Spacetime Engineering

D. Chakalov[1]
chakalov.net

Abstract

Explanation of spacetime engineering, tailored for general audience.
It will be supplemented by demonstrations of reversible elimination of
inertial mass (REIM), which will be posted at YouTube until Christmas 2019.

It is my great pleasure to announce a major breakthrough in our understanding of the Universe: the Platonic theory of spacetime[1]. It is a new pre-geometric theory of spacetime, derived from first principles[1]. In a nutshell, the *atom of geometry* (dimensionless point that "has no part", Euclid[2]) is endowed with non-trivial topology, structure, and dynamics, thanks to which we can tweak the state of physical systems, including living organisms, at fundamental level. This is spacetime engineering, based on the physics of life[3] (cf. John's jackets metaphor). Let me focus here on the former.

Every scientific theory is expected to be falsifiable and to offer at least one prediction, which is (**i**) unique to the theory and (**ii**) verifiable by experiment and/or observation. It is preferable that the prediction shows a simple algorithm in the format 'if A, then B'. Say, if we stroke cow's head, she will *most likely* wave her tail. In our case, we suggest that if we permanently fix a new future potential state of physical systems, the latter will *most likely* change their dynamics to reach the new future state[3], as depicted in the drawing below.
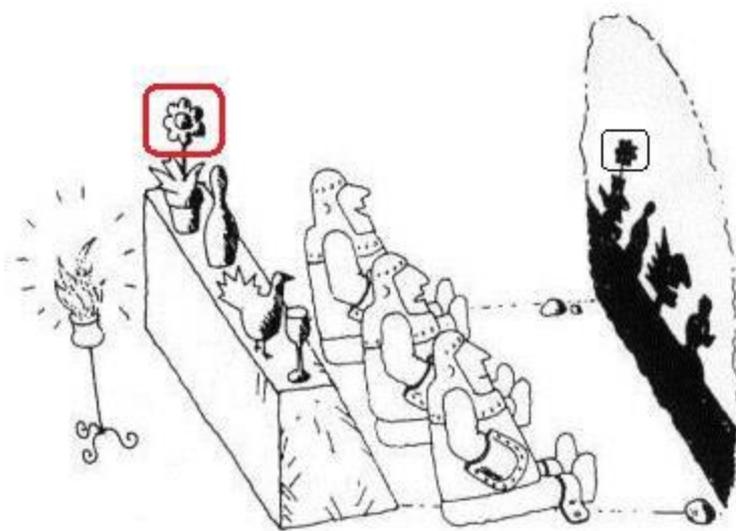

You only have to swing the carrot (*potential* future) toward your
desired destination, and the donkey will carry you and the cart there.

There are many issues related to the *potential* future ("carrot"), which need explanation[3]. I will do that by referring to my 2008 proposal for two *modes* of spacetime, local (physical) and global (Platonic *Res potentia*), based on the ideas of Plato, Aristotle, and Heraclitus

---
[1] Email: dchakalov@gmail.com. No permanent address. Download the latest version (st_eng.pdf) from this http URL.

(p. 11 in *Platonic Theory of Spacetime*[1]). The so-called local mode of spacetime pertains to 4D *physicalized* world of Platonic "shadows" (*ibid.*, p. 4) endowed with Archimedean topology (*ibid.*, p. 16), whereas the global mode of spacetime refers to the Platonic state of the entire Universe as ONE, dubbed *Res potentia* (*ibid.*, p. 33). It keeps the "carrot" shown above (dubbed 'matrix' on p. 10 in *The Physics of Life*[3]; see also pp. 7-10 therein). It is unphysical *pre-geometric* plenum, resembling one single geometric point (cf. Euclid[2]) stretched to actual/completed infinity (p. 15 in *Platonic Theory of Spacetime*[1]). In a way, it wraps the local (physical) mode of spacetime (*ibid.*, p. 18) and, depending on the direction we look at the global mode from the physical world, it looks *both* infinitely small *and* infinitely large "boundary" of the 4D physical world (see Addendum on p. 5).

