

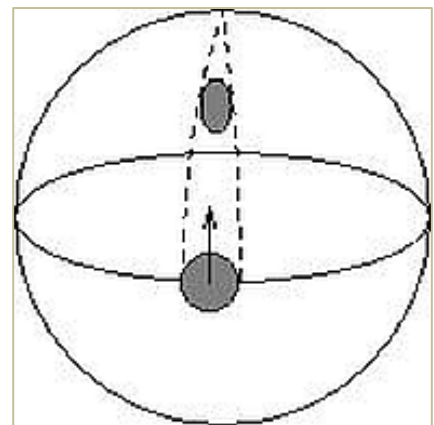
The curvature (if any) of spacetime: Can geometry produce work?

Recall Albert Einstein: "General Relativity is about forces, not geometry."

Let me explain what we understand by 'geometry'. If we look at a football, we can only imagine an ideal *geometric* sphere. We can see and touch only the physical football – the geometry itself is a product of our imagination. The same holds in looking at a mountain: we can see its *geometric* shape, but will never claim that the geometric shape *itself* can feedback-influence its physical [source](#) (the mountain) à la John Wheeler ([MTW p. 5](#)). We never speculate that the shape *itself* can push back and 'move' its mountain – geometry *cannot* produce [work](#). If it could, geometry will become matter.

In [GR](#), gravity is not a [force](#), so physicists suggest "[geometrization](#)" of the [work](#), performed by the [attractive gravity](#), with spacetime "[curvature](#)".

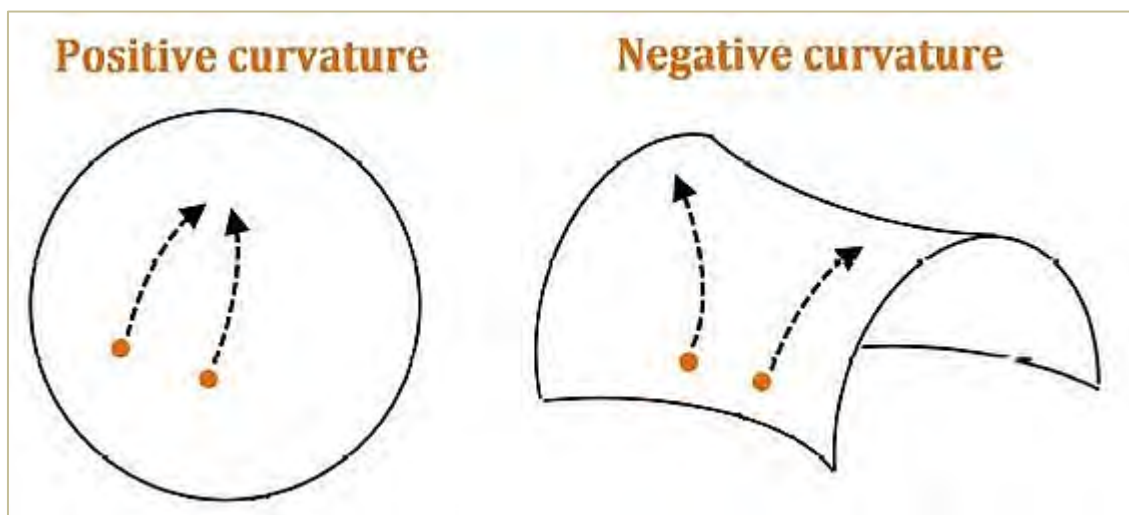
Quote from [John Baez](#): "on a positively curved surface such as a sphere, initially parallel lines converge towards one another. The same thing happens in the three-dimensional space of the Einstein static universe. In fact, the geometry of space in this model is that of a 3-sphere. This picture illustrates what happens." Untrue. This picture illustrates a paranormal "magic" – the geometry itself *cannot* produce [work](#).



In the picture above, the 'mountain' is squeezed toward the north pole by a real [physical force](#) – not by its purely geometric 'shape' called [gravity](#). There is no direct coupling of EM field and gravity, as we know since 1914.

NB: The 'mountain' interacts with *itself* by [self-action](#). Simple, isn't it?

