Can Penguins Drink Warm Water?

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Abstract
A gentle reminder of the origin of gravity and GW150914, with illustrations.


p. 4: “The lesson of these experiments would appear to be that gravity alters the way clocks run. Such a dependence of time on gravity would have been strange enough for the Newtonian view, but General Relativity is actually much more radical than that. A more accurate way of summarizing the lessons of General Relativity is that gravity does not cause time to run differently in different places (e.g., faster far from the earth than near it).

“Gravity is the unequable flow of time from place to place. It is not that there are two separate phenomena, namely gravity and time and that the one, gravity, affects the other. Rather the theory states that the phenomena we usually ascribe to gravity are actually caused by time’s flowing unequally from place to place.

p. 5: “The crucial point is that one can alternatively explain this essential attribute of gravity by assuming that time flows unequally from place to place, without calling into play any ‘force of gravity’ at all.”

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Read also John Baez, Struggles with the Continuum, 1 Feb 2018, arXiv:1609.01421v4 [math-ph]:

“One might hope that a radical approach to the foundations of mathematics – such as those listed above – would allow us to sidestep these problems. However, I know of no significant progress along these lines. (...) Is the continuum as we understand it only an approximation to some deeper model of spacetime? Only time will tell. Nature is providing us with plenty of clues, but it will take patience to read them correctly.”
It is extremely difficult to induce penguins to drink warm water (John W. Coleman).

Let me stress that “penguins” like W.G. Unruh, John Baez, and their colleagues have no choice: read the facts at p. 20, p. 25, and p. 39 in Can Geometry Produce Work.

There are three cats in quantum gravity: the grin of the Cheshire cat without the cat (as observed by Alice), the Schrödinger’s cat, and T.S. Eliot’s cat Macavity.

“Space acts on matter, telling it how to move. In turn, matter reacts back on space, telling it how to curve.”
J.A. Wheeler in MTW p. 5.

Picture the bare grin of the cat without the cat as ‘spacetime without matter’, which is being re-calibrated, ever since The Beginning, “in meters of light-travel time”: see Fig. 9 in Spacetime Physics by E.F. Taylor and J.A. Wheeler (1965, p. 18).

What phenomenon could possibly “calibrate” the ideal rods and clocks (MTW p. 397) that are pre-built in spacetime? For if we manage to tweak the matrix of light-travel time, we should be able to alter the rate of the light-travel time and reproduce all the effects of spacetime, called ‘gravity’ (W.G. Unruh).

As E.F. Taylor and J.A. Wheeler acknowledged: “We assume that every clock in the latticework, whatever its construction, has been calibrated in meters of light-travel time.” Calibrated? Can “penguins” understand the origin of gravity? Let me explain the puzzle.

Suppose you are at your terrace in a summer day. You look at the reading of your air thermometer, which shows 27° Celsius. The air temperature is caused chiefly by the
Sun (the Cheshire cat at the right-hand side of the drawing above), so if you decide to increase the reading of your thermometer locally, by heating it with a hair dryer to 37° Celsius (see below), the air temperature at your terrace will not increase.

People consider “intuitively obvious” that the bare grin of the cat without the cat, shown at the left-hand side of the drawing above, is like the powerless thermometer.

NB: But how about Earth tides? If you use GR (Wikipedia), how would you relate/convert the alteration of the rate (W.G. Unruh) of “meters of light-travel time” (E.F. Taylor and J.A. Wheeler) to the physical forces of Earth tides?

Not in GR. No way. You need to know the Platonic origin of gravitational energy. And much more (D.W. Sciama).

Read about the re-creation (Slide 1) and re-calibration of spacetime, ever since The Beginning (read above), at p. 25 and p. 39 in Can Geometry Produce Work. Follow the links.

There is nothing “fictitious” in gravity. Unlike the heating of the thermometer above, the tweaking of the complex phase (C.N. Yang) of what people call “quantum waves” does not require energy. My theory of quantum gravity is based on atemporal offer-and-confirmation waves (Slide 3), under perpetual non-conservation of energy. Here comes the so-called evolution equation. Will be happy to explain it in details.

On a side note, notice the similarity of the origin of gravity and the action of the human mind on its brain: both gravity and the mind can interact with their respective sources, yet neither gravity nor the mind can be physical stuff, for different reasons. Read the last paragraph at p. 15 in Time and Continuum: Zenon Manifold.

23 June 2020
Final version: 30 June 2020, 11:33 GMT
Questions and Answers

Q1. What’s the point you wish to make with the thermometer?