Let me explain the arguments for Platonic *pre-geometric* global mode of spacetime, and the reason why it cannot be directly observed. Notice that the **red** Platonic flower below corresponds to the "carrot" in the drawing above, but we cannot "turn around" and look at it. Why not? Because it is hidden by the "speed" of light (Slide 19 in *Quantum Spacetime*[4]). We can see only the *physicalizable* 4D "jackets" projected on the local (physical) mode of spacetime from/by the Platonic world. Example: quantum mechanics (QM)[3].

See p. 11 in *Platonic Theory of Spacetime*[1]

Check out Slides 9-12 in *Quantum Spacetime*[4] and read again the explanation of Platonic matrix on p. 10 in *The Physics of Life*[3]. It is indeed impossible to explain the physical world without its *atemporal* Platonic source in the so-called global mode of spacetime. The latter is always *precisely* **nullified** in the local mode (p. 30 in *Platonic Theory of Spacetime*[1]). We detect only its fleeting 4D "jackets", as depicted in John's jackets metaphor.

The good news is that the human brain can produce mental images (p. 8 and p. 11 in *The Physics of Life*[3]) from the Platonic matrix. This is the crux of spacetime engineering.

For example, reversible elimination of inertial mass (REIM). It's not some supranatural "magic". You only need to know the *origin* of inertia; all the rest is a matter of learning. Read pp. 41-43 in *Platonic Theory of Spacetime*[1] and study the current paper **thoroughly**.

To watch the demonstrations of REIM at my YouTube channel, you will need password. Feel free to contact me by email (available at my website above). You should explain (**i**) what you were unable to understand, and (**ii**) *exactly* why. Please be specific in explaining (**ii**), because I will start from there. Also, please put "!REIM" (without quotation marks) in the

subject line of your email, otherwise I might accidentally trash it. I will respond within five working days. To get you started, recall a well-known demonstration of REIM, and Escher's Drawing Hands.
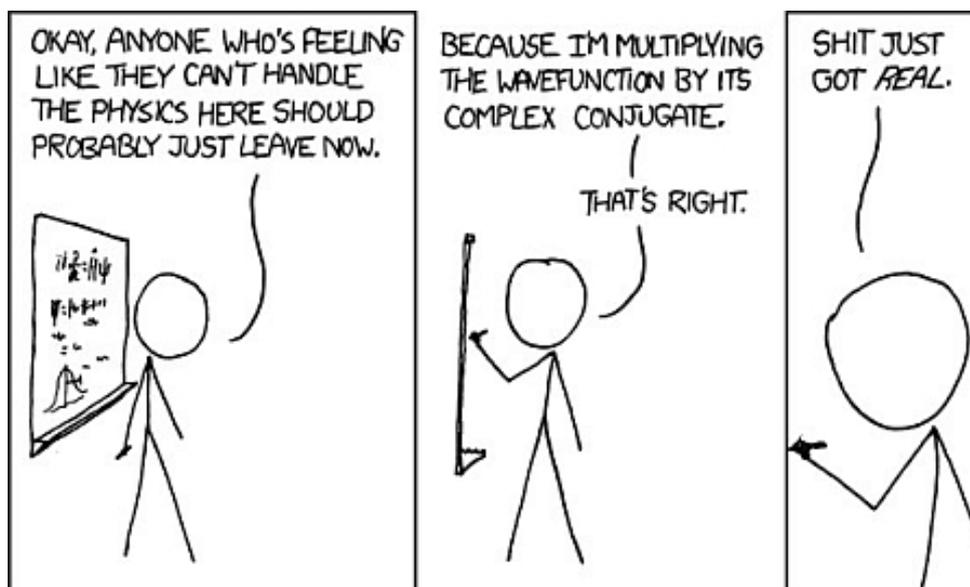

How can you access the "carrot" (dubbed 'matrix' on p. 10 in *The Physics of Life*[3]) residing in the global mode of spacetime? Can't use 1D model of time. For if we look at Escher's 'drawing hands' above, *before* the left arm begins to define/draw the right one, it must be *already* defined/drawn by the right one, but *before* the right arm begins to define/draw the left one, it must be *already* defined/drawn by the left one. Thus, no arm can execute any action, and we have frozen 1D time (not like the alleged "disappearance of time" in background-independent theories, John Baez) in *fundamentally* non-linear interactions.