Besides, there is no geometrization of *repulsive* gravity with a 3-torus topology of spacetime ([Wikipedia](#); read also [Michael Quackenbush May](#)):



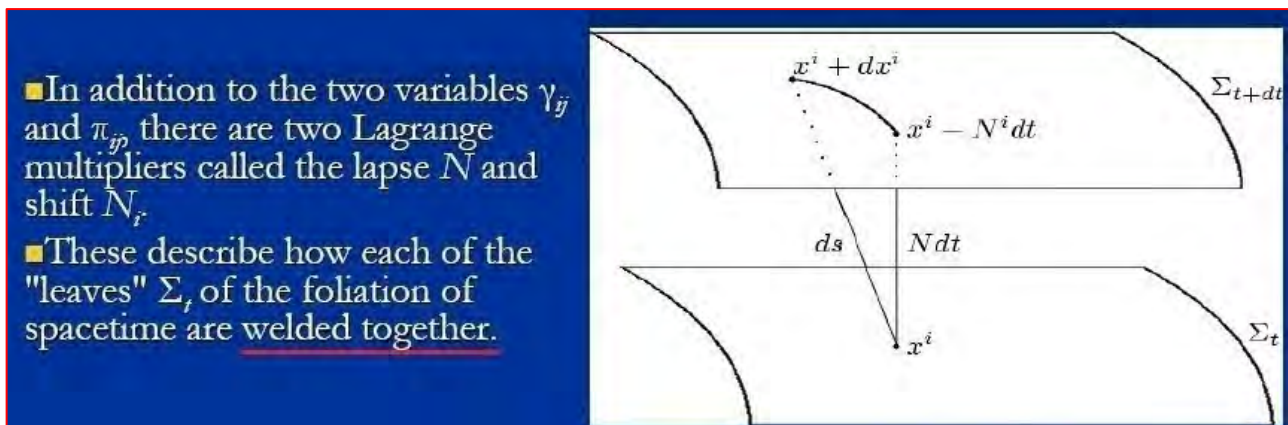
Instead of acknowledging the [work](#) by attractive-and-repulsive gravity in shaping the [cosmos](#), physicists resort to “[dark energy](#)”. Does the [work](#) by gravity in pulling up \uparrow the [ocean on Earth](#) show “dark attractive energy”?

Spacetime applies “brakes” to all accelerated bodies, but where does the [energy of inertia](#) come from? Is this again some “dark attractive energy”?

Physicists rarely acknowledge that the inertial forces are *instantaneous* ([James F. Woodward](#)): there are no ‘inertial waves’ propagating in the cosmos with the vacuum speed of light, say. But GR cannot accommodate some Newtonian-like ‘[action-at-a-distance](#)’ force. The problem is severe.

Look at the false *frozen time* hypothesis in GR textbooks. As [Robert Geroch](#) succinctly put it: “There is no dynamics within spacetime itself: nothing ever moves therein; nothing happens; nothing changes. Rather, particles are just “in” space-time, once and for all, and the world-line represents, all at once (Sic! – D.C.), the complete life history of the particle.” Another expert in GR textbooks, [George F.R. Ellis](#), declared that the initial data at an arbitrary point from the cosmological timeline “determines all physical evolution, including that of the space-time structure, to the past and the future equally (Sic! – D.C.), because we can predict and retrodict from that data up to the Cauchy horizon.” Of course, you cannot define some cutoff on the [light-like](#) boundary of [Cauchy horizon](#) (unless you are [Chuck Norris](#)), nor introduce “[gravitational waves](#)”, but let’s keep it as simple as possible.

The false *frozen time* hypothesis stems from the false claim “no dynamics within spacetime itself” by [Robert Geroch](#). Consider, e.g., [ADM hypothesis](#):

