



## The Fifth Force

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### Abstract

The two propositions in *Spacetime Engineering Manual* (BB1 and BB2, pp. 4-5 in [SEM.pdf](#)) are explained in details. Proposition BB1 is based on the proposal by Gottfried Wilhelm von Leibniz about the common origin of matter and psyche: we place their origin in their common *potential future* ([Slide 14](#)). The latter is unobservable with light. Proposition BB2 is the fundamental *arrow of spacetime*, suggested by the author on [21 September 2008](#). The matter and the psyche are both 'connected' by their common *potential future* ([Slide 14](#)) and 'separated' by the *arrow of spacetime*, in order to preserve their entirely different nature. Namely, the matter is placed in the irreversible past, and the psyche in their *common potential future*.

Proposition BB1 about the common origin of matter and psyche stems from the fact that there is no psyche in the [brain](#), nor matter in the [psyche](#): read p. 17 in [quantum.pdf](#). Yet the two are definitely *correlated* by Leibnizian [pre-established harmony](#). How? By their common 'trunk' acting as 'bridge' (the doctrine of *trialism*). Otherwise we face the insoluble paradox noticed by [Thomas H. Huxley](#): "How it is that anything so remarkable as a state of consciousness comes about as a result of irritating nervous tissue, is just as unaccountable as the appearance of the Djinn, when Aladdin rubbed his

lamp." Also, physicists have noticed long time ago that the fundamental parameters of the physical world must be such as to admit the creation of life and **conscious observers** within it "at some stage". But how can this happen? Thanks to their common 'trunk', as suggested by the author on **31 October 1989**. No need for any back-from-the-future "**anthropic principle**".

Proposition BB2 is the fundamental *arrow of spacetime* from **21 September 2008**. Here we enter a totally **uncharted territory**: please read closely pp. 7-8 in *Spacetime Engineering Manual* (**SEM.pdf**). Let me elaborate on BB2.

Imagine you are walking on steps (see below), relative to the steps at rest. At any instant, you are *both* at particular step *and* have a **next step ahead**.



We cannot apply this simple idea to the fundamental flow of events known from Heraclitus (*Panta rhei*), because the theory of relativity forbids any *physical* medium at absolute rest (e.g., **Aether**).

The fundamental *flow of events* is **non-relational**, and the propagation of electromagnetic and gravitational forces is **quasi-local**. At any spacetime point 'here and now' from the **arrow of spacetime**, you have two types of distances: (i) **local** metric distance, and (ii) **Platonic** "distance" into the **future**. The "distance" (ii) is always **nullified** (**null intervals**), as it connects your state at particular point 'here and now' to the next *atemporal future* ("**carrot**"). In order to make any *next* step, you are using both (i) and (ii). This is the **quasi-local** interaction (**Slide 1**): think globally, act **locally**.

Recall "Der Geist bewegt die Materie" (Vergil, *Aeneis* 6, 727) and replace "Der Geist" with the **self-acting Fifth Force** along the **arrow of spacetime**. No **physical stuff** can deliver the **Fifth Force**. Just don't call it "**dark**".

Notice that the *arrow of spacetime* (BB2) may be quite "**counterintuitive**", because Heraclitus' *flow* of Time (*Panta rhei*) is **directly unobservable** with light: Time is **imaginary variable**. The idea belongs to **Arthur Eddington** and has been presented to the public in **August 2020**. This is *the only* possibility for gravity to 'act back' on its source, as postulated in **GR textbooks**. Which inevitably leads to the **self-acting Fifth Force** along the **arrow of spacetime**.

But is the [Fifth Force](#) *the only* possibility for gravity to [act back](#) on matter? Yes, because any other theory will force you to choose between two **false** alternatives: either gravity is some brand new *physical field* to act on its source in the right-hand side at [Einstein's field equations](#), or gravity is a [paranormal ghost](#). Physicists deny the first option by suggesting that there is no '[gravitational force](#)' to deflect objects from their natural straight paths. Quote from [Wikipedia](#): "Instead, gravity is seen as changes in the properties of space and time. In turn, this changes [the straightest-possible paths](#) that objects will naturally follow. The curvature is, in turn, caused by the energy-momentum of matter." Like the shape of a mountain is caused only by the mountain. But how can 'the shape' [act back](#) on its 'mountain' ([MTW p. 5](#))? It should be either a new *physical field* or a [paranormal ghost](#). Again, the [Fifth Force](#) *the only* possibility for gravity to [act back](#) on matter.