The only solution is to "move" to the global mode of spacetime, in which the two arms are *already* pre-correlated (cf. Gottfried Wilhelm Leibniz in Slide 14 in *Quantum Spacetime*[4]) at every consecutive instant 'here and now'. But how can you "move" there? You can't.

Only you brain can develop the mental image of the *matrix* (p. 6 in *The Physics of Life*[3]) in the global mode of spacetime, by 'learning' (p. 43 in *Platonic Theory of Spacetime*[1]). The matrix will unfold toward you by *its own self-action* (*ibid.*, p. 38), and in few years' time you too will be flying in the 4+**0** (Sic!) local mode of spacetime. As Henry Ford famously noted, whether you believe you can do a thing or believe you can't, you are right.

Let's go back to *The Physics of Life*[3]. It resolves two outstanding issues. As we all know, here is no 'quantum world' in QM textbooks (see the cartoon below), because quantum objects become *instantaneously* real *only* at the instant of wave-function "collapse", and secondly — the alleged Higgs boson *inevitably* leads to deadly gravitational collapse, which has never happened: *reductio ad absurdum* (see Ivo van Vulpen below). Sorry for repeating these widely known facts, but many people stubbornly refuse to acknowledge them in their writings, nor to respond to my numerous email messages related to *Quantum Spacetime*[4].

For the record: this paper was submitted to arXiv.org on Fri, 8 Feb 2019 09:04:59 EST. Will the talebans at arXiv.org accept it?

Why is the universe larger than a football ?

Measured vacuum energy density:

An experiment to measure the energy density in vacuum and the energy density in matter has shown:

$$\Omega_m \approx 30\% \quad \text{and} \quad \Omega_\Lambda \approx 70\% \sim 10^{-46} \text{GeV}^4$$

$\rightarrow$ empty space is really quite empty.

Problem:
- 10^{54} orders of magnitude mismatch.
- Why is the universe larger than a football ?

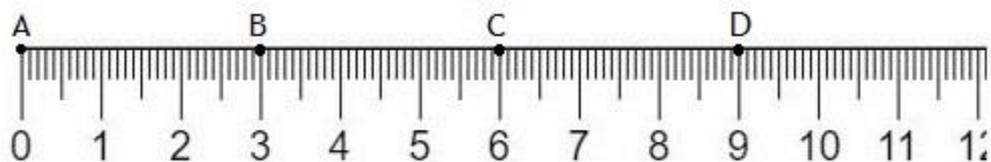Ivo van Vulpen, *The Standard Model Higgs Boson*. Lecture Notes, October 2013.

There is also another misunderstanding, which Edwin Hubble flatly rejected: "expansion" of space. Since I am relativist, I also reject the absolute character of what we call 'length'. It's all relative, so let me briefly explain how we could get rid of these two ugly notions with so-called Relative Scale (RS) spacetime. Needless to say, I will be happy to elaborate.

