

The Atemporal Platonic World: Sub-Photon Spacetime Vacuum

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Abstract

Introduction to the atemporal Platonic world 'It', emerging from [sub-photon](#) spacetime vacuum.

To reveal the *atemporal* Platonic world (p. 11 in [about spacetime.pdf](#)), called here 'It', I postulate new topology, structure, and dynamics of every dimensionless geometric point — "that which has no part", [Euclid](#). Instead of adding new 'ideal points' to spacetime (p. 23 in [BCCP](#)), I suggest **Platonic** structure of **all** points in spacetime: the apex of Minkowski cone (pp. 16-17 in [zenon.pdf](#)) is believed to possess non-trivial topology, structure, and dynamics due to the Heraclitean [flow of events](#). The latter is modeled with an axis **W** that is "orthogonal" to 4D spacetime (p. 21-23 in [BCCP](#)), and is "raised" at [null intervals](#). I will briefly mention the implications to Quantum Theory¹ and will focus on two unsolved issues in [General Relativity](#): (i) the coupling of geometry to matter and (ii) the definition of spacetime "at infinity", which is *condicio sine qua non* for understanding the [positivity mass conjecture](#) viz. the [non-trivial](#) localization of gravitational energy in the first issue (i). Once we accept the premise that geometry can **act** on matter, "telling it how to move" (John Wheeler, p. 4 in [colorless.pdf](#)), we face the century-old problem with the *origin* of gravitational energy: on the one hand, it must not be [identical](#) to that of matter and fields in the right-hand side at Einstein field equations ([EFE](#)), but on the other — only matter can **act** on matter. The problems is still unsolved, even since the efforts by Gunnar Nordström in 1914 (p. 15 in [zenon.pdf](#)), and I am happy to report its unique solution, based on the *atemporal* **Platonic** world 'It'.

How can matter become *gravitalized* in order to **act on itself**? Let's examine the [geodesic hypothesis](#).

Do not introduce [Killing vector field](#) by hand ([R. Penrose](#)). Get professional and read [T. Padmanabhan](#):

Thus, for a single particle, the condition $\nabla m T^{mn} = 0$ is equivalent to a geodesic equation. As we have already seen, the geodesic equation is capable of encoding the effect of external gravitational field on a material particle and — in general — will not lead to any conservation law. It follows that the equation $\nabla m T^{mn} = 0$ describes the way material systems are influenced by external gravity and, of course, is not a conservation law either.

More from [H. Bondi](#), [H. Ohanian](#) and [L. Szabados](#), [C. Rovelli](#), and [J. Butterfield](#) and [C.J. Isham](#). Thus, the geodesic hypothesis (read Alan Rendall [here](#)) is still a mystery, ever since the inception of GR. But instead of **solving** this mystery, the GR "experts" from LIGO wasted over **450 million EUR** for their so-called [LISA Pathfinder](#), only to **confirm** the existence of geodesic mystery, as known since the inception of GR.

Read p. 6 (last) in [GW150914: Pink Unicorns Dancing with Red Herrings](#).

The fact mentioned by [H. Ohanian](#) "the standard form of a conservation law, $\partial T_{\nu}^{\mu} / \partial x^{\mu} = 0$, which shows that the gravitational field delivers no energy or momentum to the nongravitational matter" **ANYMORE**, is explained in my endnote [therein](#). As I stressed previously, the *atemporal* **Platonic** world **cannot** have metric properties ([C. Rovelli](#)). If you decide to somehow eliminate the *atemporal* **Platonic** gravity, you will end up with a **physical** gravitational field, which guides (Sic!) the material particle along its timelike path.

It will be like you order a pizza from the nearby restaurant (the *left-hand* side at [EFE](#)), and once it is delivered at your doorstep you bring *exactly* the same pizza in your kitchen (the *right-hand* side at [EFE](#)).

No way. Thus, the mathematical fact that GR "is consistent with the local conservation of energy and momentum" ([Wikipedia](#)) **requires** (not "implies") that GR is inherently [nonlocal theory](#) consistent with perpetual **nonconservation** of energy and momentum. To quote [Hermann Bondi](#), "In relativity a non-localizable form of energy is inadmissible, because any form of energy contributes to gravitation and so its location can in principle be found." Yes, "its location can in principle be found" — once-at-a-time denoted with τ ([C. Rovelli](#)). Nature creates *perfectly* localized and **gravitalized** stress-energy-momentum and

angular momentum at every instant τ read with a clock, as the *atemporal Platonic* gravity delivers no energy-momentum to the nongravitational matter **ANYMORE**. Will do it again, at the *next* instant τ : see Fig. 3 at p. 3 in [matter-matter.pdf](#) and read p. 4 [therein](#).