Also, physicists (p. 8 in [SEM.pdf](#)) cannot place the *intact* quantum state prior to its observation on the [light cone](#), in order to reconcile QM with the theory of relativity. The *intact* quantum state ([E. Schrödinger](#)) cannot be any *physical* stuff located on the [light cone](#), nor some paranormal ghost. What *is* it, then? Read [Werner Heisenberg](#) from 1958. [Welcome aboard!](#)

You may wonder, how come physicists haven't noticed the [Fifth Force](#)? In their [theory of gravity](#), the dynamics of spacetime is necessarily **nullified** ([R. Geroch](#)), so they talk about "[dark energy](#)". And in QM textbooks, they introduce "[operators](#)" simply [by hand](#). Sorry, we don't accept "[magic](#)".

My theory is falsifiable, so the reader is invited to prove the [Fifth Force](#) **false** by suggesting the solutions to the following puzzles: the origin of (i) gravitational force producing ocean tides and [Earth tides](#), and (ii) inertial reaction forces ([J.A. Wheeler](#)). The origin of inertia ([D.W. Sciama](#)) is still missing in [GR literature](#), whereas the gravitational rotation has been swept under the carpet since the inception of GR ([R. Feynman](#)). Once I read the solutions to (i) and (ii), I will demonstrate low-energy gravitational rotation with my [solar radiometer](#), as 'proof of concept' (p. 4 in [text.pdf](#)).

To those interested in quantum gravity ([Wikipedia](#)), I will briefly elaborate on the fundamental *arrow of spacetime* (Proposition [BB2](#)). Let me comment on [A New Theory of Gravitation](#) (June 1964) by F. Hoyle and [J.V. Narlikar](#).

1. Quote from their [abstract](#): “the equation  $R_{ik} = 0$  for an empty world in Einstein theory becomes meaningless; there is no such thing as an ‘empty’ world.” Corollary: there is no such thing as “[black hole](#)”. In the physical world, any efforts to define some “event horizon” viz. “[black hole](#)” are doomed to fail, because you *cannot* avoid the [time-like naked singularity](#). The latter will cause an enormous catastrophe: *reduction ad absurdum*.
2. Quote from [p. 191](#): “the phrase ‘action at a distance’ should be changed to ‘action at no distance’.” True. The **Platonic** “distance” into the **future** is always [nullified](#) ([null intervals](#)): think globally, act [locally](#) ([p. 2](#)).
3. Quote from [p. 204](#): “If the present line of argument is at all correct it will mean abandoning the conventional point of view of physics, that the local behaviour of matter can be entirely (Sic! - D.C.) determined by local experiments.” In the [theory of spacetime](#), the “local” behavior of matter and fields is actually [quasi-local](#), thanks to the [arrow of spacetime](#) (BB2). We do not experiment with the physical universe but with the **Platonic** Universe, which is [[between](#)] the quanta of spacetime ( $Q_2 - Q_1 > 0$ ), just as there is no water between the molecules of water.

In general, the local behavior of matter and fields, in the infinitesimal surrounding of any spacetime point, cannot be *entirely* (Sic!) determined by ‘[local physics](#)’: we have **additional** global influences from the [arrow of spacetime](#), which are *perfectly embedded* into the local ones. The end result is [quasi-local](#) interactions driven by the [Fifth Force](#). More in [FI.pdf](#).

Again, please do not hesitate to prove the [Fifth Force](#) false by solving the tasks (i) and (ii) [above](#). Feel free to contact me at [dchakalov@gmail.com](mailto:dchakalov@gmail.com).

## Acknowledgements

I am grateful to [Dennis Sciama](#), [Zhaoyan Wu](#), [William Unruh](#), [Fred Hoyle](#), and [Jayant Narlikar](#), to name but a few, for their invaluable insights into the nature of gravity. I believe they have left clear traces in our [Collective Unconscious](#) (C.G. Jung, 19 October 1936), which I tried to retrieve and use in the [theory of spacetime](#). Needless to say, all [possible errors](#) are mine.