Look at the invariant spacetime interval in Special Relativity: regardless of using different coordinate systems, the interval between any two events remains invariant. But what stuff could possible *assemble* an invariant spacetime interval? It can't be physical stuff (e.g., 'one second' is "defined" as duration of 9,192,631,770 transitions of caesium-133 atom at *exactly* 0 K, Wikipedia), which can be placed in the right-hand side of Einstein's equations.
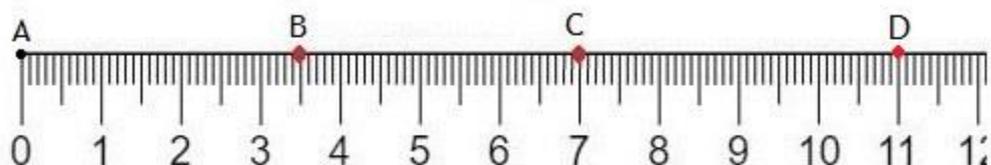
It could only be 'the grin of the Cheshire cat *without* the cat': "spacetime has its own rods and clocks built into itself" (MTW p. 396). But what if the invariant rod-and-clock *per se* is Platonic entity? If so, the things measured with 'one meter' and 'one second' could be *very* flexible and, most importantly, scale-dependent: relative to the length scale of tables and chairs, 'one meter' is roughly 10^{21} times smaller than Milky Way, yet relative to the length scale of Milky Way, its RS 'one meter' could be 10^{21} times "inflated", yielding 'one meter'. According to the theory of RS spacetime, this is how Nature creates Large and Small, and

the macroscopic world between them. There is no absolute 'length', it's all relative. More about RS spacetime on p. 5 in ref. [6] in *Platonic Theory of Spacetime*[1]. If you're familiar with Einstein's GR, read p. 46 (last) therein. Let's go back to the "expansion" of space.

Here is a clumsy drawing of distances in static spacetime. Suppose we are located on Earth at point A and look in the cosmos toward two very distant objects, B and C; 2AB = AC. Also, there could be another object D, which cannot be detected today with current telescopes.

The alleged "expansion" of space stipulates that **AC** has been expanded "more" than **AB**, whereas **D** will never be observed, because it is receding "superluminally" from **A**.

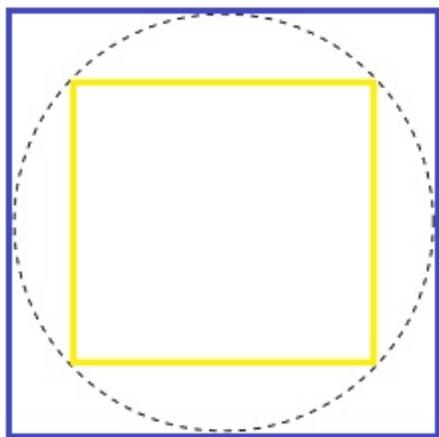But what if the spacetime metric is scale-dependent, in the sense that 1 light-second at **A** (299 792 458 meters) remains **invariant** for **AB** *and* for **AC** due to increasing **rate** of time? Namely, what if an object with size **AB** and another, twice larger object with size **AC** have "the same" 1 light-second due to increasing **rate** (**R**) of time? Think of **R** as "speed" of *assembling* invariant spacetime intervals, hence **R** of **AC** is greater than **R** of **AB**, which is in turn much greater than **R** of **A**, etc., and we have a new quasi-static cosmology with no "dark energy": the alleged "expansion" of spacetime is relational. Relative to an observer at **A**, **AB** and **AC** are being "inflated" in line with Hubble law, yet in all three cases *their* invariant spacetime intervals of 1 light-second remain "the same". Yes, Edwin Hubble was right, but it's all relative, and there is no place for any "dark energy" here. Simple, no?

People may find RS spacetime "speculative", but recall that nobody has tried to explain how the gravitational "field" was created, so that mass "there" — the **whole universe**! — could determine inertia "here" (John Wheeler). Even if acting with the "speed" of light, mass "there" *cannot* determine inertia "here" in a timely manner. In Newton's theory, gravity would "know" everything in the universe, and would act instantaneously. Bad idea. In RS spacetime, the whole universe will be spanned over "one meter" it its RS frame, and will bootstrap all mass-energy content and inertia. Again, I will be happy to elaborate.

As to spacetime engineering, perhaps our guests from other planets can tweak **R** locally in their Alien Visiting Crafts (AVCs), in such way that if they fly on Earth with, say, 5km/h, we will measure their speed 10^3 time higher, and will wonder how their AVCs achieve insane acceleration and do not crash upon sharp turns. But if you walk with 5km/h, where's the problem?

