



Subject: Re: The "radial coordinate r " in Hilbert-Droste-Weyl **red herring**
Date: Tue, 10 Mar 2015 06:39:31 +0200
Message-ID: <CAM7EkxmHY4hH_cSwpTD61p35a_8AH2f_+s4038jHquj67Jsk9g@mail.gmail.com>
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Cc: Wei-Tou Ni <weitou@gmail.com>,
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[snip]

P.S. No physical stuff can "causally communicate with infinity" (cf. excerpt attached, from D. Brill, History of a black hole horizon, Grav. & Cosmol. 20 (2014) 165-170), firstly because nobody can define "infinity" in the first place. No, the conformal recipe of Penrose from January 1963 is for the birds -- I can prove it. But you will have to read and think. Can you? How about your distinguished colleagues?

D.C.

On Tue, Mar 10, 2015 at 5:54 AM, Dimi Chakalov <dchakalov@gmail.com> wrote:

>
> Fred,
>
> Your latest arXiv:1503.02172v1 [gr-qc] is full of errors. You should
> have made your homework about that "radial coordinate r " in
> Hilbert-Droste-Weyl solution -- nothing to do with Karl Schwarzschild.
> Check out Steven Weinberg's 'Gravitation and Cosmology' (July 1972)
> and Angelo Loinger, The Black Holes do not exist - "Also Sprach Karl
> Schwarzschild", [arXiv:physics/0402088v1](http://arxiv.org/abs/physics/0402088v1) [physics.gen-ph].

>
> More at
> <http://www.god-does-not-play-dice.net/comments.txt>

>
> D. Chakalov

Attachment:

http://www.god-does-not-play-dice.net/Brill_BH.jpg

Note: As Angelo Loinger explained in [arXiv:physics/0402088v1](http://arxiv.org/abs/physics/0402088v1), "within the spatial surface $r = 2m$ (a singular locus) the time co-ordinate takes the role of the radial co-ordinate, and vice versa (and therefore ds^2 loses its essential property of physical appropriateness) and the solution becomes non-static." Further he stressed that "as far back as 1922 all the competent scientists knew the right interpretation of the standard Hilbert-Droste-Weyl-form. Indeed, in 1922 a meeting was held at the College de France, which was attended by Einstein."

So all mathematical facts were known by 1922, well before all people reading these lines were born. Karl

Schwarzschild did not suggest any "black hole" (D. Rabounski, p. 102). This whole mess started after a mistake by David Hilbert in December 1916, as demonstrated by Leonard S. Abrams in [arXiv:gr-qc/0102055](https://arxiv.org/abs/gr-qc/0102055) and [arXiv:gr-qc/0201044](https://arxiv.org/abs/gr-qc/0201044).

Besides, nobody has tried to revive the singularity theorems ("the existence of incomplete and inextendible curves", J.M.M. Senovilla, [Sec. 2](#)) in the presence of "dark matter" and "dark energy" at "[point mass](#)". The dynamics of gravitational energy *at every point* from geodesics is complicated (see [Explanatory Note below](#)), so let me instead offer some simple ideas.

Every bartender knows what is 'actual infinity':

An infinite crowd of mathematicians enters a bar. 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.

Every carpenter can understand what is 'Archimedean topology': if you have two timbers of different size, say, $A = 3\text{m}$ and $B = 10\text{m}$, you can always find a positive integer $0 < k < \infty$, such that if you multiply the smaller A by k , you can produce a timber *larger* than B , say, if $k = 4$, then $4 \times 3 = 12 > 10$. But you can never reach some "infinite large" timber and **stop** there, as in the case of *the* largest two-pint beer above. Ditto to the opposite case of going toward "zero timber". Hence the Archimedean topology is equivalent to *potential* infinity ([Eric Schechter](#)), while the actual/completed infinity is not.

As I said above, the conformal recipe of R. Penrose from 15 January 1963 (Asymptotic Properties of Fields and Space-Times, Phys. Rev. Lett. 10 (1963) 66-68) is for the birds. See what he wrote in 1964:

http://www.god-does-not-play-dice.net/Penrose_omega_zero.jpg

Notice the condition $[\omega] = 0$, which makes the endpoints at infinity unphysical and UNdecidable. Besides, no conformal transformations could help you avoid the Archimedean topology, so you cannot reach "endpoints" at infinity and will *always* proceed further, *ad infinitum*. I believe every carpenter can understand this.