2 February 2023

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## The Cosmic Censorship Conjecture (CCC)

On p. 4 [above](#), I rejected the [black hole](#) (BS) hypothesis. It inevitably leads to time-like naked singularity (Louis Witten *et al.*, [arXiv:gr-qc/0410041](#); see also [Pankaj S. Joshi](#) and Daniele Malafarina, [arXiv:1405.1146 \[gr-qc\]](#)), which will immediately cause an [enormous catastrophe](#) that has never happened: *reduction ad absurdum*. The Cosmic Censorship Conjecture (CCC) is an insult to our intelligence. First the math, and then my heuristic solution.

As [Dieter Brill](#) explained, “what makes black holes black” is encoded in the properties of [null surfaces](#) that are the generators of the horizon. But the “Schwarzschild black hole” is fake: read [arXiv:physics/0402088](#) by Angelo Loinger and Robert Geroch in [What is a Singularity in General Relativity](#): “The presence or absence of a coordinate singularity is not a property of the spacetime itself, but rather of the physicist who has chosen the coordinates by which the spacetime is described.” And again, once you accept some unknown stuff with [negative pressure](#) (Louis Witten *et al.*, [arXiv:gr-qc/0410041](#)), you cannot ban the [time-like naked singularity](#).

The solution: the [Fifth Force](#) as reinterpreted “[negative mass](#)”. Like the [quarks](#), it is *not* directly observable: recall Eliot’s cat [Macavity](#).



It creates “anti-gravity” ([Ned Wright](#)) in *dynamic equilibrium* (Sic!) with the attractive gravity (you need “anti-gravity” to explain also the formation of galaxies). Instead of some mythical “[black hole](#)”, you have, for example, a supermassive body at the center of the Milky Way ([Angelo Loinger](#)).



Again, the energy of the supermassive body at Milky Way's center (pictured above) is from the "negative mass" reinterpreted as **Platonic** gravitational reality inhabiting the *atemporal future* in the arrow of spacetime (BB2): the **Fifth Force**. There are no *physical* "dark energy" nor "negative mass" *per se* (Wikipedia). They are artifacts from the current model of spacetime (p. 3). You will have to reconcile 'the arrow' with the three forms of mass (Yakov Terletsii) and avoid the mythical runaway paradox (Brian Schmidt).

Briefly, everything "happens" on null surfaces: the **Platonic** "distance" into the **future** (BB2). From the perspective of the physical world (depicted with the flattened or "collapsed" 4D lily at p. 2 in [Newton.pdf](#)), the **Platonic** world is "located" at **zero** distance to *each and every* 4D spacetime point. It (not "He") is *everywhere at once* at actual/absolute infinity ([Fl.pdf](#)), as there is nothing left in the *physical* world to "move" into. Subsequently, the physical 4D spacetime is **infinitely differentiable** ( $C^\infty$ ): there is no **gap** (called **Zen** or **Dao**) in the **number line**. On the other hand, I proposed to augment the number line with *hyperimaginary numbers* (**W**) pertaining to the **Platonic** world, such that the *squared W* decays to **complex numbers**, and **nothing else**. This may lead to *hypercomplex* analysis with which we can calculate the 4D derivatives in **4+0 D spacetime** (p. 4 in [Newton.pdf](#)). Only the Mathematics is **unknown**, and is waiting patiently to be **uncovered**. Perhaps the *gravitational* rotation (p. 4 and p. 10 in [text.pdf](#)) can be harnessed to produce **unlimited clean energy** and avoid the **climate crisis**.

For more, read closely Larry Ford ([arXiv:0911.3597](#)), Banesh Hoffmann ([Hoffmann.rar](#)), Guang-Jiong Ni ([arXiv:physics/0308038](#)), Friedwardt Winterberg ([arXiv:0805.3184](#)), and Robert Forward's *Negative Matter Propulsion* discussed on p. 12 in [Newton.pdf](#). My efforts can be read [here](#).

The facts are on the table: read p. 3. As Stephen Hawking pointed out in [arXiv:hep-th/9510029](#), "Unless quantum gravity can make contact with observation, it will become as academic as arguments about how many angels can dance on the head of a pin." Hope to hear from GR experts **soon**.