Addendum

To understand the notions of 'geometric point' viz. *pre-geometric* plenum (p. 2), recall that the axiom of 'limit' is nothing but "a **guess** of the value of a function or sequence" (Wikipedia). Consider two polygons, inscribed (yellow) and circumvented (blue) below.

To demonstrate the notion of 'limit' at which the two polygons will have infinite (actual infinity) number of sides and will *inevitably* fuse into a *perfectly* smooth circle and **stop** there, make a sequence (bounded and monotonic) of increasing numbers of polygon sides **n**: 4,5,6, … , ∞ (p. 15 in *Platonic Theory of Spacetime*[1]). This is the idea of 'continuum', in which all *geometric* points follow each other without any *physical* (Sic!) thing "between" them. True. The *pre-geometric* plenum is not physical stuff but Platonic *Res potentia*. Physically, it is *exactly* nullified topological dimension, leading to 4+**0**-dimensional local mode of spacetime.

But how can we describe an object that cannot be seen or detected in principle? We call it *pre-geometric* plenum (p. 2). It is not 'green' (like mixing yellow and blue pigments). It has become "colorless" entity, like Kantian *Ding an sich*. Depending on the direction we look at **it**, we can say that **it** might be incredibly small object, much smaller than the segments from the circumscribed circle above, so "small" that **it** just *cannot* get smaller anymore, because **it** has hit its *limit* and has **stopped** there. **It** does not have metric anymore either. Strangely enough, this *pre-geometric* plenum somehow "belongs" to the local mode of spacetime, in the sense that **it** is the ultimate limit at which the Archimedean topology of the physical world is <u>not</u> valid anymore. If we nevertheless try to apply it, we will hit the insoluble Thomson's lamp paradox (p. 16 in *Platonic Theory of Spacetime*[1]).

Again, depending on the direction we look at the *pre-geometric* plenum from the physical world, **it** (not "He") will look *both* infinitely small *and* infinitely large "boundary" of the 4+**0** (Sic!) local mode of spacetime. Namely, it is both *dimensionless* geometric point[2] and *the* largest, seemingly "infinite", region of spacetime. The latter cannot be physical stuff either, because if it were made by any physical stuff, the "smaller" physical universe will immediately absorb it (p. 26 in *Platonic Theory of Spacetime*[1]). The difference between the "smallest" geometric point and its multiplicative inverse, which looks to observers at macroscopic scale (read explanation above) like some infinitely large region of spacetime, is that the latter is "expanding" indefinitely toward "infinity" in the future, whereas the former is fixed as 'fact' in the *irreversible* past, leading asymptotically to The Beginning.

Either way, **it** (not "He) is the ultimate, yet *physically* unreachable, limit on the physical world, dubbed *pre-geometric* plenum. Physically, **it** may be envisaged as extremely "small" and extremely "large", after the two opposite physical directions toward **it**. Yet **it** is both The Beginning and The End: once created, the Universe is *already* eternal. This is the essence of *dual age* cosmology (p. 7 in *Platonic Theory of Spacetime*[1]) and the solution to the metric paradox of Yakov Zel'dovich (p. 3 therein).

Now you will be ready to study the doctrine of *trialism* (pp. 11-12 in *The Physics of Life*[3]) and develop your skills in spacetime engineering. Good luck.

5 February 2019
Last update: 12 February 2019, 11:00 GMT

References and Notes

1. D. Chakalov, *Platonic Theory of Spacetime*. 9 February 2019, 46 pages, at this http URL.

2. C. Stover and E. Weisstein. "Point." From MathWorld — A Wolfram Web Resource. http://mathworld.wolfram.com/Point.html

3. D. Chakalov, *The Physics of Life*. 20 January 2019, 14 pages, at this http URL.

4. D. Chakalov, *Quantum Spacetime*. 14 March 2017, 19 slides, at this http URL.