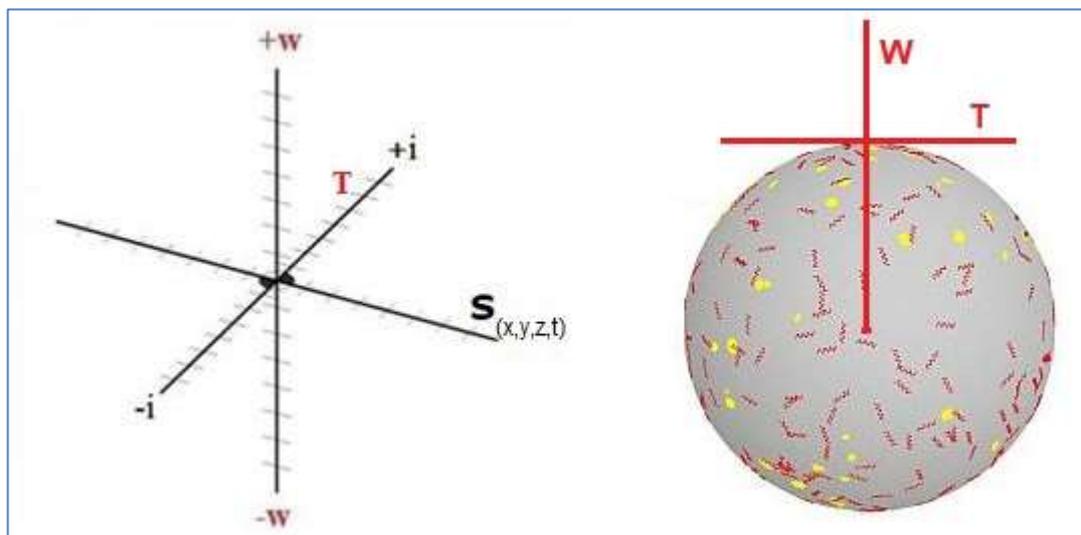


Fig. I. Compare it to Fig. 7 and to Fig. B on p. 21 in [BCCP](#).

The physical, **4D universe**, depicted only with the axis **S** above, is the area “around” the horizontal **red** line in Fig. D at p. 8. The loose term “around” means that the density parameter  $\Omega$  ([Wikipedia](#)) corresponds to *asymptotically* flat 4D spacetime; see also the **dual red axis** in Fig. E at p. 8. Read again the explanation of Fig. 6 and notice that the *atemporal* **Platonic** world along the hyperimaginary axis **W** is *completely nullified* in 4D spacetime, as shown in Fig. 3 at p. 2. Which is why I proposed **4+0 D** spacetime (p. 14).

We live along the **symmetric 3D axis S**, and [Edwin Hubble](#) noticed that the “distance” between its segments has been “inflating” ([Ned Wright](#)), in the sense that “galaxies are moving away from the Earth at speeds proportional to their distance” ([Wikipedia](#)). In my theory of **4+0 D** spacetime, this observational fact means that the variable *rate* of Time, **creating** gravity and 4D spacetime (p. 9), is **infinitely flexible**: see Fig. F at p. 9 above and read pp. 20-21 in [BCCP.pdf](#). There is no absolute Newtonian clock carried by some absolute meta-observer ([Allah?](#)) which can “see” the entire 4D spacetime *en bloc* and measure the variable *rate* of global Heraclitean Time since the Beginning (Fig. E), to prove the hypothesis of “inflation” (if any). It’s all relative, as uncle Albert used to say.

People can only record the local values of their local cosmological time, corresponding (allegedly) to the dimensionless **scale factor**, and get [Nobel Prize](#) “for the discovery of the accelerating expansion of the Universe through observations of distant supernovae” that can be seen with light (p. 4). Read Antoine de Saint-Exupéry above. What if the **human brain** can develop **qualia** from the **matrix** (p. 10 and **M2**)? Well, check out p. 6 in [GR\\_textbook.pdf](#) and p. 11 above.

**M5.** You’ve been working on your stuff for almost 50 years, but where’s the money?

**C5.** True. I started my project in January 1972, at age 19 (p. 26 in [GR\\_textbook.pdf](#)). But I never expected to be a lucrative enterprise. It just can't. Bottom line is to find out how the **human brain** works as a *physical* system, given that it is *somehow* (Sic!) coupled to its mind, volition, memory, consciousness, etc. At the end of the day, we should be able to improve the **integral behavior** of **neural binding** of the entire brain (**Q**). As my late grandfather used to say, if you wish to fix something, you should know how it works. This is completely **unchartered territory**. More from Gottfried Wilhelm von Leibniz [here](#).