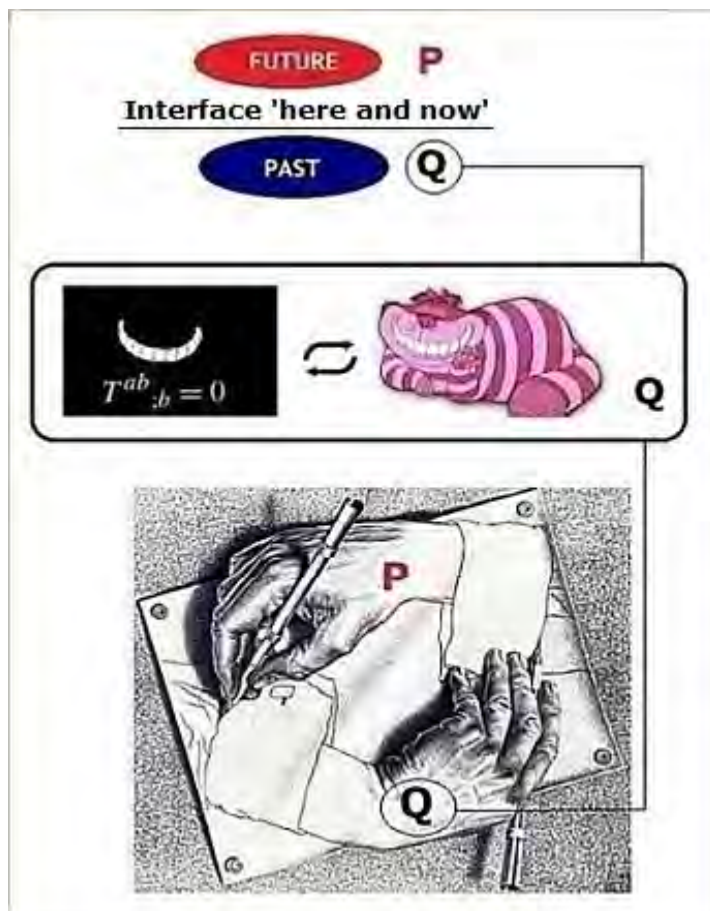


Time is ‘[change](#)’, so to define rigorously the so-called lapse and shift, you need the external ambient (white) background medium above, with respect to which the successive “leaves” are *both* separated by the infinitesimal dt ([Wolfram](#)) and “welded together” without any ‘[Zen gaps](#)’. You cannot paint a painting [without any canvas](#), yet the latter must be *exactly* eliminated — there is no *physical* ambient background medium (resembling the [Aether](#)) in which the physical spacetime can be embedded. Can you square the circle?

Yes you can, because the 'canvas' occupies the **future** in the **arrow of Time**, which is **exactly nullified** in the 4D physical world cast in the **past**.

The only way you can 'have your cake and eat it' is with the **arrow of Time**: the *atemporal* 'canvas', placed in the potential **future** (P), does not exist in the mundane physical world **re-created** in the ever-increasing **past** (Q):

The 4D spacetime — the bare geometric grin on the face of Cheshire cat — and its source — the physical cat but without its gravitational 'grin' — are in perpetual *negotiation* for every **next** instant 'here and now', at which the total energy of the system 'cat + gravity' (Q) will be again **re-balanced** (Sic!) along the **arrow of Time**. The latter is based on two *modes* of spacetime, local (physical) and global (**Platonic**), suggested on **21 September 2008**. Thus, the **next** instant 'here and now' is being negotiated in the **future** (p. 8 in *Modified Gravity*) and is **re-created** with the rule 'think globally, act locally', which leads to **universal holomotion**.



NB: All this leads to a **new dynamics** of **4+0 D spacetime** viz. a **new theory of gravity** based on the **Fifth Force** along the **arrow of Time**. Read *Universal Holomotion* ([waves.pdf](#)) and *Simple Quantum Mechanics* ([quanta.pdf](#)). The theory predicts **new gravitational effects**, explained in *Modified Gravity* at [modified_gravity.pdf](#) and *Spacetime Engineering 101* at [video_101.pdf](#), and rejects the fake "gravitational waves" (pp. 18-20 in *GW Parapsychology*). The final 4th run by LIGO & Virgo in **2024** will be **total catastrophe**, **again**. They may only detect "dark" **attractive-and-repulsive** gravitational effects created by the genuine *gravitational radiation*. Fake GWs **cannot do work**.

Read Hermann Bondi from **8 February 1990**. He wrote on **1 February 1990**: "Not only is general relativity by its nature a nonlinear theory, but the question of the "reality" of the waves essentially concerned whether they transported energy." For example, the energy from gravity in pulling up \uparrow the **ocean on Earth**. How is gravity coupled to matter, so that you can boil water with **Bondi news** (**Paper VII**)? More in my note on p. 1 in [dignity.pdf](#).

Is the Moon pulling up ↑ the [ocean on Earth](#) and the rocks underneath with “[pulsating](#)” GWs facilitated by “[gravitons](#)”? Why gravitating systems rotate?

To quote from Richard Feynman’s [Character Of Physical Law](#), 1967, p. 8:

“The next question was — what makes planets go around the sun? At the time of Kepler some people answered this problem by saying that there were angels behind them beating their wings and pushing the planets around an orbit. As you will see, the answer is not very far from the truth. The only difference is that the angels sit in a different direction and their wings push inward.”



The Christoffel symbols cannot rotate the Earth *and* pull up ↑ rocks. And the Isaacson stress-energy tensor (Richard Isaacson, *Phys. Rev.* **166** (1968) 1272) won’t help you either. Forget it.

The interaction of gravitation and matter — “space acts on matter, telling it how to move” (MTW p. 5) — is a mystery ([Hans Ohanian](#)). The physical or ‘tangible’ ([Hermann Bondi](#)) gravitational forces “make a contribution to the mass-energy of a gravitationally interacting system”, but certainly not by a “local gravitational energy-momentum” (MTW p. 467). Gravity is inherently *nonlocal* ([Laszlo Szabados](#)), but in the theory of relativity ‘nonlocal energy’ is an oxymoron. What a mess.