Luckily, I don't need **quantum gravity** to practice **spacetime engineering**. Does a fish need a **bicycle**?

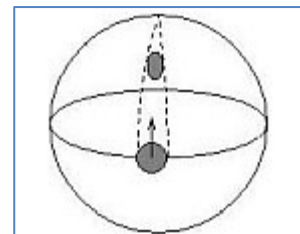
10 February 2023, 23:30 GMT

## Gravity and Time: The Fifth Force

To understand the origin of gravity, recall two phenomena that cannot be *physically* observed due to limitations from the “speed” of light: the Aether (e.g., M. Dupre and F. Tipler in [arXiv:1007.4572](#)) and the [reference fluid](#). The two must be *completely* absent in the physical 4D spacetime pictured with a flattened or “collapsed” 4D lily on p. 2 in [Newton.pdf](#), and are replaced with the **Platonic** world (p. 5 in [Newton.pdf](#)) in 4+0 D spacetime endowed with the fundamental *arrow of spacetime* (BB2 on p. 2). Then the *force* of gravity, producing ocean tides and [Earth tides](#) (p. 3), is the prime candidate for the [Fifth Force](#). If the Fifth Force operates also in the [human brain](#), the Proposition BB1 on p. 1 suggests that we can modify (locally) gravity and fly by ‘reversible elimination of inertial mass’ (p. 9 in [SEM.pdf](#)). In short, gravity is caused by the *moving matter continuum* ([Zhaoyan Wu](#)) along ‘[the arrow](#)’ (p. 2): everything “happens” on null surfaces (p. 6).

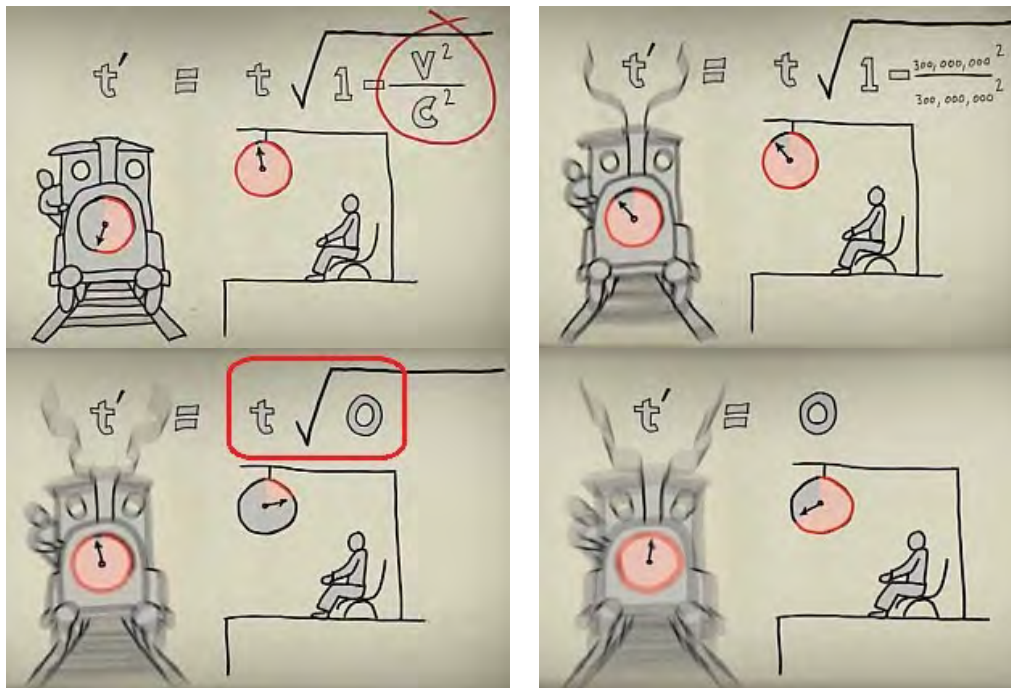
That’s too much to swallow at once. Let’s go back to the [origin of gravity](#) by explaining what gravity is *not*. I hope the reader will grasp the ‘[proof of concept](#)’ (p. 4 in [text.pdf](#)) and the [gravitational rotation](#) (p. 3). [Forget GR](#).