Here is an analogy. Suppose you own an old but very reliable VW Golf. It runs from point A to point B, and has a roof so that it doesn't rain inside. But imagine one day something spontaneously happens to your VW Golf, such that it behaves like a Porsche 911 Turbo S. And on top of that, now it consumes much less fuel. But after a few days, it suddenly goes back to the way it was designed to perform, like a good old VW Golf. This is what we call 'anecdotal cases' (references [upon request](#)). We can't reproduce them, to study and hopefully understand how people can unleash their latent abilities; see for example p. 14 in [test.pdf](#). I do believe (recall **M2**) **we together** can work it out: read [Henry Ford](#).

The challenge is indeed **extraordinary**. You can verify it with **your brain**, too. Consider the *meanings* explicated with the four sayings below (cf. p. 22 and p. 15 in [zenon.pdf](#)):

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. Surely, all words are somehow **encoded** in the brain, but not their *meaning*. It is **invariant** (Sic!) in **all** human brains, despite their anatomic and neurophysiological differences. It does *not* decay with time and age. Worms can't eat it, because **it is not made of atoms** from the periodic chart.

**NB:** Your brain has access to some **UNSpeakable** and **dual cognitive vacuum** that cannot be "**encoded**" *in principle*. Metaphorically speaking, the *dual* vacuum (dubbed "**trunk**") resembles the *colorless* octopus (**REIM**): all colors can be encoded; *colorless* things can't. The *colorless* monad does not have 'windows' (**Leibniz**). Only **colorizable** 4D '**jackets**'. With **light**, we can see only 'colors'. **It** (not "**He**") is **invisible** (**Antoine de Saint-Exupéry**).

**Complicated?** Let me offer another experiment (prompted by **Werner Heisenberg**) in which everything is "visible", although to your mind only (pp. 8-9 in [q\\_coin.pdf](#)):

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?

How would you call the object or 'agent' capable of building the cube, rotating it with your imagination, and counting the little cubes with 3 painted sides, 2, 1, and zero? It is not some "**homunculus**." It does perform *work* in your brain, so it must be physical stuff. Or at least some "part" of it must be physical. Which "**part**"? See again Fig. 2 at p. 1.

Let me comment on the unsolved puzzles exhibited in the experiments [above](#). How does the psyche spring from the brain? As [Thomas H. Huxley](#) noted, this phenomenon is just as incomprehensible as the appearance of the Jinni when [Aladdin](#) rubbed his lamp. All we know for sure is that our subjective world does *not* emerge exclusively from our brains, just like we are certain that the images and sound we see and hear from a TV set are not produced exclusively in the TV. Also, the ‘neural correlates of consciousness’ (NCC): there is no [isomorphism](#) between the external stimuli and their neural correlates (HPC) spread across the brain ([Antti Revonsuo](#)). For comparison, if you watch a movie recorded on a DVD, rest assured there is exact isomorphism between the encoded information, by 1’s and 0’s, and the movie you watch on your TV screen. Not in the [brain](#), of course.

**NB:** Your *brain* (not mind) used *energy* to perform the two experiments [above](#), but what energy is it? It must be some *physical* energy capable of producing [work](#) in your brain – only matter interacts with matter. Your brain is not empowered by [paranormal ghosts](#). Yet the energy used **by** your brain cannot be found in physics textbooks, because your brain will become some dumb [computing machine](#) ([HBP.pdf](#)). With [light](#), we see **only** the [self-acting brain](#) (p. 6 in [GR\\_textbook.pdf](#)). Ditto to the [origin](#) (P) of ‘tangible energy’ (Q) from gravity ([Hermann Bondi](#)): read **NB** at p. 7 [above](#) and pp. 2-3 in [gr\\_energy.pdf](#).

This is why I suggested the [self-acting matrix](#) (pp. 10-11) as the “mediator” ([Fig. 2](#)) of the human mind (p. 15 in [zenon.pdf](#)). It pertains to **all** living-and-quantum-gravitational systems constituting the global [Brain of the Universe](#). This is physical theology (p. 5). We don’t need, and are firmly opposed to some “all-mighty supervisor” called usually [Allah](#).

Everything is possible, including [Climageddon](#) (p. 12) and [WWIII](#). It is also possible to eliminate them from our [future forever](#). The choice is ours ([Henry Ford](#)).

The so-called [anthropic principle](#) – “the universe would not even be possible if the laws of the universe had been incompatible with the development of sentient life” – is sheer parapsychology. You can’t invoke from the ‘[very early universe](#)’ some *intangible* (Sic!) [propensities](#) that *may* or *may not* happen to produce the unique and *extremely* unlikely conditions in the [future](#), which are needed for “the development of [sentient life](#)”. We need the doctrine of *trialism*, as matter-and-psyche spring from their [common source](#).