A1. In GR textbooks (Wikipedia), the gravitational energy is *wegtransformierbar*. Look at the drawing below: what do you see?

Obviously, this is an elephant walking on a tight rope, only it fell off *exactly* at the instant (Sic!) you looked at it, just like Eliot’s cat *Macavity*. Why? Because in the good old GR textbooks (MTW p. 467) the gravitational energy is *not* localizable. It is a weird “non-local” animal (H. Ohanian and L. Szabados). Hence the problem with explaining the Earth tides above.

Let me use another example. Suppose you heat up your coffee in a microwave “that heats and cooks food by exposing it to electromagnetic radiation in the microwave frequency range” (Wikipedia). If you *think* of EM radiation as gravity, you will make it a physical field. False. According to your GR textbooks, you may change — by hand — the coordinates of your coffee cup in the microwave to “freely falling coordinates” and turn off the “wegtransformierbar” (read above) microwave. Do you smell rat?

**Forget GR** (p. 45 in *Can Geometry Produce Work*). Read again ‘three cats in quantum gravity’ above. As an illustration (*not* explanation), consider a quantum-gravitational train, which has to reach Hamburg (B) from Munich (A), depicted below. The train will have to find its path by following the principle of least action, discovered by Gottfried Wilhelm von Leibniz in 1707 (no typo). How? By *anticipating* all potential railroads.

Why? Because the quantum-gravitational train does *not* have pre-determined railroad ahead. The train *creates* its own railroad, as it moves from Munich (A) to its infinitesimal next step (A + ∆t), until it *creates* its entire railroad to Hamburg (B) with the principle of least action. Click [here](#) to see how it works. This is the idea of *biocausality* from January 1990: read p. 6 in *Can Geometry Produce Work*. And since the train is quantum-gravitational object, all of its Platonic pre-geometric states (dubbed John) are “wegtransformierbar” and are nullified, leaving only their physicalized 4D “jackets”.

Details at the conference *GRAVITY 21* (pp. 25-26 in *Can Geometry Produce Work*).
Q2. Do you have experimental predictions? What can you “cook” with your theory?

A2. The theory has unique experimental predictions based on the so-called evolution equation. I hope to explain my equation in details at the conference GRAVITY 21 on 26-27 March 2021 in Munich (mentioned above). As to the second question, I believe can cook you a delicious dinner with my equation: spacetime engineering. If you are tempted to ‘drink warm water’, read again about the quantum-gravitational train and pp. 5-9 in Gravitational Energy.

Q3. Regarding the train above, what do you mean by Platonic pre-geometric states?

A3. Read p. 2 and p. 6 in Can Geometry Produce Work. The pre-geometric Platonic world (Res potentia) lives along the postulated axis $W$ erected at null intervals, depicted in the second drawing below. The first drawing shows the balloon analogy by Arthur Eddington (1933): every 4D point/event on balloon’s 4D surface belongs also to the nilpotent point from the radius of the inflating balloon. The axis $W$ is both along the unphysical radius of the inflating balloon and orthogonal to it (explanation here). It will be difficult to overestimate the importance of this crucial mathematical fact.

![Slide 2 from my talk at GRAVITY 21](image1)

Notice that the pre-geometric Platonic world along $W$ is always nullified in the squared invariant spacetime interval $\Delta s^2$ (R.M. Wald, Ch. 11, p. 286). If It (not “He”) were not nullified, one could detect a physical Aether and the Theory of Relativity will be demolished. People quietly ignore the fundamental asymmetry between time and space: all physical systems, even at rest in their reference frames, are evolving in Time (Fermilab), with different rates (W.G. Unruh). But with respect to what? To the pre-geometric Platonic world, which is always exactly nullified in the physical world on balloon’s 4D surface above. Perhaps one can locate the Platonic world by splitting the geometric point that “has no part” (Euclid), as explained at p. 9 in Can Geometry Produce Work. In my opinion, we need new numbers (called hyperimaginary numbers, $|w|^2 = 0$) to understand the Continuum. Any other ideas?

2 July 2020, 00:48 GMT
**Q4:** Can you explain gravitation?

**A4.** This question came on 2 July 2020 by text message from a good friend of mine in Greece (p. 31 in *Platonic Theory of Spacetime*). To my knowledge, nobody has so far explained gravity, because such explanation will require to reduce the energy from gravity to ‘something else’, e.g., to kinetic energy, like the way your coffee increased its kinetic energy in the microwave from the energy of EM radiation (see p. 4 above).