You can have 'the largest beer' of two pints perfectly defined by *actual* infinity, because you're working within a physical world with defined metric, hence the Archimedean topology is perfectly valid. But then you have *borders between* *the* largest beer (denoted with two **red** dots fixing the **closed** interval in the drawing below) and the rest of the world (ambient environment), defined by the **metric**.



The two **red** dots belong *both* to 'the largest beer' *and* to the ambient environment

Not so for the "infinity" of the spacetime itself. In the case of spacelike infinity (spi), there are some murky calculations suggesting that it might be "placed" at 10^{90} km ([Martin Walker](#)). This is *the* largest spacetime, and if you manage to unite it with null-infinity at $[\omega] = 0$, it will border some "ambient environment" that is **not** spacetime (the largest beer) anymore. **Forget it.**

Thus, you have to start your journey from the endpoints at null-infinity, to find out whether you might hit some "event horizon", but *nothing* could "causally communicate with infinity" (cf. the excerpt above, from Dieter Brill) and define the "entire future history of the spacetime" [[Ref. 1](#)]. In the first place, *nothing* could possibly define **borders at infinity**, except for the *nothingness* itself. And even if you could, all physical stuff in the *entire* spacetime will be short-circuited with the *nothingness*. No, you cannot define '**borders at infinity**'. It's an oxymoron.

No way Fred. No way Dieter. No way Roger. Forget it.

D. Chakalov

March 10, 2015

Last updated: June 2, 2015, 13:02 GMT

[Ref. 1] Dieter Brill, Black Hole Horizons and How They Begin,
Astronomical Review, 19 January 2012.

<http://astroreview.com/issue/2012/article/black-hole-horizons-and-how-they-begin>

"The reason for this odd behavior lies in the very definition of a black hole horizon, which is based on the future of the spacetime in which it lives. Rather than being defined by initial conditions, like normal dynamical systems, the horizon satisfies a "teleological" final condition: it must eventually hover in an unstable state between collapse and expansion. One cannot exactly locate the horizon without knowing the entire future history of the spacetime."

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Subject: Horizons in General Relativity: Request for references

Date: Mon, 2 Feb 2015 22:29:36 +0200

Message-ID: <CAM7EkxnNFgJsu4u-MR57hbDHz66NF7b5-itLxRMSa4s6jrtyUQ@mail.gmail.com>

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Paul Tod <tod@maths.ox.ac.uk>,
Harvey S Reall <H.S.Reall@damtp.cam.ac.uk>

Dear Dr. Eichmair,

I understood that you will be speaking at 'Geometric Aspects of General Relativity' (September 28th - October 1st, 2015, Montpellier).

If possible, please send me at least one reference to mathematically precise derivation of 'event horizon' (not "apparent horizon"), as well as your explanation of the reason(s) to ignore the teleological problem in the definition of the event horizon.

I extend this request to all your colleagues.

In my opinion -- please correct me if I am wrong -- in an asymptotically flat spacetime, the future event horizon is a hypothetical hypersurface which separates the events causally connected to future infinity from those that are not. Likewise the past event horizon pertains to a hypothetical hypersurface which separated the events that are causally connected to past infinity from those that are not. Thus, the teleological problem is not some epistemological problem, which would allow you to claim that you cannot "know" the entire history and future in future/past null directions, yet the entire history and future is indeed fixed 'out there'. If it were fixed, it would be as if you have a big black bag containing many small balls, which you cannot open to count the balls, yet the very fact that the black bag is determined is the necessary and sufficient condition to claim that the number of balls is indeed fixed 'out there' in the black bag.

Thus, I believe the teleological problem is ontological one, because you and your colleagues cannot, not even in principle, define any spacetime (vacuum included) that can uniquely fix its entire history and future, after which one could offer a mathematically precise derivation of 'event horizon'. It's a bundle, plain and simple. No apparent, trapping, isolated, dynamical, evolving, causal, Killing, non-Killing, universal, Rindler, particle, cosmological, or putative "horizons" (reference upon request) can solve the ontological problem of 'event horizon'.