Check out again my endnote in [H. Ohanian and L. Szabados](#). We need quantum gravity based on the *atemporal* pregeometric **Platonic** world¹ (pp. 5-6 in [colorless.pdf](#)). **It** resembles the old Aether (p. 27 in [zenon.pdf](#)), but is placed infinitely far away "at null infinity": no *physical* object, including a light beam, could reach **It**, ever. Thus, **It** is physically unobservable *atemporal* pregeometric **Platonic** world, which (not "Who") wraps the *entire* physical world at actual/completed infinity, up to null- and spacelike infinity.

And now we can define the *entire* physical world as '[isolated system](#)' that is [isolated](#) from **It**, ... and **by It**.

Notice that **It** refers to the 'still-not-squared' **radius** of the "inflating balloon" in Fig. B at p. 21 in [BCCP](#), thanks to which we have *atemporal* (global) 'change of space' along **W** as well (cf. [matter-matter.pdf](#)).

We define 'the *entire* physical world' *relationally*, but in such way that its physical, 4D spacetime can be immersed into 'something else' ([C.J. Isham and J. Butterfield](#)), called here '**It**'. Otherwise we face the paradox of [infinite regress](#), also known as '[turtles all the way down](#)' (p. 5 in [colorless.pdf](#)). Needless to say, the **Platonic 'It'** is *pregeometric* entity residing "[inside](#)" every 4D geometric point/event *as well*.

NB: The spacetime manifold ([Zenon manifold](#)) includes the *pregeometric* Platonic **It** (denoted with **W**), which creates "some kind of boundary, or margin, which is not part of the space-time but that, somehow, it is accessible from within it" ([José Senovilla](#)). The *asymptotic* properties of the physical spacetime and fields can be investigated by studying **W** at '[finite infinity](#)' (FI), as well as the *local* behavior of fields at **W**. This is the proposal to the topology of *spacetime* (p. 11 in [BCCP](#)), matching its [structure and dynamics](#).

Plato suggested **It** many centuries ago. **It** is the sole option for quantum gravity. Don't use [tensors](#) to model the properties of gravity. We need *atemporal Platonic* quantum-gravitational waves and their *physicalized* "[jackets](#)". If you disagree², I will leave you in the company of [S. Weinberg](#) and [R. Penrose](#).

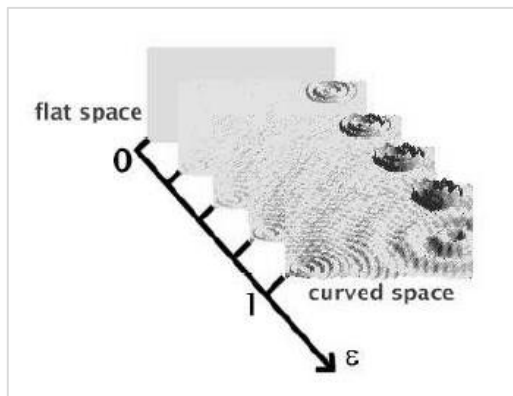
Comments

1. **It** is not some mythical "unphysical" spacetime manifold à la [Penrose](#). **It** (not "He") is neither matter (*Res extensa*) nor mind (*Res cogitans*): read the doctrine of trialism at p. 25 in [BCCP](#) and in [colorless.pdf](#). The Platonic **matrix** is presented as 'John' in [Schrödinger's cat](#), and with a new kind of '**zero**' in [Macavity cat](#). In symbolic terms, $\mathbf{1} + \mathbf{0} = \mathbf{1}$: all "[probabilities](#)" for observing [John's jackets](#) sum up *exactly* to **1**, whereas the chance to observe 'John' as Platonic **matrix** is *exactly zero* (e.g., point **A** at p. 10 in [BCCP](#)). Read Erwin Schrödinger at p. 6 in [BCCP](#) and pp. 13-14 therein. Details at p. 6 in [The Physics of Life](#) and at p. 27 in [BCCP](#). The entire Universe is non-relational **ONE** entity. **It** can be reached only with [Mathematics](#).