In my (not quite humble) opinion, gravitational energy per se does not exist in Nature, just as there is no vacuum energy per se in Quantum Field Theory (QFT). We observe only the physicalized mediators (Q) of vacuum energy, but never the underlying unobservable zero-point field itself. To quote Peter Milonni, “an atom, for instance, can be considered to be “dressed” by emission and reabsorption of “virtual photons” from the vacuum.” I suggested the metaphor of ‘hand in a glove’: we observe only the 4D physical ‘glove’ (Q), and never the Platonic ‘hand’ (also dubbed John) denoted P. Read about the transition P → Q at p. 2 in *Can Geometry Produce Work* (A3 above).

Thus, the physical energy from gravity poses highly non-trivial puzzle, firstly because of the universality of gravity: the set of all possible Qs from P → Q above includes all macroscopic objects with positive mass-energy, from apples (Newton) and Earth tides (p. 3 above) to rotating galaxies and beyond (p. 40 in *Can Geometry Produce Work*). Even today, many people strongly believe, for reasons I was never able to understand, that the mythical “gravitational waves” (Kip Thorne) can be detected after some “transfer of energy between the field and the detector” that “measures the energy carried away by the gravitational field” (Piotr Chrusciel).

No way José! We can only detect the physicalized mediators (Q) of the Platonic energy from gravity: the wegtransformierbar Platonic ‘hand’ (P) in a 4D ‘glove’ (Q). To use the example with the microwave (p. 4 above), your coffee will exhibit rotation (W. Zhao and L. Santos) due to attractive and repulsive gravity: watch a clip by Daniel Pomarède here. But you cannot detect the Platonic gravitational energy per se, just as you cannot detect “a zero-point field of infinite energy density” (Peter Milonni).

Back in October 1920 (excerpt here), Arthur Eddington spoke about ethereal energy possessing “the chief mechanical properties of matter—viz., mass and momentum”. In the context of my ansatz above, the energy-momentum and angular momentum are delivered by the physicalized mediators (Q) of the Platonic gravitational energy (P), like a Platonic ‘hand’ (P) in 4D ‘glove’ (Q).

As to GWs, you cannot employ them to perform any work whatsoever, as proven by Hermann Weyl in his widely known article from October 1944, entitled ‘How Far Can One Get With a Linear Field Theory of Gravitation in Flat Space-Time?’: “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 the linear stage.”

Yes, the gravitational radiation does exist, but to understand how it carries its own sources (unlike EM radiation, which does not carry its sources — charged particles) you have to abandon the linearized ‘spherical cow’ approximation of GR (J.G. Pereira). You need quantum gravity: read my endnote here. The physicalized gravity (Q) always carries its Platonic sources (P), which Einstein considered “a total field (Gesamtfeld) of as yet unknown structure” (p. 13 in Gravitational Energy):

“The right side is a formal condensation of all things whose comprehension in the sense of a field-theory is still problematic. Not for a moment, of course, did I doubt that this formulation was merely a makeshift in order to give the general principle of relativity a preliminary closed expression. For it was essentially not anything more than a theory of the gravitational field, which was somewhat artificially isolated from a total field (Gesamtfeld) of as yet unknown structure.”

See Escher’s ‘drawing hands’. To use John’s jackets metaphor, all mediators (Q) of gravity are just physicalized 4D “jackets” cast from their Platonic sources (P) called also Gesamtfeld (Albert Einstein). Hence the 4D “glove” (Q) always carries its “hand” (P): read p. 6 above. Notice that the interface ‘here and now’ in the so-called ‘atom of geometry’ (Slide 3) separates the Platonic Gesamtfeld (P) from its 4D “jackets” (Q), so that P and Q can preserve their ontologically different nature (Slide 1). Read again p. 9 in Can Geometry Produce Work and p. 5 therein, and A3 above.

Let me diagnose your knowledge in GR. Try to create “gravitons” by waving rapidly your arms like a Hummingbird, as suggested by Kip Thorne (no joke) in ‘Gravitational Waves and Experimental Tests of General Relativity’ from 7.09.2012, pp. 31-32:

Exercise 27.8 Problem: Gravitational waves from arm waving

Wave your arms rapidly and thereby try to generate gravitational waves.

(a) Compute in order of magnitude, using classical general relativity, the wavelength of the waves you generate and their dimensionless amplitude at a distance of one wavelength away from you.

(b) How many gravitons do you produce per second?
Go ahead and submit your manuscript to some peer-reviewed academic journal, e.g., Physical Review D (PRD). Don’t hesitate to use math as much as you can. Good luck.