More in 'Relative Scale Spacetime',
<http://vixra.org/abs/1410.0194>

Looking forward to hearing from you and your colleagues,

Yours sincerely,

D. Chakalov

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 of as yet unknown structure](#).

Albert Einstein, *Philosopher-Scientist*, ed. by Paul A. Schilpp, Tudor Publishing Company, New York, 1951, [p. 75](#)

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Subject: [arXiv:1503.05723v1 \[gr-qc\]](#)
Date: Sat, 21 Mar 2015 11:13:16 +0200
Message-ID: <CAM7EkxnCnoBs_JpE8AM+v6cGJicGpjygiv_GavKNDg9V4AJdWg@mail.gmail.com>
From: Dimi Chakalov <dchakalov@gmail.com>
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John,

May I suggest two corrections to your latest essay.

1. You stated (p. 1) that "the mediator of the gravitational interaction (the graviton) also feels the gravitational force", but forgot to acknowledge that such self-acting "gravitons" are [nonrenormalizable](#) hypothetical stuff that nobody knows whether they might exist *in principle*; more from Freeman Dyson ([Poincare Prize Lecture](#), August 6, 2012). So your entire essay is grounded on a wild guess supported only by your wishful thinking.
2. You also wrote (p. 5) that singularities "were where time ran out: part of the edge of spacetime [28]", offering your 1993 book 'The Origin of the Universe' in ref. [28], but again forgot to acknowledge that nobody has delivered the mathematical existence of 'event horizon': see p. 2 in

<http://www.god-does-not-play-dice.net/horizon.pdf>

I don't know why you stubbornly refuse to face the facts, which are widely known since 1922.

More in
<http://www.god-does-not-play-dice.net/comments.pdf>

When will you get professional and correct your essay? You may of course continue to ignore my email messages, like [all your colleagues](#) do, but can't change the facts. Nobody can.

D. Chakalov

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Subject: RE: Update?
Date: Sun, 22 Mar 2015 02:42:25 +0200
Message-ID: <CAM7EkxnVZt9nkt6vpps8+NSkMdaJsfEutJFf9f1=TxOaFVQBtQ@mail.gmail.com>
From: Dimi Chakalov <dchakalov@gmail.com>
To: Chris Isham <c.isham@imperial.ac.uk>
Cc: [snip]

P.S. I mentioned your name and quoted from your arXiv:gr-qc/9310031v1 on p. 7 at

<http://www.god-does-not-play-dice.net/horizon.pdf>

[Matthew 7:6](#).

(just another crank)

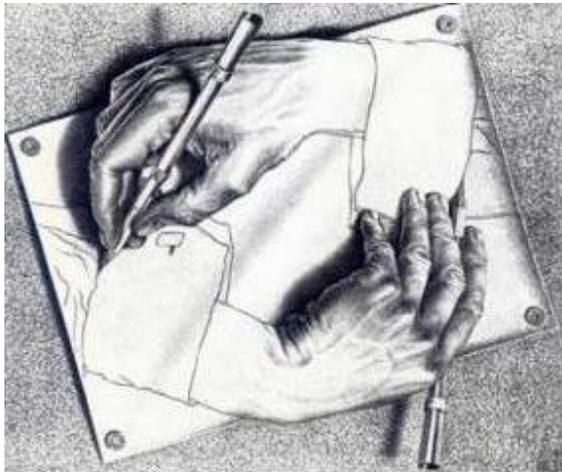
On Fri, 12 Oct 2007 15:14:09 +0100,

Message-ID: <18BC110D9A023542A41960EE3D066CD402D89B0C@icex3.ic.ac.uk> ,
 Isham, Christopher J <c.isham@imperial.ac.uk> wrote:
 [snip]
 > your current mode of writing suggests to everyone that you are
 > just another crank.
 [snip]

Explanatory Note

Back in June 1972, after studying GR for little over four months, I suddenly felt that I have finally grasped it. Beautiful feeling. It lasted up until the end of 1973 (MTW, p. 467). As of today, I am firmly convinced that the correct version of GR (cf. Einstein [above](#)) must involve null hypersurfaces *as well* (cf. biocausality, [January 1990](#)), in terms of an *atemporal* global mode of spacetime, which complements the local (physical) mode of spacetime.