Compare the Platonic theory of spacetime (read **NB** [above](#)) to the trick attempted by [R. Penrose](#) with some *unphysical* manifold that has *finite* hypersurface: see his [Fig. 1](#). To understand the trick, recall that in calculus we always employ the *completed/actual* infinity, so [we don't care about how exactly](#) we obtain final results. Here's the old story about an *infinite* number of thirsty mathematicians entering a pub (p. 2 in [Penrose diagram.pdf](#)). The first one says to the bartender: 'We all will drink from one glass,' and orders a pint. The second one orders a half pint, the third one a quarter pint... 'Got it,' says the bartender, and pours two pints. Clever story, but notice that all *spacetime points* from the glass holding two pints of beer are embedded in, and belong to the *larger* pub, which is why one can introduce **metric** and define a *finite* glass. R. Penrose, however, eliminated the pub and suggested a *finite* 'two pint' hypersurface "at infinity", which required some *unphysical* spacetime manifold "mapped" to Minkowski spacetime "at infinity". The asymptotic structure of Minkowski spacetime ([G. Compere](#)) is still [mathematical jabberwocky](#). There can be no *physical* stuff "at infinity", in the first place. We need 'finite infinity' (FI): read [below](#). Simply replace the alleged "non-geometric properties at the boundary of the unphysical spacetime" ([G. Compere](#)) with the *pregeometric Platonic* world '**It**': the entire *physicalized* world will be [isolated](#) from **It**, ... and **by It**. Think of the latter as numerically finite yet *physically* unattainable **cutoff**, like [absolute zero](#) temperature. The *physicalized* 4D spacetime can only tend *asymptotically* toward its **cutoff**. No physical particle can *actually* reach **It** and inevitably **stop** (Sic!) there, neither "inside" the [infinitesimal](#) nor *exactly* "at infinity", because its state will be fundamentally **UN**decidable, like [Thomson's lamp](#) and 'John' in [Schrödinger's cat](#).

2. Look at eq. (7.6.1) by [S. Weinberg](#), in which " $h_{\mu\nu}$ vanishes at infinity". What kind of "limit" is that? To illustrate this *effective* "limit", suppose you make BBQ at your backyard. It is a hot summer day and your air thermometer reads 28°C. You measure the temperature *very* close to your BBQ and the thermometer reads, say, 60°C. Then you walk away from the hot BBQ and notice that the air temperature decreases, until it reaches 28°C, at 5m from the BBQ, and at this point it **stops** there. You are "sufficiently" faraway, *exactly* 5m from the BBQ, and at this point the thermal effect from the BBQ is **zero**.

People like [S. Weinberg](#) and [R. Penrose](#) use the same *effective* "limit", only now " $h_{\mu\nu}$ vanishes at infinity" at which " $\Omega = 0$ " — not at *finite* distances, 5m from the BBQ or 'two pint beer', as in the examples [above](#). In the unfortunate *linearized* approximation of GR ([S. Weinberg](#)), the "intuitively clear" parameter ϵ , shown in the first drawing below, simply *cannot* exist ([M. Maggiore](#)). As I stressed [previously](#), ϵ has been "derived" from something we do **not** know (p. 4 in [B. Schutz](#)), by sheer wishful thinking and imagination.



The very idea of GWs as "metric waves" that are supposedly "empty" of *any* material content is nonsense. It will be like the grin on the face of Cheshire cat, but *without* the cat: read 'the three cats in quantum gravity' at p. 4 in [colorless.pdf](#). There are no "empty" [de Broglie waves](#), propagating in spacetime but not carrying energy or momentum and not associated with *any* particles. But the same type of 'ghost waves' are suggested by [Kip Thorne and his collaborators](#). Why? Because GWs are not *physical* waves, like in the example with ordering a pizza [above](#). Instead, GWs are made of mythical "gravitons" ([Kip Thorne](#)), which propagate **within themselves** only. Why? Because GWs **cannot** propagate in any *physical* medium, like [EM waves](#). Why not? Because the [linear](#) GWs *cannot* transport energy: the gravitational "field" does not carry energy-momentum. It just can't. If it could, gravity will become *physical* field ([pizza](#)) and will have to be placed in the right-hand side of [Einstein field equations](#). Read p. 24 in [BCCP](#) and p. 13 in [zenon.pdf](#). Period.