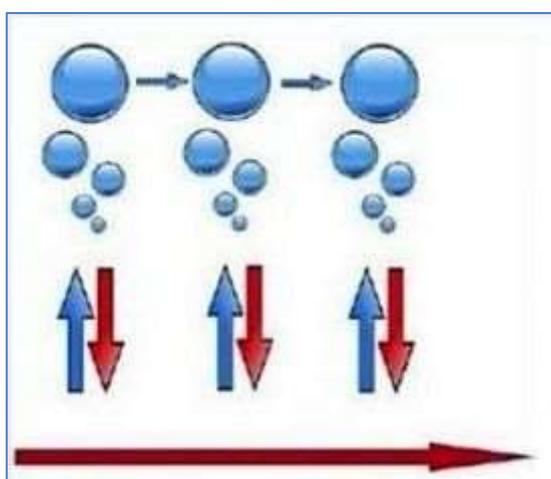
Notice that ‘propensities’ pertain to the [future](#) ([Fig. 2](#)), hence the condition ‘*may* or *may not* happen’ is **ontological**: the future is ‘open’ (p. 11). The same condition *cannot* be applied to the irreversible **past** build up only by 4D **facts** that ‘*might* or *might not*’ have happened, ensuing only from your *knowledge* about these facts. The latter is a very simple *epistemological* condition, which can in principle be verified with experiment or observation. We can never make experiments or observations of the potential [future](#), which *always* includes the ontological ‘unknown unknown’ (*ibid.*) that *cannot* live on the [light cone](#). Physicists like [Robert Geroch](#) will – *of course* – disagree (p. 12 in [test.pdf](#)).

What if the Universe is **alive**? We need [quantum gravity](#) and [cosmology](#) to understand the [physics of Life](#): Max Planck at p. 5 and Erwin Schrödinger at p. 12. I am scratching the [tip of the iceberg](#). You asked, where’s the money (M5)? Does a fish need a [bicycle](#)?

M6. Your ideas are terribly messy and tortuous, I only got a headache.

C6. I suppose you refer to the two experiments at p. 16 above. It may be quite difficult to think *about* that with which you think, *by* that with which you think, hence you got a headache, like a **microphone feedback**. The whole point here is to show the **self-acting** faculty of your brain. It is not like **Baron Munchausen**. I suggest new physics: read p. 227 in **S. Hawking & G.F.R. Ellis** and compare it to the **self-acting** faculty of gravity [here](#). In one sentence, in the presence of gravity “the matter-energy content of spacetime” (**Wikipedia**) becomes **self-acting**. This is a bold fact. Example: Earth tides, Fig. B at p. 7.

To understand the puzzle of **Earth tides**, compare it to the discovery of ‘quantum time’ with the **cloud chamber** of Charles Wilson (**Slide 7**) below.



Can we explain the **red** and **blue** arrows in the Wilson cloud chamber?

Can we explain *consecutive* energy-momentum exchanges between the quantum **particle & wave** and its **macroscopic** environment? Are quantum waves with **complex** phases (Chen N. Yang 1987) physical reality or *physicalizable* reality (Slide 15) “just in the middle between possibility and reality” (**Heisenberg 1958**)? What is the origin of **time** in **Schrödinger equation**? Can **clocks** read it?

**Yes** and **No**: The **matrix** (Chakalov 2016).

Fig. J. References are available [upon request](#). See also [Slide 9](#) and [Slide 10](#).

The droplets (in **blue**) are “visible as a “cloud” track that persists for several seconds” (*ibid.*): this is a *bona fide* ‘relativistic time as read with a clock’. Despite the fact that in QM you *cannot* have a time operator (**Pauli’s argument**), the *quantum time* associated with the quantum world (**Werner Heisenberg**) can show up “for several seconds”, as read with a clock. Back to the **Earth tides**: unlike the **brief red** quantum time in Fig. J, there are no restrictions on the duration of *gravitational* time, and many people believe (for reason I was never able to understand) that the *gravitational time itself* is **observable** (p. 10). But there is **no way** to define *gravitational* energy-momentum densities – the *energy-momentum current* of gravity alone is like the **red arrow** above. **Chris J. Isham** was **fully aware** of the problem, but decided to sweep it under the carpet. Again, the main difference between the **red** ‘quantum time’ in Fig. J and the ‘gravitational time’ is the unrestricted duration of **self-acting** faculty of gravity, as exhibited in **Earth tides**.

“Strictly speaking, general relativity is not a parametrized field theory” (**Charles Torre**). The *gravitational* time and the *quantum* time **do exist**, but are still a mystery (p. 10).

If people believe that the energy-momentum current of gravity can be formulated with **GR textbooks**, read p. 9 above, **Hermann Bondi**, **Carlo Rovelli**, and **Hans Ohanian**. If the quantum world and the gravity *itself* were some physical fields acting on matter and

fields, we could easily time their [action](#) – under the obligatory requirement that the *total* energy of the system is [conserved](#) – with a clock.

**No way.** We see only 4D ‘[jackets](#)’ or ‘[gloves](#)’ (p. 5), transporting *their* localized mass-energy and [angular momentum](#) in a wavy pattern, like a [school of fish](#) (p. 7 in [test.pdf](#) and p. 18 in [facts.pdf](#)). This is *the* gravitational radiation under perpetual mass-energy “non-conservation” (p. 12). Read p. 7 in [gr\\_energy.pdf](#) and watch the explanation by [Paul Steinhardt](#). Forget the mythical [GWs](#) (Fig. G at p. 9). Is the Brooklyn Bridge [for sale](#)?