Those who disagree should recall the conclusion about [General Relativity](#) by its founding father [Albert Einstein](#): “The representation of matter by a tensor was only a fill-in to make it possible to do something temporarily, a wooden nose in a snowman”. The right theory of gravity (p. 1) is quantum gravity: read the last page in *Spacetime Engineering 101* ([video_101.pdf](#)). In quantum gravity, the potential **future** in the [arrow of Time](#) (p. 3) plays the *double role* of ‘[canvas](#)’ viz. ‘[reference fluid](#)’ *and* the ‘chooser’ in the [quantum world](#): God casts the **die**, not the dice ([Albert Einstein](#)). With light (recall [Macavity](#)), we observe only the *physicalized local mode* of spacetime made of ‘gloves’ (p. 8 in [video_101.pdf](#)): think [globally](#) (**P**), act [locally](#) (**Q**).

To elaborate on the *double role* of the potential **future**, presented here as a quantum-gravitational **matrix** (p. 2 in [video_101.pdf](#)): the old background ‘canvas’ (p. 3), acting as a ‘[reference fluid](#)’, does not exist as a physical reality placed in the **past** — the **matrix** solves all the topological problems of [spacetime continuum](#) from the **future** (pp. 1-2 in [canvas.pdf](#)). And the ‘chooser’ in the quantum world (pp. 2-3 in [quanta.pdf](#)) does not exist as a physical reality placed in the **past** either — the **matrix** solves the problems of ‘quantum reality’ from the **future**. This is why the quantum ‘[jackets](#)’, placed in the **past**, *must* be fundamentally **flexible** (not “**uncertain**”) to allow for the action of [quantum matrix](#): God casts the **die**, not the dice.

As Albert Einstein wrote on 29 April 1924 (p. 17 in [talk.pdf](#)): “I find the idea quite intolerable that an electron exposed to radiation should choose of its own free will (Sic! – D.C.), not only its moment to jump off, but also its direction. In that case, I would rather be a cobbler, or even an employee in a gaming house, than a physicist.” The electron does not have “free will”, of course. Instead, it **must** be fundamentally *underdetermined* and **flexible** (not “uncertain”) to facilitate the **quantum matrix** acting from the future.

As an example, “the miraculous identity of particles of the same type” (e.g., the **identical proton mass**), which is “a central mystery of physics” (John A. Wheeler in [MTW p. 1215](#)). Again, God casts the **die** (the **matrix**) — not the dice — to create the **identical proton mass**. The incredible precision in assembling the **identical proton mass** ([Wikipedia](#)) — the central mystery of physics — is nothing but **phenomenal**. The perfect quantum ‘template’ (called **matrix**), used to assemble the **identical proton mass**, cannot be made of matter — read [Leibniz](#). The central mystery of physics is only a preamble to the **physics of Life**. As Erwin Schrödinger wrote in 1944 (p. 4 in [Simple Quantum Mechanics](#)), “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”.

I suggested the solution to the measurement problem in QM textbooks — “how a superposition of many possible values becomes a single measured value” ([Wikipedia](#)) — twenty-four years ago (p. 9 in [video_101.pdf](#)). The ultimate ‘chooser’ in the **quantum world** — the **quantum matrix** acting from the future — solves the puzzle of missing collapsing agent in [Schrödinger’s equation](#). The *verdammte Quantenspringerei* ([Erwin Schrödinger](#)) are just artifacts from the *inanimate* measuring devices at the macroscopic world: dead matter makes quantum jumps; the living and **quantum matter** is smarter. In the example by Einstein from 29 April 1924 [above](#), the electron is not “uncertain” and prone to *Quantenspringerei*, but fundamentally *underdetermined* and **flexible**. Read p. 6 in [Simple Quantum Mechanics](#).

To sum up, the quantum-gravitational **matrix** — the potential **future** in the **arrow of Time** (p. 3) — does not act on the *physicalized* 4D ‘gloves’ (pp. 8-9 in [video_101.pdf](#)), but makes them **self-acting** (p. 1), like the **human brain**. Ultimately, the entire quantum-gravitational Universe is animated by its common **matrix** ([Slide 12](#)). Metaphorically, this is the living Brain of the Universe and your local **brain & mind** is embedded (p. 31) in It (not “Him”). With **light**, we can observe only the **self-acting** ‘thoughts’ of the Universe and their fundamental **flexibility** (not “uncertainty”): *anything* is possible. Perhaps one day (pp. 6-9 in [video_101.pdf](#)) we will learn how to tweak the **global Brain** by the **local brain** with **spacetime engineering**. Mark my words.

Demonstrations of [modified gravity](#) will be presented to the public in the summer of 2024. We urgently need new [clean energy sources](#) to avoid the [climate crisis](#). Time is [running out](#)!

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