To those interested in the linearized or ‘spherical cow’ approximation of GR and the “linear” perturbations of Minkowski spacetime, check out Lecture Notes on General Relativity by Stefan Hollands and Ko Sanders, September 2015, Ch. 14, pp. 107-119; their drawing below (explained at p. 117) shows the “energy flux” of GWs (if any).

All you need is to discover some GW “mirror” installed exactly at null-and-spacelike infinity, and you will be heading toward ‘isolated systems’ in GR, which nobody has been able to define. Read p. 150 in Piotr Chrusciel’s Elements of General Relativity (explanation here). Not surprisingly, the non-linear GWs (MTW p. 968) are ignored. Even Bondi’s ‘news tensor’, which estimates (under highly suspicious approximations) the alleged “energy flux” of GWs, is swept under the carpet by LIGO. Forget it. Can you observe pink unicorns dancing with red herrings (called for short GW150914)?

What did LISA Pathfinder actually “prove”? That one can have two cubes “isolated from all forces except gravity” (European Space Agency) in “purely geodesic” motion? This exercise wasted at least 450 million euros — all taxpayers’ money. Ridiculous. Yet the LISA launch (team members here) is planned for 2034. It will waste BILLIONS.

I thank Professor Dr. Dr. h.c. Bernard F. Schutz and Nobel Laureate Kip S. Thorne for their illuminating errors, which provided crucial (though unintended) help to my quest for understanding Time and gravity. Needless to say, this report reflects my personal, and perhaps strongly biased, opinion. I hope it will be scrutinized by many experts in differential geometry and topology at the international conference GRAVITY 21 on 26-27 March 2021 in Munich (p. 13 in Can Geometry Produce Work). Qui vivra verra.

4 July 2020
Latest update: 18 July 2020, 12:53 GMT
The Gravitational Matrix

I introduced (p. 2) the matrix of light-travel time, with which one can reproduce all effects of spacetime, called ‘gravity’. Let me try to explain.

In Platonic theory of spacetime (see chakalov.net), the notion of matrix (pl matrixes) refers to the Platonic world (Res potentia), suggested by Plato (p. 9 in BCCP):

We postulate that the Platonic world is a third type of reality, being the origin of both matter (Res extensa) and the noetic world (Res cogitans). In the drawing above, the atemporal Platonic matrixes are placed behind the “chained observers” like you and me, so we cannot turn around and see them. Why not? Because of the so-called “speed” of light: p. 20 and p. 9 (atom of geometry) in Can Geometry Produce Work.

The Platonic matrix is not physical stuff, like the one used e.g. in matrix molding, as an enclosure within which something originates or develops. And It (not “He”) is not mental stuff either. That is, we do not endorse the opinion of Max Planck in his 1944 speech Das Wesen der Materie [The Nature of Matter]: “There is no matter as such! All matter originates and exists only by virtue of a force which brings the particles of an atom to vibration and holds this most minute solar system of the atom together. We must assume behind this force the existence of a conscious and intelligent Geist (bewußten intelligenten Geist). This Geist is the matrix of all matter.”

Again, the Platonic theory of spacetime suggests three types of reality: physical (Res extensa), noetic (Res cogitans), and Platonic (Res potentia); for example, the matrix.
Subsequently, we unravel the Platonic matrix in (i) all biological systems (e.g., in the human brain, p. 5 in Gravitational Energy), (ii) the quantum world (p. 18 in Can Geometry Produce Work), and (iii) the macroscopic world governed by gravity (p. 2).

In all three cases, the Platonic matrix (A3 at p. 5) acts as an operator $P \rightarrow Q$: read p. 2 in Can Geometry Produce Work and notice the metaphor ‘hand in a glove’ at p. 6 above. It is manifestly impossible to fix spacetime boundaries without Platonic matrix (p. 10 in Can Geometry Produce Work) endowed with self-action (ibid., p. 6).

Let me elaborate on the gravitational matrix (iii). How is it possible to calibrate the spacetime in meters of light-travel time (p. 2)? Because the matter doesn’t matter.

According to the principle of locality, “to exert an influence, something, such as a wave or particle, must travel through the space between the two points, carrying the influence” (Wikipedia), no matter in extragalactic dust or in condensed matter. Thus, the ‘light-travel time’ of, say, 3.3 nanoseconds (p. 3) does not depend on how much physical stuff occupies the space between the points, as if light travels in “vacuum”.