Going back to the new [topology of spacetime](#): in many (but not all) cases you may use the murky "local differential geometry" ([R. Geroch](#)) and all is sweet, but you are sweeping the garbage [under the rug](#). The 'garbage' is the crucial **error** ϵ ([Augustin-Louis Cauchy](#)) in "reaching" *the* limit "at infinity" (if any), which Bishop Berkeley called '[the Ghosts of departed Quantities](#)': notice $R_\infty = \emptyset$ in the drawing [here](#) by George Lakoff and Rafael Núñez and read pp. 6-8 in [st_eng.pdf](#). Bartenders (read [above](#)) need not be interested in Mathematics, but mathematicians who *think* like bartenders are not welcomed here. The only way to 'have our cake and eat it' is with *finite infinity* (FI): we include **absolutely all** ($R_\infty = \emptyset$) points in the two-pint beer [above](#) with actual/completed infinity and place this *physicalized* object in the irreversible **past** from the [Heraclitean flow of time](#), whereas the never-ending *potential* infinity is booked for the *atemporal* **Platonic** state placed at the potential **future** of *the same* object evolving along the [flow of time](#). We use *two* forms of reality: physical in the irreversible **past**, and **Platonic** in the potential **future**. This is 'the atom of geometry' equipped with FI: see Fig. 3 at p. 16 in [zenon.pdf](#) and read p. 9 in [BCCP](#). If true, one can expect radical corrections to the current [point-set topology](#), [set theory](#), and [number theory](#). If the current differential geometry and [topology](#) can be amended with the new *hyperimaginary* numbers in the atom of geometry, perhaps we can develop quantum geometry and quantum spacetime (p. 27 in [BCCP](#)). The task of building the so-called Zenon manifold equipped with **W** (read [above](#)) is highly non-trivial.

Hint: start with [Kähler manifold](#) in which the [Hermitian metric](#) vanishes asymptotically at $d\Omega = |\mathbf{w}|^2 = 0$. Once I get it right, I will retire and [have a beer!](#) Meanwhile I will leave my "[thirsty colleagues](#)" with the tantalizing question "what *are* the correct general-relativistic conserved quantities?" ([Adam Helfer](#)).

Let me use the opportunity to stress that the true [theory of gravity](#) *cannot* be bona fide classical theory. To quote [Mihaela Iftime](#): "Theories like QED, QCD are theories on a fixed (flat or curved) background space-time metric. GR or in any general relativistic theory on the other hand are distinguished from other dynamical field theories by invariance under "active" diffeomorphisms; its field equations are invariant under all differentiable diffeomorphisms (the group $\text{Diff}(M)$) of the underlying manifold M , which have no spatio-temporal significance **until** (emphasis added – D.C.) the dynamical fields are specified."

Thus, the dynamical fields *become* "specified" at every instant from the *physical* time τ ([C. Rovelli](#)). The dynamical fields are not like a pizza (read [above](#)). Surely the true theory of gravity *cannot* be bona fide quantum theory either. Yet how can '[John the Platonic gravity](#)' cast its *physicalizable* 4D "[jackets](#)" along a continual [timelike geodesic](#)? Are these "[jackets](#)" *conserved* (p. 9 in [BCCP](#)) at each **individual** 4D instant from the *physical* time τ ? This is the geodesic mystery [above](#), as known since the inception of GR. It has to be resolved along with another geodesic-like mystery known since 1911, thanks to [Charles Wilson](#).

Many years ago, in October 2002, I was struggling with the well-known mathematical fact spelled out by Mihaela Iftime [above](#), and asked, very politely indeed, [Britain's greatest quantum gravity expert](#) for help: "please explain to me what kind of time is implied by 'moving points around' in $\text{Diff}(M)$ -invariance, and how can your wristwatch read it." The reply I got from him was more than elusive, to say the least, and I continued to ask GR experts for help. The last feedback hit me ten years later, in May 2012, from Prof. Dr. [Maurice de Gosson](#) at the University of Vienna: "Buzz off, idiot!" (Mon, 21 May 2012 18:47:46 +0200).