Read also the [last paragraph](#) in p. 16 and notice my video lecture from [15 January 2020](#). I might update it by the end of June this year. We all are like a fish that ‘has no concept of water’ (read [above](#)): we are immersed in the [Platonic world](#), but cannot observe it with light (p. 4). ‘So what?’ you may ask. You can’t explain the creation of *any* quantum particle; for example, the proton ([Slide 10](#)). You need the [matrix](#) of all matter (p. 10).

Think of the [matrix](#) as a virtual pool of infinitely many instructions ‘if **P**, then **Q**’, which create and develop all quantum and living systems (**Q**), e.g., your [prenatal brain](#), so that now you can read these lines and make experiments with your brain (p. 16). How is the living-and-quantum-gravitational matter **guided** by the [Platonic matrix](#)? Read again this report from p. 1 [above](#). In [January 1990](#), I proposed the most general form of retarded relativistic [causality](#) (dubbed *biocausality*) applicable to all living and quantum systems (p. 12), in which *two* ontologically different antecedents – **P** from the irreversible **past**, and **P** from the [Platonic matrix](#) – jointly **guide** (*Sic!*) the outcomes **Q**, one-**Q**-at-a-time ([Slide 1](#) and [Slide 2](#)). In the *inanimate* macroscopic world at the length scale of tables and chairs, the [Platonic matrix](#) – the antecedent **P** – has a vanishing small [feedback](#), which gradually *increases* in the living-and-quantum-gravitational matter, along the hyperimaginary axis **W** in [Fig. I](#): see Table 1 at p. 27 in [BCCP.pdf](#). We need Mathematics.

As I wrote on p. 13 [above](#), my target audience are mathematicians with genuine interest in Mathematics. The “tortuous” issue could be the origin of what we call Time: recall the *imaginary* axis in [Fig. I](#) at p. 15. Sir Arthur Eddington explained the puzzle in 1920. For example, if you are eating an apple and I tell you that all physical apples [emerge](#) from a single *atemporal* [Platonic](#) apple, you probably will brush away such a bombastic claim. But can you explain the [matter-antimatter asymmetry](#) and the total absence of [negative mass](#) (squared [imaginary mass](#)) in the 4D [partition](#) of the Universe? [Yes I can](#). Read closely **NB** at p. 10 and the last paragraph at p. 12 [above](#). Or have a [beer](#) instead.

The facts are on the table: read p. 7 and recall [Fig. G](#) at p. 9. People just keep [quiet](#).

Albert Einstein once offered an operational definition of insanity: doing the same thing over and over again, but expecting different results. Perhaps it is insane to expect any professional feedback from the current [academic scholars](#). Yet one can never predict what might evolve from the *unknown unknown* in the [future](#) – everything is possible. As of today, the [climate catastrophe](#) (p. 17) looks inevitable: read p. 28 (last) in [BCCP.pdf](#). We must act **now** and save our planet. Do *not* ever say that you knew nothing about it!

## Spacetime Engineering 101

Will spacetime engineering (15 January 2020) become an [empirical science](#)?



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 3<sup>rd</sup> law* is not valid.

To make sure we are on the same page, I will offer an illustration of the *carrot* above. Think of the cart/donkey as a train, which goes regularly from Munich to Stuttgart. You decide to swing the carrot and change the end station of the train to, say, Hamburg. The donkey will have no choice but to *change* its trajectory (wordline) and find its *new* path to Hamburg. How? Well, the ‘path’ is *not* fixed on the ground. It is *flexible* (p. 9), as all paths (worldliness) are being *re-created anew* (p. 10 and p. 23), thanks to the *flow* of Heraclitean Time (Fig. N). If you decide to swing the carrot and change the end station of the train to London, the donkey will perhaps manage to carry you there as well. But if you wish to go by train from Munich to New York, the donkey will say ‘no way José’. Hence I suggested the existence of Causal Field (CF): read p. 6 in *Gravitational Energy*. Sure, I could not add gravity in *January 1990*. But now I can claim, with the benefit of hindsight, that if I had support from theoretical physicists, we could have done it by the end of the past century, at the latest. Instead, it took me over 23 years, from *January 1990* until *20 October 2013*, to just connect the dots, all by myself. Here’s some history.

In March 1994, I updated my proposal about the so-called *biocausality* from *January 1990* (p. 19) and sent it by snail mail to the U.S. Department of Energy. The response from DoE, dated 8 April 1994, was a sarcastic letter from Walter M. Polansky, in which he suggested that I should “read physics textbooks”. I challenged him to find at least *one* error in my proposal and sent him many emails, but never heard from him. I believe this elusive jerk still works at the Computational Science Research & Partnerships at the U.S. DoE in Washington, D.C. Perhaps he and his colleagues could have unlimited and ecologically clean energy by the end of 1999, instead of going to war on Iraq and killing 650,000+ people, as estimated in the second Lancet Survey from *11 October 2006*. I also claim, with the benefit of the hindsight, that we could have avoided the forthcoming climate catastrophe (p. 12). We only needed the crux of the theory: the *flow* of Time from *Heraclitus* and the common source of matter and mind, after *Leibniz*. Simple, no?