We can picture the electromagnetic field as a *physical* field [propagating](#) on the rigid [background](#) of fixed flat [Minkowski spacetime](#). Gravity is a totally different, fully “[geometrized](#)” animal. It is *not* a mundane physical field, simple because it [can’t](#). Let me add two pictures of what gravity is *not*:



The first picture doesn’t show gravity, because gravity can make only one path between NYC and Madrid. The second picture does not show gravity either: GR says **nothing** about the [gravitational rotation](#) (p. 3) and the *flexible* rate of Time ([William Unruh](#)) affecting the two gravitational paths. More by the author of these lines from [21 September 2008](#). People like [Gerardus and his buddies](#) don’t care about [quantum gravity](#). Hope you do.

Finally, let me explain how everything “happens” on null surfaces (p. 6). Notice the video clip at [YouTube](#) and the snapshots below (0.26-0.52): “Relative to the platform (Sic! - D.C.), time on the train completely stops.”



But the expression  $\sqrt{0}$  is **indeterminate** ([Wikipedia](#)). It makes no sense. It suggests that, if a plane flying from NYC to Madrid (see [above](#)) can reach the “speed” of light at Madrid, then — *relative to* an observer in Madrid — the clock **on the plain** — *relative to* an observer in Madrid — will **stop**. Also, the size of the plane will match the size of a photon, and will shrink *exactly* to **zero**, again *relative to* an observer in Madrid. These “predictions” are outside the applicable limits of the theory of relativity. Instead, I suggest to treat the *limit* on the speed of all ‘**massive particles**’ at the “speed” of light as an *infinitesimal*: an “explicitly nonzero and yet smaller in absolute value than any real (Sic! - D.C.) quantity” ([Wolfram](#)). Namely, I suggest to insert “inside” the *infinitesimal* the so-called *hypercomplex* numbers (p. 6) which contain the *hyperimaginary* unit **W**, such that  $W^2 = 0$ . Then “before” (recall [Macavity](#)) being squared, **+W** and **-W** correspond to the **Platonic** world (BB1) on null surfaces (p. 6) along ‘**the arrow**’ (BB2). You only have to split the “photon” to see the *atemporal*  $\pm W > 0$ , right above your neck. Physically, it is “zero”. Are you interested in *hypercomplex* analysis (p. 6)?

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## Questions and Answers

Q1: Can you explain the Fifth Force in layman's terms?

A1: There are two reasons why the [Fifth Force](#), announced on 23 June 2022 ([talk.pdf](#) and [text.pdf](#)), is different from the [four physical forces](#). First, the Fifth Force is not an additional *physical* force, because it only "animates" the physical systems. The latter behave like a 'glove' with **Platonic** 'hand' inside: read p. 2 in [talk.pdf](#). For example, the [human brain](#) shown below.



Secondly, the *physicalized* influence of the Fifth Force on its host (glove) is by making the latter **self-acting**: only matter can interact with matter. In the case of the [human brain](#), the *physicalized* Fifth Force has a miniscule magnitude, as it only has to *guide* all constituents of the brain as a [holistic system](#) (not like some [homunculus](#)). In [quantum systems](#), the *physicalized* Fifth Force acts as a quantum **matrix** ([Werner Heisenberg](#)), which explains "the miraculous identity of particles of the same type" ([John A. Wheeler](#)). And in gravitating systems, the *physicalized* Fifth Force explains the energy of gravity producing, e.g., ocean tides and [Earth tides](#), and also removes the mythical "[dark energy](#)". No [physical stuff](#) can create 'the arrow' (p. 2). Only the **self-acting** Fifth Force rooted on Aristotle's [Unmoved Mover](#). All in all, the Fifth Force is the *physicalized* force of Time (p. 2 in [FI.pdf](#)), which "animates" all physical systems depicted as 'gloves'. Only the **self-acting human brain** can [utilize](#) the Fifth Force (cf. the doctrine of *trialism*, p. 1).