Any other suggestions? The issue here "is not the existence of gravitational energy, but the localizability of gravitational energy" ([MTW p. 467](#)). Yes, it is *localizable* ([J.L. Synge and H. Bondi](#)), but one cannot solve the puzzle with [tensors](#) (p. 14 in [BCCP](#)). Again, we need *atemporal Platonic* quantum-gravitational waves and their *physicalizable* "[jackets](#)", which are *conserved* at each **individual** 4D instant from the *physical* time, as read with your wristwatch (p. 9 in [BCCP](#)). Thus, the *localizability* of gravitational energy might be explained iff we solve the underlying puzzle of *positive* energy density viz. the [positivity mass conjecture](#). The [energy conditions](#) are introduced by hand. Why is that we observe only [positive energy density](#)? Can we tweak the mechanism producing *positive* energy density only (p. 3 in [BCCP](#))?

Can we access the [still-not-squared](#) *atemporal Platonic* quantum-gravitational waves inside [null intervals](#) ($x^2 = (\pm ct)^2$), at **sub-quantum** & **sub-photon** level? Read pp. 3-4 in [How to Bind Matter to Matter](#) and **NB** [above](#).

Watch 'Spacetime Engineering 101' (app. 20 min, password protected) on 15 January 2020 at 10:30 GMT. To obtain the password, follow the instructions at pp. 2-3 in [Spacetime Engineering](#). The main talking points:

- The need for *atemporal Platonic* reality¹ in all living organisms (p. 1 in [How to Bind Matter to Matter](#)): **It** (not "He") is presented as 'potential future' depicted with the carrot in the drawing below.



In the case of the [human brain](#) endowed with consciousness and volition, you only have to swing the carrot (*potential future*) toward your desired destination, and the donkey will carry you *and* the cart there. This is 'Spacetime Engineering 101'.

- The need for *atemporal* quantum-gravitational **Platonic** reality¹: the **matrix** (pp. 8-9 in [q_coin.pdf](#)). The [Platonic theory of spacetime](#) has specific predictions, demonstrated by many individuals and uploaded at YouTube (p. 7 in [colorless.pdf](#)). My proposal to harness the “[anomalous](#)” gravitational rotation is shown in Fig. **E** at p. 18 in [BCCP](#).

- The need for spacetime engineering: p. 8 (last) in [colorless.pdf](#).

5 January 2020

Last update: 21 January 2020, 21:43 GMT

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Post scriptum

Thirty-three years ago, on 5 February 1987, I suggested *atemporal* quantum reality to explain the physics of the brain (p. 4 in [Penrose-Norris Diagram](#)). Three years later, on 15 January 1990, I launched a new form of causality, dubbed *biocausality* (abstract [here](#)). As of today, 5 February 2020, nobody has shown interest in my [endeavors](#). Nobody subscribed to watch ‘Spacetime Engineering 101’ from [15 January 2020](#) either. It was announced in February 2019, and was communicated to a great many mathematicians and theoretical physicists. As of today, none of them has even confirmed the receipt of my email message, by saying something to the effect that ‘I am too busy go to hell’ or directly “buzz off, idiot!” (read [above](#)).

Why am I casting pearls before swine ([St. Matthew](#))? Because of our kids. Firstly, they are not [sheeple](#), and secondly — they face staggering problems, just ten years from now: read p. 28 in [BCCP](#) and p. 8 (last) in [Spacetime Engineering 101](#). The price of climate change *inaction* could hit [1.2 trillion USD](#).

Here is the timeline, after [Max Planck](#) (emphasis mine): “An important scientific innovation rarely makes its way by gradually winning over and converting its opponents. What does happen is that its opponents *gradually* die out and that the growing generation is familiarized with the idea from the *beginning*: another instance of the fact that the future lies with youth.”

Yes, the next generation will be familiarized with the [Platonic theory of spacetime](#) from the beginning, but we cannot wait another 20+ years. Time is running out. We need spacetime engineering **right now!** I do hope that in the near future some of the people reading these lines with [speak up](#). The sooner the better.

One last word about the current mathematicians and theoretical physicists mentioned [above](#). I consider them [sheeple](#), because they are unable to keep an open mind. Just one example (p. 3 in [colorless.pdf](#)): the operational definition of ‘one meter’ ([BIMP](#)) as “the length of the path travelled by light in **vacuum** (Sic! – D.C.) during a time interval with duration of 1/299 792 458 of a second.” Do you smell rat?