Yet many (otherwise *smart*) people deeply believe that there is no *flow* of Time (Fig. 2).

Only [global hyperbolicity](#). According to [Thibault Damour](#), “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”. These people suffer from severe [cognitive dissonance](#). They will *never* acknowledge the experimental facts ([p. 16](#)). They just *can't*. They are good for nothing. As Max Planck warned us in 1936, they will have to gradually *die out* ([p. 6](#)). As of today, there are [too many](#) of them.

Briefly about ‘Spacetime Engineering 101’ from [15 January 2020](#). It is based on the non-relational *rate* of the Heraclitean Time ([p. 6](#) and [p. 9](#)). Example: place an apple on a table at rest, so that the apple will not “consume” 3D space, but only time (Fig. C, [p. 5](#) in [test.pdf](#)). Time will *not* stop. Your clock (Fig. F) will show ‘change’, but we *cannot* show 3D ‘change’ in the drawings below. Why not? Because the [Heraclitean Time](#) is non-relational. The *atemporal Ether*, shown with black space at “absolute rest” below, does exist. Yet *It* (not “*He*”) is unobservable ([p. 15](#) and [p. 4](#)). In [quantum gravity](#), we see *only* its ‘*jackets*’ ([p. 5](#)), a.k.a. [eigenstates](#) in QM. Read [p. 20](#) in [Can Geometry Produce Work](#).

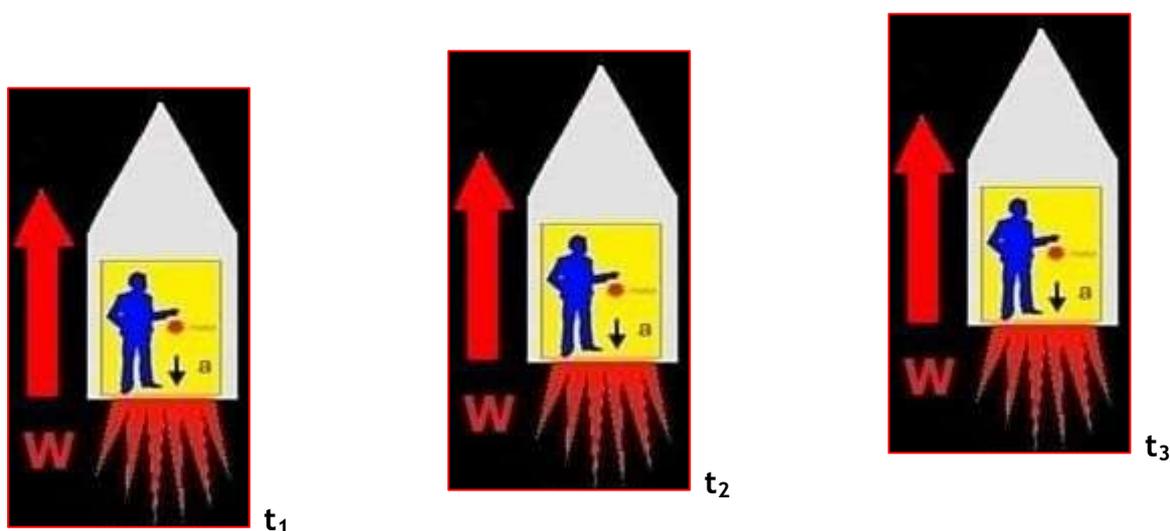


Fig. K. The *atemporal* ‘change of space’ ([p. 4](#)) along **W** (Fig. I).

Once you get the [qualia](#) ([p. 16](#)) from the [Heraclitean Time](#) and its *rate* (see (ii) at [p. 9](#)), you could alter the [matrix](#) ([p. 10](#)) and work with spacetime engineering ([p. 13](#)). Simply let the antecedent **P** from the [Platonic matrix](#) ([p. 19](#)) *guide* you effortlessly. *That's all*. Everyone can learn [spacetime engineering](#). All you need is your [self-acting](#) brain ([p. 17](#)). And you won't need me sitting next to you. Just learn the theory of [Platonic spacetime](#) very well, and then your brain will develop the mental image (example at [p. 16](#) above) that will *guide* you further. You won't be able to misuse it, nor to make money ([p. 13](#)).

A [friend of mine](#) 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 facts 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 develop without that “crazy stuff”? Try [meditating on a rock](#) instead.