Thus, we have a common approach to the physics of Life ([Erwin Schrödinger](#) in [video.pdf](#)) and quantum gravity ([Newton.pdf](#)). Physically, the Fifth Force is "[nothing](#)". To understand how it is "[inserted](#)" in the physical world, read p. 6 [above](#). If you have more questions, email me at [dchakalov@gmail.com](mailto:dchakalov@gmail.com).

Some of my readers complain that the theory is very convoluted, given the postulates about the common source of matter and psyche (the doctrine of *trialism*, p. 1), and the arrow of Time (p. 2). But this is how Nature works, in my opinion. Let me briefly explain the alternative metaphysical ideas, which may look deceptively “simple” and “scientific” to many people.

The alternatives to the doctrine of *trialism* (p. 1) are (i) [parapsychology](#) (here comes the claim about “[magic](#)”) and (ii) the metaphysical thesis known as [physicalism](#): “everything is physical”. When you watch a DVD video on your TV, you know that *everything* you see and hear is encoded in the DVD and processed by your DVD player and TV set. Likewise, the [brain](#) is the hardware and the [mind](#) is its software. But both [parapsychology](#) and [physicalism](#) are false. Check out Thomas H. Huxley from 1869 on p. 1 and the experiments with your brain & mind [here](#) and [here](#).

The alternative to the arrow of Time (p. 2) is simple: Time does *not* exist. For example, read [Thibault Damour](#) and [Carlo Rovelli](#). The latter argued that entropy, which never decreases, is “the only equation of fundamental physics that knows any difference between past and future”, and suggested that the *direction* of Time is lost. Even more, the [direction of Time](#) is lost at the most primitive level of their theory of gravity ([Daniel Pollack et al.](#)).

But Nature is *not* made exclusively from [physical stuff](#). Otherwise the theory of relativity ([forget GR](#)) will be [demolished](#). Why? Because in physics every observation is necessarily *relational*. For example, you see a photo of a car on a street. It could be parked there or it could be moving, either forward or backward, *with respect to* the street at rest. If you have a video from the car, you will figure it out immediately. But in physics, the [direction of Time](#) cannot in principle be observed in a “[video](#)”. You cannot act as some “[absolute observer](#)” placed on the banks of Heraclitus’ river.



Everything changes and nothing remains still – you cannot step twice into the same stream, for fresh waters are ever flowing in upon you.

[Heraclitus](#)

Thus, the *direction of Time* is *physically* unobservable. Nature is *not* made only and exclusively only from physical stuff (p. 2). On 21 September 2008, I suggested *two modes of spacetime*, called local (physical) and global (**Platonic**). The latter is needed to explain the *asymmetry* of Time encoded in the metaphysical thesis of *causality*: read p. 9 *above* and p. 7 in [SEM.pdf](#).

As an illustration of the *physicalized* force of Time (p. 9), watch [ball.mp4](#). In Case A below, the magnitude of the Fifth Force as *the "force" of Time* is unimaginably small yet *not* zero, roughly  $6 \times 10^{-10}$  joules per cubic meter.



Case A: Newton's [laws of motion](#)



Case B: No idiotic "dark energy"

But in Case B (p. 6), the magnitude of the Fifth Force as *the "force" of Time* is not vanishing small anymore, and the "anomalous" physical effects, triggered in the ball by its **self-acting** Fifth Force (p. 9), can be detected: read p. 4 in [text.pdf](#). Sorry, nothing is "simple". We still do not have full [quantum gravity](#) to explain how the [quantum-gravitational vacuum](#) creates *exclusively positive mass* (p. 11 in [Newton.pdf](#)) due to the *asymmetry of Time*. The "negative mass" is not directly observable (recall the "quarks").



Back to Heraclitus' river (p. 10): don't complain that you cannot "see" it. If you could, you will expose the [Aether](#) and demolish the theory of relativity (p. 17 in [Newton.pdf](#)). Also, you could imagine the whole Universe as ONE (called "trunk" in the doctrine of *trialism*, p. 1) as a [physical stuff](#), which is impossible. We can only try to approach 'the ONE' with [Mathematics](#).

So far the only feedback from [theoretical physicists](#) came in May 2012, from [Maurice de Gosson](#) (Mon, 21 May 2012 18:47:46 +0200): "Buzz off, idiot!"

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