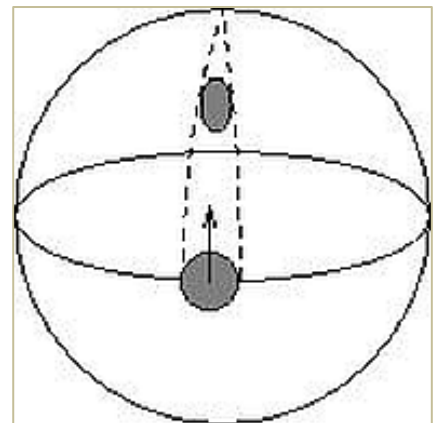


The curvature (if any) of spacetime: Can geometry produce work?

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.

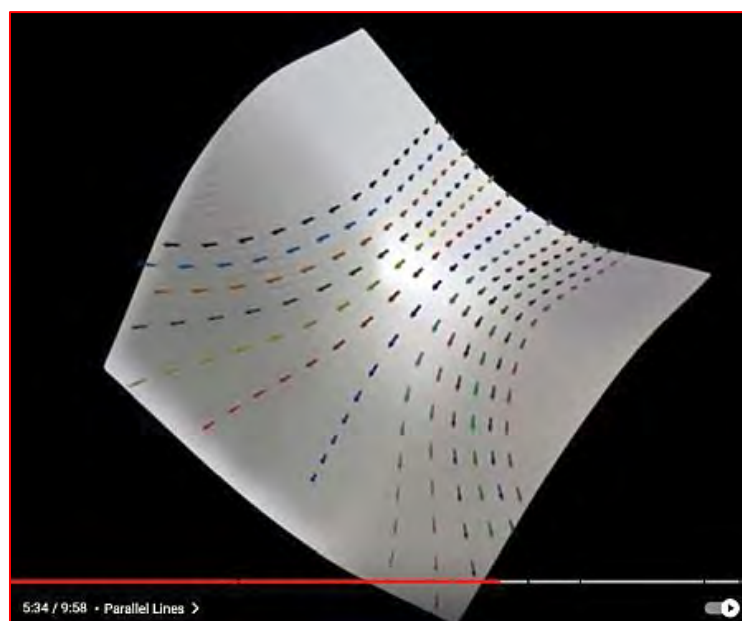
In GR, gravity is not a [force](#), so physicists suggest "geometrization" of the [work](#), performed by the [attractive gravity](#), with spacetime "curvature".

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." In fact, 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](#). Instead, 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 ([Michael Quackenbush May](#); read also [Wikipedia](#)):



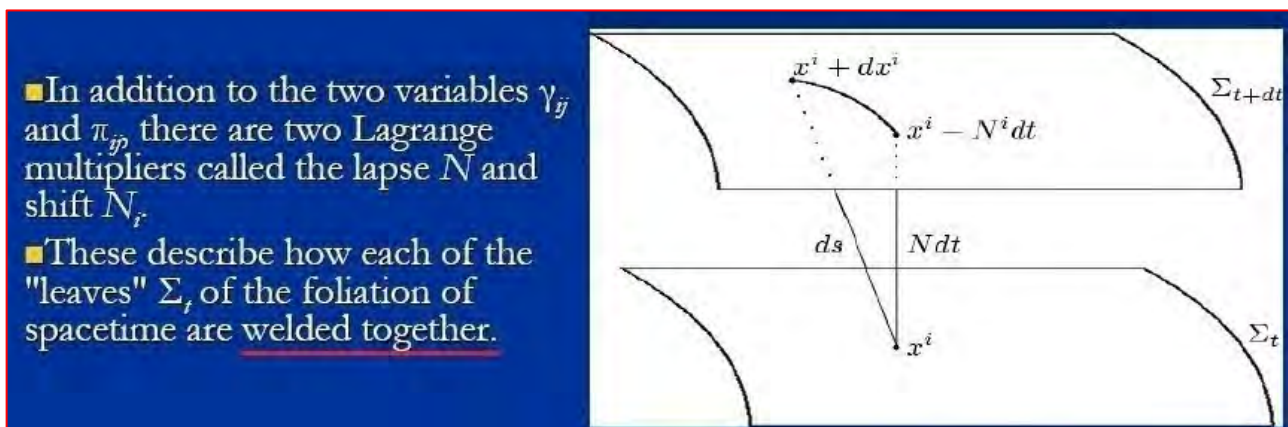
Instead of acknowledging the [work](#) by attractive-and-repulsive gravity in shaping the [cosmos](#), physicists resort to “[dark energy](#)”. Does the [work](#) by gravity in pulling up \uparrow the [ocean on Earth](#) show “dark attractive energy”?

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](#):

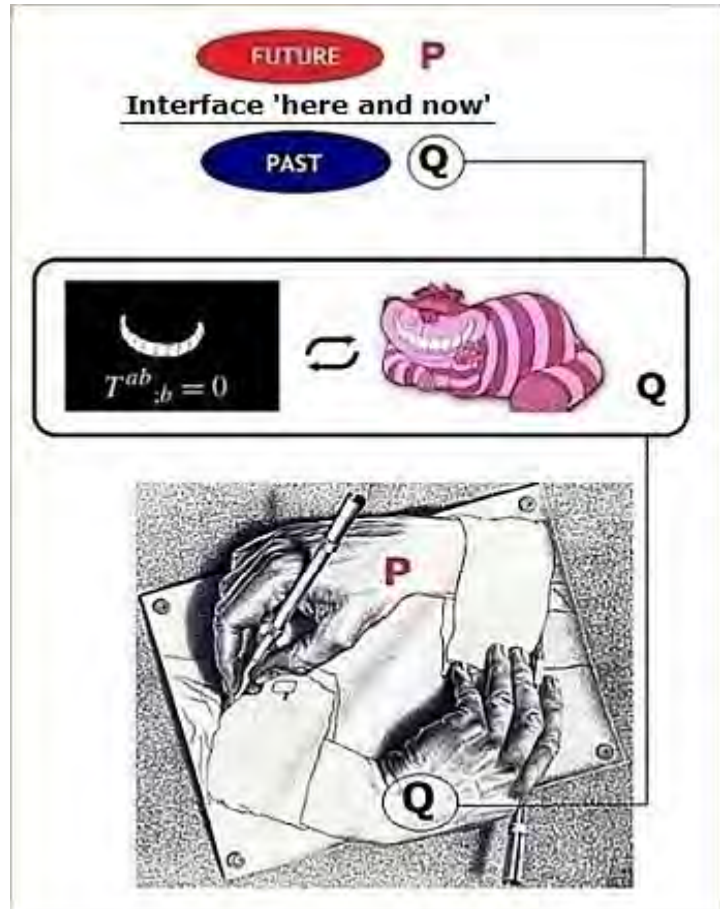


Time is ‘[change](#)’, so to define rigorously the so-called lapse and shift, you need the external ambient (white) background medium above, with respect to which the successive “leaves” are *both* separated by the infinitesimal dt ([Wolfram](#)) and “welded together” without any ‘[Zen gaps](#)’. You 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 my non-technical note on p. 1 in [dignity.pdf](#); more from [Hans Bauer](#).

Demonstrations of **modified gravity** will be presented to the public in 2024. We urgently need new **clean energy sources** to combat the **climate crisis**. Time is **running out!**

D. Chkalov

26 November 2023, 09:48 GMT