On 15 February 2020, I announced five confirmations of spacetime engineering (p. 8 in [Gravitational Energy](#)). I also wrote above (p. 19) that, by the end of June 2021, I might update the video from [15 January 2020](#). There is no guarantee that I will make the extra efforts to explain the *rate* of Time (recall (ii) at p. 9) and the origin of gravity (pp. 2-3 in [Experimental Tests of Spacetime Engineering](#)). Let me just set the record straight.

NB: The *origin* of gravity is *atemporal* pre-geometric **Platonic Universe as ONE** (p. 5), which is **neither matter nor mind** (p. 1). It lives in the *potential future* (p. 9 and Fig. 2).

The global phenomenon in Relative Scale (RS) spacetime (pp. 20-27 in [BCCP](#)), which creates the Large and the Small (Fig. L), also creates gravity **locally**, which **alters** the local **flexible rate** of Time along **W** (Fig. I), compared to the *rate* of Time in **free fall**.

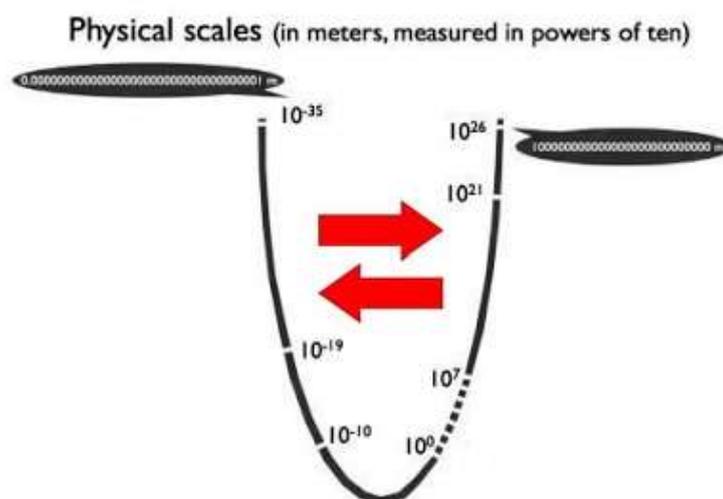
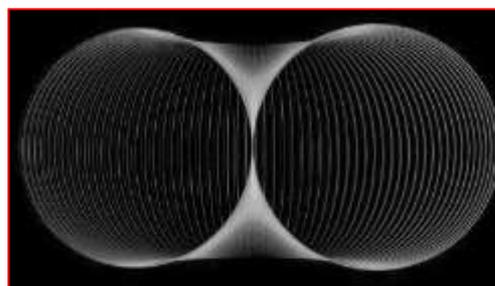
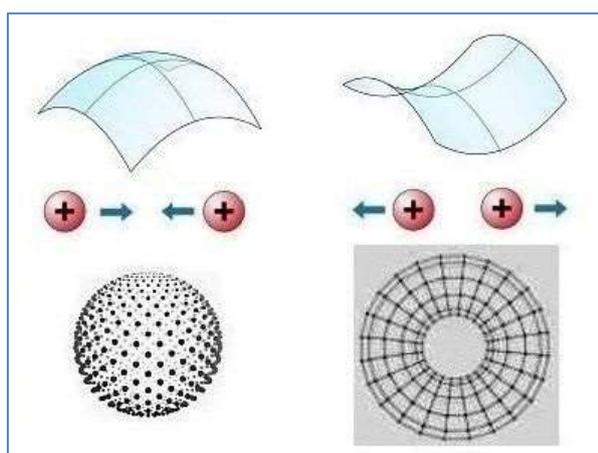


Fig. L. The mutual **penetration** of the Large and the Small.  
Read pp. 10-11 in [Time and Continuum: Zenon Manifold](#).

Namely, Nature modulates the *rate* of Time (Fig. I) and “shrinks” the spacetime metric to produce local gravitational attraction, and at the same instant “inflates” the metric to produce local gravitational repulsion, until the tug-of-war manifestations of gravity reach **dynamic equilibrium**. This is how gravity (**W.G. Unruh**) creates the cosmos, by bootstrapping the entire physical part of the Universe (**S. Hawking & G.F.R. Ellis**) like an *entangled* (Fig. L) **brain**. Eugene Taylor and John Wheeler offered far more conservative assumptions (Fig. F), but I am relativist and do not accept *absolute* physical phenomena, such as the absolute length scale ([Wikipedia](#)). All is relative, as uncle Albert used to say.

But how can we include the gravitational **rotation** (**Richard Feynman**) **and** inertia (p. 7)? From the sphere  $\Leftrightarrow$  torus transitions (p. 8 and Fig. M): the Dragon biting its tail ([Slide 1](#)).



Watch it at YouTube, [2:14/9:16](#)

Fig. M. Compare it to Fig. E at [p. 8](#).

