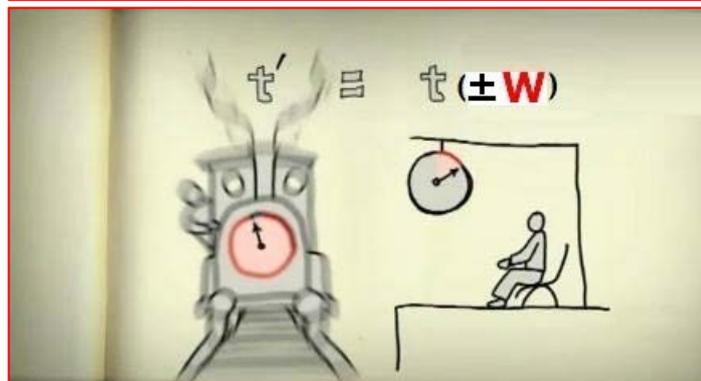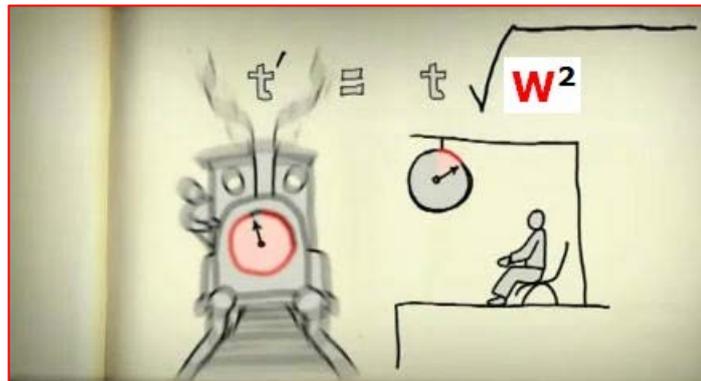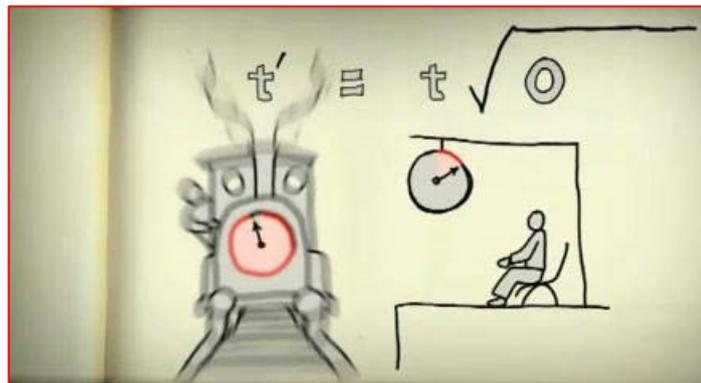**0:47-0:51**: "Relative to the platform, time on the train completely stops."
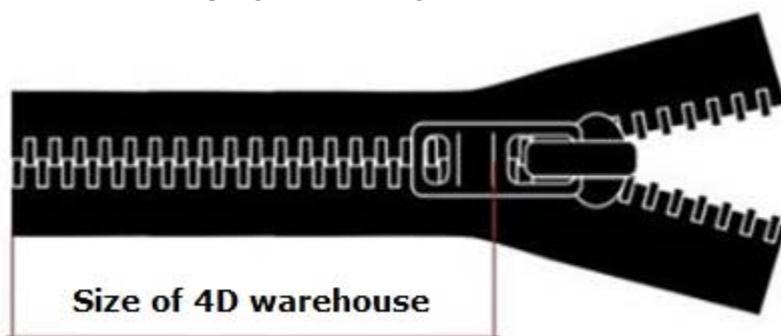
We postulate that the *fabric* of spacetime is made of 'meters of light-travel time' (p. 3), which are endowed with **elasticity** — they can *deflate* and *inflate* (p. 5). Namely, the spacetime has **elastic** rods-and-clocks "built into itself, even when matter and nongravitational fields are absent!" (MTW p. 396). But how come "absent"? On 5 May 1920, Albert Einstein explained the ether as follows: "But this ether may not be thought of as endowed with the quality characteristic of ponderable media, as consisting of parts which may be tracked through time. The idea of motion may not be applied to it." I will briefly introduce a new theory of gravity based on the fundamental **elastic** *fabric* of spacetime: matter and fields become *gravitalized* by the fifth force. Details at p. 6.