In classical physics, there is no “vacuum” as “space devoid of matter” ([Wikipedia](#)), just as there is no grin on the face of Cheshire cat, but *without* the cat (p. 4 in [colorless.pdf](#)) — [EM radiation](#) belongs to ‘**the cat**’. Yet [sheeple](#) talk about “the speed of light in vacuum” ([Wikipedia](#)), meaning some fictitious “region with no charges ($\rho = 0$) and no currents ($\mathbf{J} = \mathbf{0}$), such as in a vacuum” ([Wikipedia](#)). There is no such animal.

The only stuff that is “waving” is the *physical* world: ‘**the cat**’. The “classical vacuum” is red herring. Can we replace this sort of ‘[ground state](#)’ with a putative [sub-photon](#) spacetime vacuum (p. 6 in [colorless.pdf](#))?

There is no *physical* Aether in the [theory of relativity](#), which could be inserted “**between**” photons:

[[one photon](#)] **between** [[one photon](#)] **between** [[one photon](#)]

See the “quantization” of spacetime in Fig. **3** on p. 3 in [How to Bind Matter to Matter](#). One may *not* speak of motion *in relation to* (Sic!) the [luminiferous Aether](#), but this observational fact only **requires** that the *atemporal* Aether, called here ‘**It**’, *cannot* exist as physical reality, such as [EM radiation](#) *within* ‘**the cat**’.

Namely, 'It' does not exist as *physical* reality "**between**" [photons](#), just as quantum waves endowed with complex phase do not exist as *physical* reality "**between**" [quantized fields](#) (p. 2 in [BCCP](#)). Why not? Because **It** does not live **anywhere** on the [light cone](#): the probability of observing **It** is **exactly zero**¹. Just like *the* quantum state [John](#), **It** offers "no resistance to bodies passing through it" ([Wikipedia](#)). Bingo!

NB: This is how **It** is [hidden](#) to *direct* observation. **It** has physical manifestations only *within* '**the cat**', yet **It** *cannot* be derived *exclusively* from '**the cat**'. The fictitious "space devoid of matter" ([Wikipedia](#)) is just like 'time devoid of matter' — they cannot exist as *physical* reality. We talk here about a Platonic **hand** in 4D "glove" (p. 5 in [colorless.pdf](#)).

Thus, the [luminiferous Aether](#) is not *physical* reality "**between**" photons, but *atemporal* **Platonic** reality¹, thanks to which its *physicalized* "[jackets](#)" (dubbed [photons](#)) travel in [spacetime](#) with [invariant speed](#). Ever since [1905](#), people *postulate* that "objects travelling at speed **c** in one reference frame will **necessarily** (Sic! – D.C.) travel at speed **c** in all reference frames" ([Wikipedia](#)), without making any effort to explain **what** phenomenon could **determine** the *invariance* of "speed **c** in all reference frames". As of today, the universal invariance of "speed **c** in all reference frames" is a plain "miracle" backed *only* by a [postulate](#): read again E.F. Taylor and J.A. Wheeler at p. 3 in [colorless.pdf](#). Unlike [sheeple](#), I don't accept "[miracles](#)".

Thirty-three years ago, on 5 February 1987, I argued about *atemporal* quantum reality, ensuing from the facts we know from Erwin Schrödinger (p. 6 in [BCCP](#)), but the Bulgarian [sheeple](#) told me to just get lost (p. 4 in [Penrose-Norris Diagram](#)). And the balkanization of Physics is still alive and well: read [above](#).

Don't give oxygen to sheeple. Don't cast pearls before swine. If you do, they may trample them under their feet, and turn and tear you to pieces ([St. Matthew](#)).

Again, all this is because of our kids, as explained [above](#). We *must* fight for their future. I feel like being brutally forced, along with my children and grandchildren, to take seat in a rubber boat, surrounded by a bunch of crazy idiots, who enjoy rafting on a mountain river toward a [gigantic waterfall](#). I can only shout at these morons to stop immediately *our* boat, before it is too late. For if we pass the [tipping point](#) in 2030 — only **ten** years left! — we will be dead close to [Climageddon](#) and [WWIII](#).

Don't even think that WWIII cannot happen because the governments were "smart". They are not.

D. Chakalov

5 February 2020, 10:30 GMT