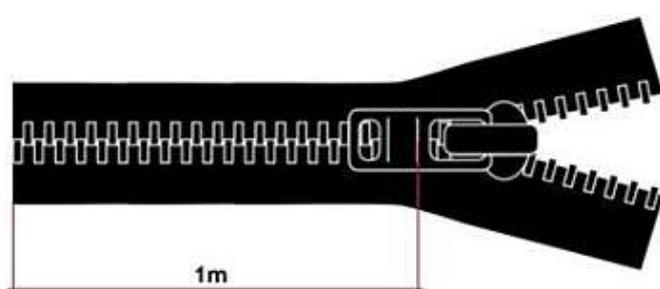
To make the theory of gravity a bit less complicated, let me underline the statement by [Isaac Newton](#) from 1693: “The cause of gravity is what I [do not pretend to know](#)”. What we do know is that Newton’s *action-at-a-distance* is not acceptable, and I suggested *two* types of metric between spacetime points ([p. 4](#)) viz. the hypothetical Zenon Connection ([p. 1](#) and [Sec. 4](#)). Yes, the geometry of spacetime will *diverge* from that in flat space, but no “curvature” *alone* (Sic!) can produce **work** on matter and fields ([p. 7](#)). It will be like claiming that changes in the readings of a weather thermometer can *cause* changes of the weather: read pp. 2-4 in [Can Penguins Drink Warm Water](#). Thus, I suggested that the global phenomenon which ‘changes the weather’ ([p. 9](#)) presents the physics of *Life as well* ([p. 12](#)). Notice that the **antecedent P** from the **Platonic matrix** ([p. 19](#)) can guide *effortlessly* (Sic!) the selection of the **next** instant ‘here and now’ ([Fig. 2](#)) iff all matter and fields are *flexible* ([Werner Heisenberg](#)), like your **brain** ([p. 10](#)). There is no fundamental “uncertainty”. Only fundamental *flexibility*, thanks to the fact that every event in the living and quantum-gravitational world is **under-determined** by its history. What happens ‘here and now’ is jointly *guided* by the **past** and by the **future** ([Fig. 2](#)).

Dead matter makes quantum jumps; the living-and-quantum matter is smarter. Recall [Albert Einstein](#): “I find the idea quite intolerable that an electron exposed to radiation should choose of its own free will not only its moment to jump off but its direction. In that case I would rather be a cobbler, or even an employee in a gaming house, than a physicist.” In my theory, God ([Fig. E](#)) casts the **matrix** ([p. 17](#) and [p. 19](#)), not the dice.

Taking the risk to be very boring again, let me stress that I do not endorse *any* religion, neither **theism** not **anti-theism**. In the doctrine of *trialism*, we are inevitably agnostic about the “**trunk**”. We only argue that the latter has two *complementary* explications, depending on *our* path toward understanding the common source of Matter and Mind: **both** ‘the Universe as **ONE**’ ([p. 17](#)) and God ([p. 12](#)) residing *inside* the 4D instant ‘here and now’ ([John 1:1](#); [Luke 17:21](#); [1 John 4:8](#)). This is the crux of spacetime engineering ([p. 13](#)) and the correct understanding of ‘the **matrix** of all matter’ by Max Planck ([p. 5](#)). Where is the **matrix**? Read [p. 23](#) in [BCCP](#) and notice the **nullified** ([p. 2](#) and [p. 4](#)) normal *and* tangential “directions” along light-like zero intervals at [this http URL](#). More at [p. 6](#).

People consider only the *local mode* of spacetime (p. 4) viz. [global hyperbolicity](#) (p. 20), like [Robert Geroch](#) (pp. 12-13 in [Experimental Tests of Spacetime Engineering](#)), because they can examine only the *physicalized*, 4D world fixed as ‘facts’ in the *irreversible past* (Fig. 2), accessible with light (p. 4). The correct Theory of Relativity is different (p. 15), because the *pre-geometric* origin of gravity (p. 7) and the *intact* quantum word (p. 19) are unified from the outset in the so-called Relative Scale (RS) spacetime (Fig. L, p. 22). The theory also predicts new technologies for unlimited clean energy sources (p. 12), as well as an [enhanced](#) form of [natural healing](#), based on spacetime engineering (p. 13).

Read about the [re-creation](#) (Slide 1) and [re-calibration](#) of spacetime (Fig. F) ever since the Beginning (Slide 12) at p. 25 and p. 39 in [Can Geometry Produce Work](#), and at p. 11 in [Über Die Gravitationsfeldrelativitätstheorie](#). Compare Fig. N below to Fig. F at p. 9.



*Die Gravitationsfeldrelativitätstheorie* (GTR) treats the *physicalized* world as ‘retarded light’ endowed with [positive mass](#) and inertia (p. 7), and photons with [zero proper mass](#) ( $M^2 = 0$ ) and [non-relational](#) (p. 20) “speed”  $c$ . Read p. 4 in [Can Geometry Produce Work](#).

Fig. N. [3.3 ns](#) of [RS](#) light-travel time (Fig. F) *assembles* 1m with [flexible rate](#) (p. 22).