To explain the "intuitively clear" idea about 'time as read with a clock' (Wikipedia), we recall that it will be impossible to move from one spatial location to another without also "moving" in time. But we "move" in time even if we do not "consume" space (P. Mainwood), as we (not photons) can always choose a reference frame at which we are at rest. But what is the *rate* at which we 'move' in time? One second per second makes no sense. What if time is actually an *imaginary* variable (Arthur Eddington)? Here is my "intuitively clear" idea about the *rate* of time.

Suppose the speed of a runner (pictured here) was exactly the speed of light. His 'time as read with a clock' will "shrink" to *one single* point and will stop. But if he was running at 99.5% the speed of light, his time will slow by a factor of ten. To quote John D. Norton, his clock will tick "once each twenty seconds instead of once each two seconds." How come at 99.5% the speed of light, the *rate* of time will slow by a factor of ten?

Picture the 4D spacetime like a warehouse that always has some **finite** size (p. 9), never zero nor infinite; read p. 25 and p. 39 in *Can Geometry Produce Work*. Suppose also that the zipped section of the warehouse below is being dynamically *assembled* with a variable *rate* of time.



Size of 4D warehouse

A smaller zipped interval assembled with lower speed is like a greater zipped interval assembled with greater speed. Voila.

If the "speed" of *assembling* is 99.5% the speed of light, the *rate* of time will slow by a factor of ten. If the "speed" of *assembling* was infinite, the *rate* of time will slow by a factor of infinite. This is the absolute luxonic Time, which requires new numbers called *hyperimaginary numbers* (**W**).

To understand the *assembling* phenomenon, start with its force: read talk.pdf. Then move to the new relative-scale (**RS**) spacetime (p. 5 in synopsis.pdf). The origin of gravity is the same global phenomenon that *assembles* the Small and the Large, only applied locally. Let me explain.
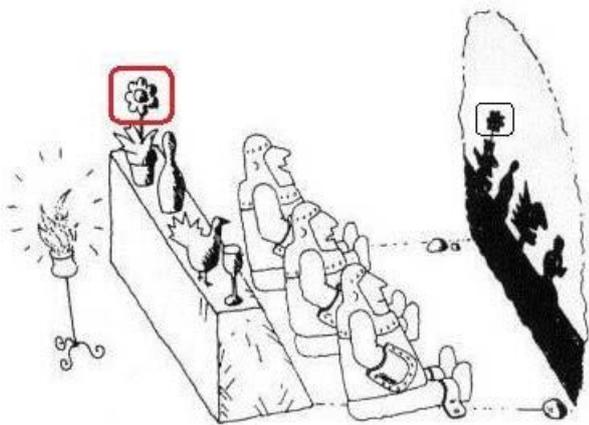
First, some prerequisites. The dynamics of spacetime *itself* is categorically rejected in GR textbooks: "nothing ever moves therein; nothing happens; nothing changes" (Robert Geroch). Physicists deeply believe we inhabit a "block universe" (G.F.R. Ellis): the universe does *not* "fly" (J.A. Wheeler). As the old saying goes, if you only have a hammer, you will see every problem as a nail. Of course, the dynamics of spacetime *itself* **cannot be** relational. If it were, the aether will be *physically* observable and the "speed" of light will become relational, and the absolute luxonic Time will be exposed to *physical* observations. Another example of the dynamics of spacetime is from the metaphysical principles of locality and causality: what is the *primordial influencer* called Time? If this phenomenon was *relational*, it must be executed by some "dark" *physical* stuff. Bad idea.