Now we suggest gravitational matrix fixing 1s of light-travel time — regardless of the physical content of such spacetime region with size app. 299,792x10$^3$ m. Without the gravitational matrix fixing the ‘standard’ 1s of light-travel time, the spacetime will be a total mess, because it will depend solely and entirely on the physical stuff in it (the Cheshire cat in the drawing at p. 2). Recall, for example, that the operational definition of ‘one second’ is passed on radiation produced by the transition between the two hyperfine ground states of cesium (in the absence of any external influences such as the Earth’s magnetic field) with a frequency of “exactly 9192631770 Hz”, but no physical process could assemble any physical stuff to create an exact ‘one second’. Ditto to ‘one meter’. So, what keeps them ‘the same’ by fixing the invariant 1s of light-travel time? Only the gravitational matrix. The matter (the cat) doesn’t matter.

We suggest dynamical re-calibration of spacetime (p. 2) by the gravitational matrix, with which one can reproduce all effects of spacetime, called ‘gravity’ (W.G. Unruh). In one sentence, the spacetime is pliant and flexible, which is why it can be deflated and inflated by the gravitational matrix. Physically, the matrix is wegtransformierbar and is exactly nullified (p. 4). This is the unique feature of Platonic matrix, as the new third type of reality (p. 9), “just in the middle between possibility and reality” (Werner Heisenberg). Otherwise it will be some “dark” physical stuff. To use the analogy with the quantum-gravitational train at p. 4, it will have to be empowered by some idiotic “mystery matter”, which is sheer GR parapsychology (pardon my French).

Read the interpretation of “dark energy” and “dark matter” at p. 25 in Can Geometry Produce Work. Don’t miss the analogy with tweaking the air thermometer at pp. 2-3 above and the genuine gravitational radiation from Einstein’s Gesamtfeld, explained at p. 7 in GW150914. Try to suggest any other interpretation of gravity. Good luck.

To wrap up, let me offer my opinion of the current situation with the Platonic matrix.
For comparison, recall Michael Faraday, who suggested in 1852 a new type of physical reality called ‘field’, and the shocking idea of ‘line of force’ that can be stretched even “across a vacuum” (Wikipedia). But he was not exercising in metaphysics. He had a vast number of indisputable experimental facts in electromagnetism, but was not sufficiently fluent in mathematics. Luckily, James Clerk Maxwell, an outstanding mathematician, took on and in 1864 the electromagnetism was born. Our life changed two centuries ago for good, thanks to the revolutionary discoveries of these two men.

Fast forward to 2020. My first paper aimed at the physics of the brain (January 1990) did not attract any attention. I suggested the broadest form of relativistic causality, called biocausality, and a new field called causal field (p. 6 in Gravitational Energy), which also can be stretched ‘across a vacuum’. Here am not indulging in metaphysics either. The Platonic theory of spacetime (p. 9) is grounded on indisputable and widely known facts. No need to present my own experiments, like Michael Faraday did, to convince the present-day community of physicists. For example, the groundbreaking discovery by Charles Wilson in 1911. I was trying to get in touch with CERN for nearly three years, arguing that they need to reexamine the so-called Higgs boson, because they have missed an essential element of Nature: read the bold facts in p. 18 in Can Geometry Produce Work. And what happened? The talibans at CERN blocked my email address due to “phishing attacks”. I have never made any phishing attack, of course. They just lied. They may look quite civilized, but are in fact talibans. CERN talibans.

The talibans at LIGO are a bit different breed, as they never responded to my email messages. Check out the tantalizing experiment proposed by LIGO’s godfather at p. 7.

The latest feedback to my pre-geometric Platonic theory of spacetime reached me eight years ago, from Prof. Dr. Maurice de Gosson at the University of Vienna: “Buzz off, idiot!” (Mon, 21 May 2012 18:47:46 +0200). That’s it. I need James Clerk Maxwell.

The task is strictly mathematical. On 21 September 2008, commemorating 100 years of Hermann Minkowski’s lecture Raum und Zeit on 21 September 1908, I suggested two modes of spacetime: local (physical) and global (Platonic). The local mode is only the necessary condition for spacetime continuum endowed with causality and locality: “to exert an influence, something, such as a wave or particle, must travel through the space between the two points (Sic! - D.C.), carrying the influence” (p. 10). The global mode is the sufficient condition, because matter alone cannot make a spacetime. To quote Piotr Chrusciel, “space-time is a time-orientable Lorentzian manifold on which a time-orientation has been chosen”. But by what? It is not enough to have only “a wave or particle” (p. 10). The waves and particles belong to the local (physical) mode of spacetime, whereas the global (Platonic) mode is the complementary sufficient condition for spacetime. Matter alone cannot do the job. We need new physics. Once we unravel the hyperimaginary numbers, the world will change: p. 8 in GW150914.

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21 July 2020
Last update: 24 July 2020, 14:40 GMT