If I am on the right track, one day we may learn how to harness the [gravitational time differentials](#) (pp. 4-5 in [Can Geometry Produce Work](#)) and fly by ‘reversible elimination of inertial mass’ (REIM). [Mark my words](#). It is not some eldritch Chinese “magic” – any sufficiently advanced technology is indistinguishable from magic ([Clarke’s Third Law](#)).

Back to the Earth tides (Fig. B at p. 7): the [Moon and the Sun](#) act on our planet by *deflating* its local *rate* of Time (Fig. M), which *evokes* the attractive form of gravity, which *effortlessly* changes the next [future](#) state of the Earth, like [swinging the carrot](#). Again, gravity is *not* a force, just as changing the [QM phase](#) does not require any energy.

But now the Earth has a different [next future](#) state, which it *must* follow. Why? Because the “donkey” *has no choice*. But how? Only by [acting on itself](#). The *atemporal* [Platonic](#) quantum-gravitational [matrix](#) (p. 10 and p. 19) only *evokes* [self-action](#) of its ‘jackets’ (p. 5), for example, the constituents of proton’s mass (Slide 10). The same rule applies to the entire living world (p. 12); for example, to your [brain](#) embedded in the quantum-gravitational [Brain](#) of the Universe (p. 17). We do not endorse any religion (p. 23).

Back to the [origin](#) of gravity. As [Zhao-Yan Wu](#) proved in 2018, “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.”

True. Which is why Nature made gravity a *special* force endowed with **self-action**. As an illustration, recall Escher's 'drawing hands' in which the 'upper hand', denoted **P**, is always **nullified** in the physical world (p. 2), which is how the physical, 4D 'hand' **Q** becomes **self-acting** – thanks to the **matrix** (p. 19) in the **Platonic** future (Fig. 2). Only in your **GR textbooks** you could “move” in the coordinate time like you change your 3D coordinates, say, from the left to the right. The **hyperimaginary** axis **W** of the global Heraclitean **Time** and its **unphysical imaginary component** are always **nullified** in the **squared** (Sic!) invariant spacetime interval (p. 6). This is why it is crucially important to work with the **not-yet-squared Ether** (Fig. K). But how? Pretty much like you worked with your mental cube (p. 16, p. 19 and p. 13). Notice p. 4 and read about the so-called Causal Field (CF) at p. 6 in *Gravitational Energy*. More at p. 7.

Is there *gravitational* energy? **No way**. There is only **gravitalized energy-momentum** and **angular momentum** of the **gravitalized** 'jackets' (p. 5): read pp. 2-3 in my note on the origin of **gravitalized** energy at [this http URL](#). Once we understand the **gravitalized** energy, perhaps we will also crack the puzzle of the powerful **relativistic jets** of *positive* mass-energy (p. 10), without invoking **red herrings**. Yes, my theory is indeed speculative (p. 12 and p. 15), 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 would have never discovered America. In our case, we don't have *any* “route” (p. 9).

**NB:** Any effort to replace the gravitational **self-action** (p. 23) with **conventional physics** leads to “the worst theoretical prediction in the history of physics!” (**Mike Hobson et al.**) and to “**mystery matter**”. Read pp. 6-9 in *Experimental Tests of Spacetime Engineering*. Why is the **universe larger** than a football (**Ivo van Vulpen**)? What is “**imaginary mass**”? How is the positive mass-energy related to its “negative” and “imaginary” **counterparts**?

Again, the geometry of spacetime will certainly *diverge* from that in flat space (p. 22), but the mantra about some “intrinsic **curvature**” is **dead false**. The “curvature” is in the mathematics, in order to compute derivatives (p. 17 in *Can Geometry Produce Work*). The obvious *deviation* from straight wordlines is **not** caused by spacetime “**curvature**”, but by the so-called **Zenon Connection** (Sec. 4) which both **propels up↑** and **rotates** the **4D partition** of the Universe. Locally, the *deviation* from straight wordlines will look like **Coriolis effect**. There is no absolute observer of the **flow of Time**, which can **judge** on the global “curvature” of spacetime and count the number of blond angels dancing on the **head of a pin** (app.  $10^{770}$ , Eq. 3 in [arXiv:0910.1589](#) by two famous **Russian experts**).

As of today, die gegenwärtige Situation in der Gravitationsfeldrelativitätstheorie (Fig. N) resembles the situation with chemistry and physics in 1799, at the time **Alessandro Volta** invented the **electrical battery**. Yet we still practice chemistry as an **empirical science**. Perhaps this will be the fate of **spacetime engineering**. I believe we can do **much better**, but I haven't so far heard from any **theoretical physicists** (Fig. G). If they wish to learn more about the Theory of Relativity (p. 15) and **quantum gravity** (p. 22), they only have to follow the instructions at p. 11. But if they are not interested – **fine**. I will leave the **1590 “GW experts”** to simmer in their own sauce (**Matthew 7:6**).

D. Chakalov<sup>†</sup>

25 April 2021, 12:45 GMT