Can we suggest a *non-relational* dynamics of spacetime? Take for example the perpetual, hence dynamical, *calibration* of every clock in "meters of light-travel time" (E.F. Taylor and J.A. Wheeler). This ongoing calibration is simply a *non-relational* phenomenon exposing the dynamics of spacetime. I will use it to postulate that the 4D spacetime is being *assembled* (p. 2) with a variable *rate*. To grasp the idea, here is a simple analogy.

First, recall that if A, B, and C were photons, they "will not have aged" (Wikipedia): they will "live" in the absolute luxonic Time of the *atemporal* **Platonic** world (p. 6 in *The Arrow of Spacetime*). Now, think of 'rate' as frames/ticks per second (FPS), and imagine three cars, called Alice (A), Bob (B), and Carol (C). Let them travel, relative to the road at rest, with speed (S) denoted $S_A$, $S_B$, and $S_C$ over *the same* interval (D) from the zipped 4D spacetime (p. 2), called '4D invariant spacetime interval' (Wikipedia).

Now, if $S_A = S_B = S_C$, the three cars will "assemble" *the same* 4D interval D. But what if we *inflate* Carol's 4D interval denoted $D_C$ and — at the same instant — *deflate* Bob's 4D interval denoted $D_B$, relative to Alice's 4D interval $D_A$? Then Bob could *shrink* to the size of protons and beyond, and at the same instant Carol could *inflate* to the size of galaxies and beyond.

But we want to keep their 4D intervals 'the same', meaning $D_B = D_A = D_C$. How can we do that? By introducing variable *rates* of assembling the Small (Bob) and the Large (Carol), relative to the macroscopic world (Alice) at the length scale of tables and chairs. Namely, relative to Alice's *rate* of time, Carol's *rate* of time will be *inflated* and Bob's *rate* of time will be *deflated*, in such way that $D_B = D_A = D_C$. Relative to Alice (Sic!), Carol will "assemble" a *larger* 4D interval from the "warehouse" (p. 2), whereas Bob will "assemble" a *smaller* 4D interval from the "warehouse". It will be like the car C (Carol) was traveling faster than the car A (Alice), and the car A (Alice) was traveling faster than the car B (Bob). To keep their "assembled" invariant 4D intervals 'the same' ($D_B = D_A = D_C$), Carol's time will run/tick "faster" than Alice's, and the latter will run/tick "faster" than Bob's. If Carol's time could run/tick *infinitely* fast, Carol will "assemble" the entire finite "warehouse" (p. 2) *instantaneously*, and her time will be "frozen". And if Bob's time could run/tick *infinitely* slow, Bob can "assemble" only one single spacetime point, and his time will be "frozen" as well. The two asymptotic cases (p. 24) are physically indistinguishable, and Carol and Bob will inhabit the global luxonic Time of the *atemporal* Platonic world (p. 3).



Thanks to the "speed" of light, we cannot turn around and look at the *atemporal* Platonic world. The latter is interpreted as the common source of matter and psyche, after Leibniz, and is placed in the potential future (denoted P, see Escher's drawing hands) in the arrow of spacetime.
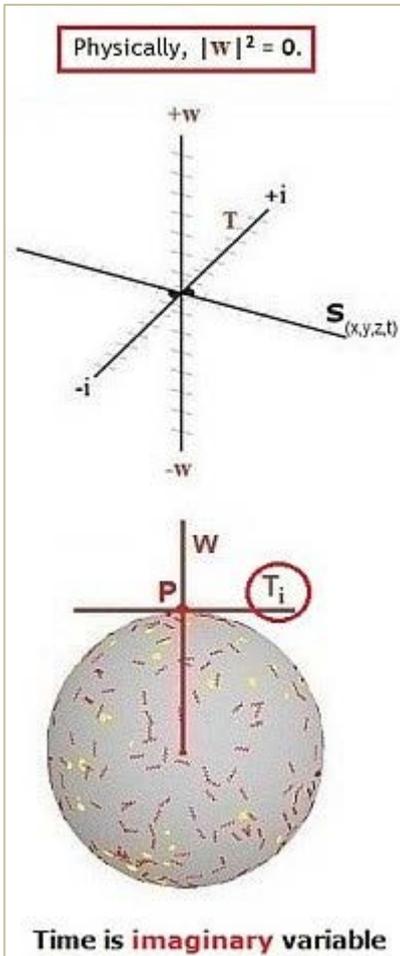
Again, relative to Alice, Bob will be truly "small" and Carol will be truly "large". But the world of the Small is *indistinguishable* — not identical — to the world of the Large. This is RS spacetime in a nutshell. So, if Bob's size matches the RS size of protons and Carol's size matches the RS size of our Milky Way, their RS invariant spacetime intervals will be *indistinguishable.* Relative to Alice's clock, Carol's clock can tick "once each twenty seconds instead of once each two seconds" (p. 2): the 'tick' will be RS inflated by factor of 10. And relative to Alice's clock, Bob's clock will be RS deflated and can, for example, tick 10x per second, instead of once each second of

Alice. In *their* **RS** reference frames, protons and galaxies are 'the same'.

**NB**: This is how Nature RS-inflates and RS-deflates the invariant "meters of light-travel time". **Why**? In order to keep the "speed" of light everywhere and always RS-**constant**. It is all relative, as uncle Albert used to say. The origin of attractive gravity is RS-deflated spacetime locally, and the origin of repulsive gravity is RS-inflated spacetime locally. Forget "dark energy".

Those who reject my theory of gravity as "too speculative" will be kindly invited to explain the Earth tides with GR (MTW p. 467).

 If GWs transported energy, they will be *physical* waves; if GWs *cannot* transport energy, they will be some parapsychological ghosts. This is the dilemma in GW parapsychology.

Because the Christoffel symbols cannot *rotate* the Earth *and* pull up↑ rocks. Only the fifth force can, in **RS** spacetime (p. **v** in *The Physics of Life*).

Now we can suggest the *mutual penetration* (entanglement) of the Large and the Small. It begins from Alice at macroscopic scale (watch YouTube) along two opposite **3D** "directions" toward the Large and the Small.



This is the road to the theory of gravitational rotation and quantum gravity. As of today, however, nobody is interested.

23 June 2022
Last update: 27 August 2022, 16:06 GMT

**Q1**. Why do you postulate some "squared variable" to be "zero" (p. 1)?

**A1**. The three types of invariant intervals, including the null interval, are squared. Physically, $|W|^2 = 0$ (see the drawing at left, from Slide 2).



Physically, $|w|^2 = 0.$

Time is imaginary variable

The so-called *hyperimaginary numbers* denote Macavity, which, "when" squared, is **re-nullified**. To understand the meaning of 'when', read the thought experiment here. Thus, the *atemporal* **Platonic** world (p. 4) does exist, but "before" light, just like Macavity. Namely, "during" every consecutive 4D instant 'here and now' (Slide 1), the *atemporal* **Platonic** world has been "already" **re-nullified**, hence the **finite** and "zipped" 4D spacetime (p. 2) is "already" **re**-assembled. An example of "already" **re**-assembled cases is here.

The term (±**W**) on p. 1 stands for the "collapsed" **Platonic** world (p. 4), which decays to *imaginary* numbers, and **nothing else**. Which is why time is an *imaginary* variable (Arthur Eddington). To understand the bundle of normal and tangential directions "along" null intervals (p. 21 in BCCP), read the explanation at this http URL. In other words, **W** and **T$_i$** , shown in the drawing at left, are *physically* indistinguishable. They pertain to the Platonic **matrix**: read p. 7 in *The Fifth Force*.

Notice the asymptotes (x = 0) and (y = 0) in Slide 3, and imagine a gimbal flying in RS spacetime with **RS speed 1m/s** and $\Omega = 10^3$. We (Alice) will be shocked by its flying dynamics: in *our* RS frame **of** $\Omega = 1$, it will be flying with $10^3$m/s, but in gimbal's RS frame the speed is 1m/s. It's all relative.

Again, the gimbal is not flying with some mythical "dark energy" but with the fifth force, after moving from the RS frame of Alice to that of Carol. Explanation on 23 June 2022. The video (p. 11 in *The Arrow of Spacetime*) will be available only upon request, until Christmas 2022. To receive the link to Vimeo, follow strictly the requirements (1)-(2)-(3) at p. 5 (last) in explanation.pdf.

Q2. What's the purpose of this exercise?

A2. First, we need spacetime engineering to combat the climate crisis. And secondly, we must rebuke GW parapsychology: read p. 5. Recall GW150914 from 14 September 2015. It was called "by far the most powerful explosion humans have ever detected except for the big bang" (Kip Thorne), only it was *totally* silent, because "a vacuum BBH merger does not produce any EM or particle emission *whatsoever*" (p. 9 in arXiv:1602.08492v4). Moreover, despite the well-known fact that we know *nothing* about the wave pattern of *very* strong GWs at the vicinity of "the most powerful explosion humans have ever detected", Kip Thorne and his LIGO collaborators claim that the same *totally unknown* GW pattern was **absolutely *not*** (Sic!) altered due to non-linear interactions of strong GWs with matter and fields in the cosmos for over one billion years (it should be *many more* years, read B. Schutz), before being "detected" on 14 September 2015. Why? Because LIGO can "detect" only *linear* GWs. **Fact**.

Are we so stupid and gullible? The *linearized* approximation of gravity is for the birds. Let me quote Hermann Weyl from 1944, in How Far Can One Get With a Linear Field Theory of Gravitation in Flat Space-Time? *American Journal of Mathematics*, **66**(4) 591-604 (1944): "At its present stage our theory (L) accounts for the force which an electromagnetic field exerts upon matter, but the gravitational field remains a **powerless shadow**. From the standpoint of Einstein's theory this is as it should be, because the gravitational force arises only when one continues the approximation *beyond* (Sic! – D.C.) the linear stage. We pointed out above that no remedy for this defect may be found in a gauge invariant gravitational energy-momentum tensor." You can't argue with Hermann Weyl. Read more about the delusional ridiculous idiotic pathetic "theory" of LIGO here and here.

I raised my voice on 19 February 2003 and explained the problems of LIGO on 17 July 2005. It was immediately deleted by the talebans at arXiv.org. The genuine *non-linear* gravitational radiation always *transports* its **source** (p. 6 in *The Fifth Force*) and will rebuke the mythical "GW 170817": the "*intangible* energy of the gravitational field" (Hermann Bondi) is converted into detectable EM energy emitted from NGC 4993. Even a gentle human thought (p. 3) requires "tangible" energy to transport its neural sources. This is how the **fifth force** operates in the **4D** "brain" of the Universe.

NB: Who will find the courage to say that the Emperor has no clothes?

Cut the crap and move to quantum gravity (MTW p. 467). Thanks to the *intangible* energy (Hermann Bondi) of the "brain" of the Universe, gravity "is not a natural force" (Zhaoyan Wu) and the complex quantum waves do *not* possess "tangible" energy. Their *intangible* energy is not localizable.

Hence it cannot be "carried" in 4D spacetime from point A to point B. It (not "He") belongs to the **Platonic** quantum-gravitational world, which is "located" *everywhere* at once. It simply *emerges* in the form of detectable *physicalized* energy, e.g., as photons at the instant we turn on the light. Physically, they were **non-existent** in the quantum vacuum (Peter Milonni) "before" they *emerged* as light (Slide 9). Recall Macavity at p. 6 above.

All this is widely known for decades. As Albert Einstein put it: "I want to know God's thoughts; the rest are details". We only need Mathematics.

The latest feedback hit me ten years ago from Maurice de Gosson at the University of Vienna: "Buzz off, idiot!" (Mon, 21 May 2012 18:47:46 +0200).

## Post Scriptum

The subtle suggestion by Maurice de Gosson, prompted by my 2008 theory of two *modes* of spacetime (p. 6 in *Notes on Spacetime Engineering*), was of course duly ignored. On June 8th this year, I informed many physicists and mathematicians about the experimental verification of the fifth force. Very briefly, the theory of two *modes* of spacetime predicts that the rice in the jar below can "tunnel" into the empty jar at right, nice'n easy.



This is brain-controlled quantum tunneling (BCQT). Not Chinese "magic". Read about the 'gimbal' at p. 19 in *Notes on Spacetime Engineering.* But there is no physical theory, which can explain how quantum effects, such as quantum tunneling, can be "elevated" at macroscopic length scale. The first step is to conduct BCQT at some renowned technical lab under tightly controlled conditions. Don't expect from me to show it in some cafeteria.

Suppose, for the sake of argument, that I fly over the River Thames in London. Many of the tourists there will be fascinated (tourists *love* free entertainment), but will the theoretical physicists become at least slightly curious about spacetime topology and the origin of gravity? When pigs fly.

Read pp. 8-16 in *The Fifth Force* and the "sampler" here (p. 10). Mater and fields *cannot* generate any "smooth timelike vector field" viz. consecutive "different time surfaces" (G.F.R. Ellis). Time is missing in GR (C. Rovelli).

Yet all objects with non-zero positive rest energy always experience the local (physical) *mode* of spacetime (p. 6), while at *the same instant* all photons live in the global (Platonic) *mode* of spacetime (*ibid.*), which is why they "will not have aged" (p. 3). The **fifth force** doesn't have age either, as it springs from the Unmoved Mover. To understand how the fifth force makes your brain **self-acting**, try the experiment here. Simple, no?

The two *modes* of spacetime can explain the "zipped warehouse" (p. 2) as well. Fig. A below depicts the story about actual/absolute infinity: a crowd of infinitely many 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.
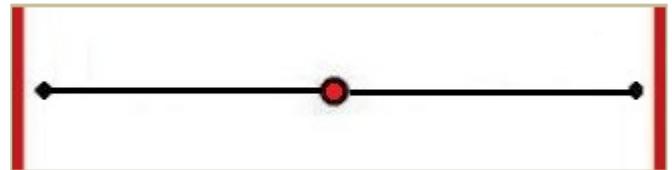


Fig. A. See Fig. 5 in
*Quantum of Spacetime.*



Fig. B. Read p. 24 in
*Notes on Spacetime Engineering.*

Fig. B, on the other hand, shows the idea of 'the entire spacetime *en bloc*', as "seen" from the global (Platonic) *mode* of spacetime (p. 6). Notice that Fig. B includes *absolutely all* (Sic!) points from the horizontal **black** line. Also, *any* point from **black** line is '**equally away**' from the red edge/cutoff located at future/past null infinity (p. 24), which is why the local (physical) *mode* of spacetime is truly **infinite**. Yet 'the entire spacetime *en bloc*' has always *finite* size in the global mode, like the "zipped warehouse" (p. 2). The two pint beer and its two cutoffs in Fig. A belong to the *local* mode, governed exclusively by *potential* infinity: recall Thomson's lamp paradox. We can of course find an exact [two pint beer], because the latter belongs *also* to the ambient pub (Fig. A). In the local (physical) mode of spacetime, *nothing*, not even a human thought, could reach "the edge of space-time" (S.W. Hawking and G.F.R. Ellis) and ultimately stop there. This is the true Finite Infinity (FI). Not the one suggested by G.F.R. Ellis. More at pp. 7-8.

Again, it will be impossible for any system in the local (physical) *mode* of spacetime to reach the Platonic Universe as ONE (p. 4) and stop there. Read the *metric paradox* by Yakov Zeldovich on p. 7 in *The Fifth Force*. The Platonic Universe (not "He") happily lives in the **global mode** of spacetime, *both* infinitely close *and* infinitely away from us, ever since the Beginning. Once created (John 1:1; 1 John 4:8), the Universe is *already* eternal. Amen.

To refute the theory (pp. 11-13 in *Notes on Spacetime Engineering*), the readers will have to discover some brand new, and completely unknown, "smooth timelike vector field **Z**" (Fig. C), and install it in the so-called "lapse" and "shift" in the perplexing ADM hypothesis.
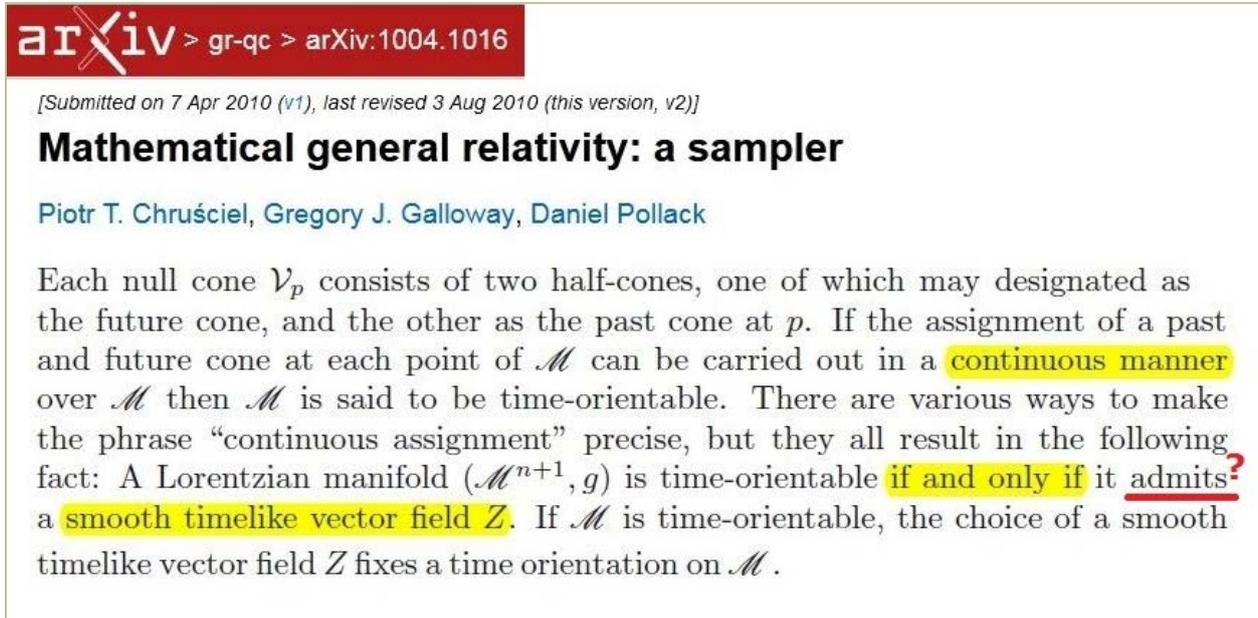


Fig. C

How can matter and fields generate such "smooth timelike vector field **Z**"? We can, of course, introduce 'by hand' a Killing vector field, provided "the Lie derivative with respect to **X** of the metric g **vanishes**" (Wikipedia), and in this sense a Lorentzian manifold "**admits**" a smooth timelike vector field (Fig. C). It is like looking at a car chassis and saying that the chassis would "**admit**" an engine. Maybe, but what is the *origin* of the engine? In **4+0** D spacetime, the 'engine' is the self-acting **fifth force** that *animates* the 4D 'glove', like **Platonic** hand (Q1 at p. 6) in a glove (p. 2 in *The Fifth Force*).

NB: The fifth force is the *sufficient* component of spacetime: read the last paragraph at p. 1 in *The Fifth Force*. Don't say you know nothing about it.

## Acknowledgements

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