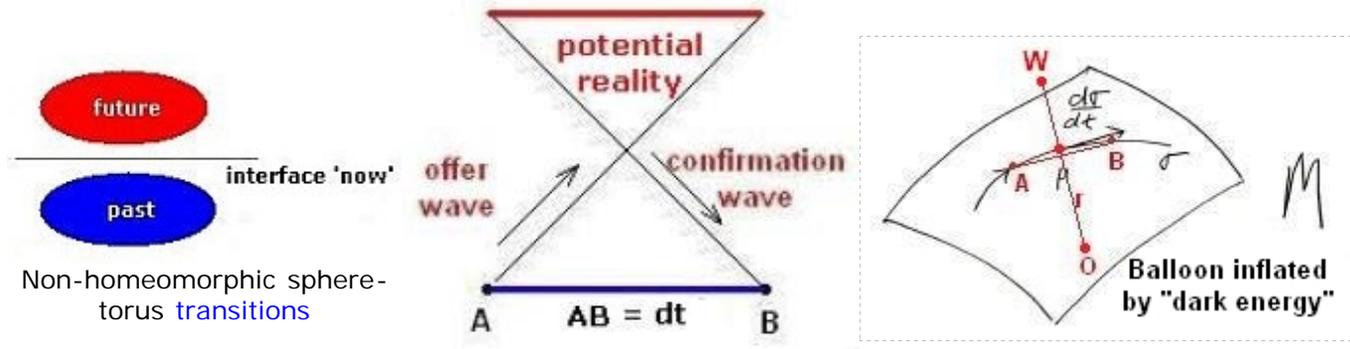
Here's the problem of the *mediator* of the gravitational interaction: **self-interaction**. I will use Escher's 'drawing hands' below and will call the two pari-passu hands *marble* and *timber*, after Einstein.



Which goes first?
 Marble (potential reality) or
 timber (physical reality)?

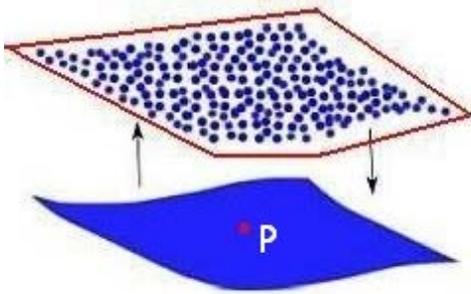
$$\underbrace{R_{\mu\nu} - \frac{1}{2}g_{\mu\nu}R}_{\text{Marble}} = \underbrace{\kappa T_{\mu\nu}}_{\text{Timber}}$$

The timber (matter) tells the marble (spacetime) how to curve, and *at the same instant* (cf. the interface 'now') the curved marble tells the timber how to move. If you use 1-D time, you'll have to specify which goes first. Wrong, because the two hands, *timber* and *marble*, define each other *simultaneously*: at every *interface* 'now' with *infinitesimal* duration **AB** (cf. the second drawing below), the gravitational contribution to every timber has been **already** negotiated by the two hands. The negotiation takes place along **null directions** ([Kevin Brown](#)), and its physical duration **dt** is tending *asymptotically* toward "zero".



The atemporal *global mode* of spacetime, "during" which the *hyperimaginary* unit **w** is *not* squared (explanation [below](#)), pertains to quantum, gravitational, and [living systems](#). Point **P** (cf. the third

drawing) belongs to the **null surface** at **P** (Kevin Brown); **PO** is inward-pointing normal to **P** and **PW** is **outer-pointing normal** to **P**, along with two orthogonal independent spacelike directions (not shown). The dimensionless **scale factor** is related to the "expansion" of the balloon surface (**APB**), driven by "dark energy" (cf. the note on p. 75 in comments.pdf): the *transience* of time is **not** physical phenomenon. The normal (**PO** and **PW**) and spacelike directions (not shown) pertain to the *atemporal* global mode of spacetime, in which the offer-and-confirmation wave *negotiates* (see the cognitive cycle of Ulric Neisser) the **next** state of 'physical reality'. Once negotiated, it occupies the *local mode* of spacetime ($\mathbf{w}^2 = \mathbf{0}$), in which **PO** = **PW** = **0** (James Hartle). All **living** and quantum-gravitational systems, bootstrapped by their **Bridge** as the **Brain of the Universe**, have access to the atemporal global mode of spacetime *via* point **P**:

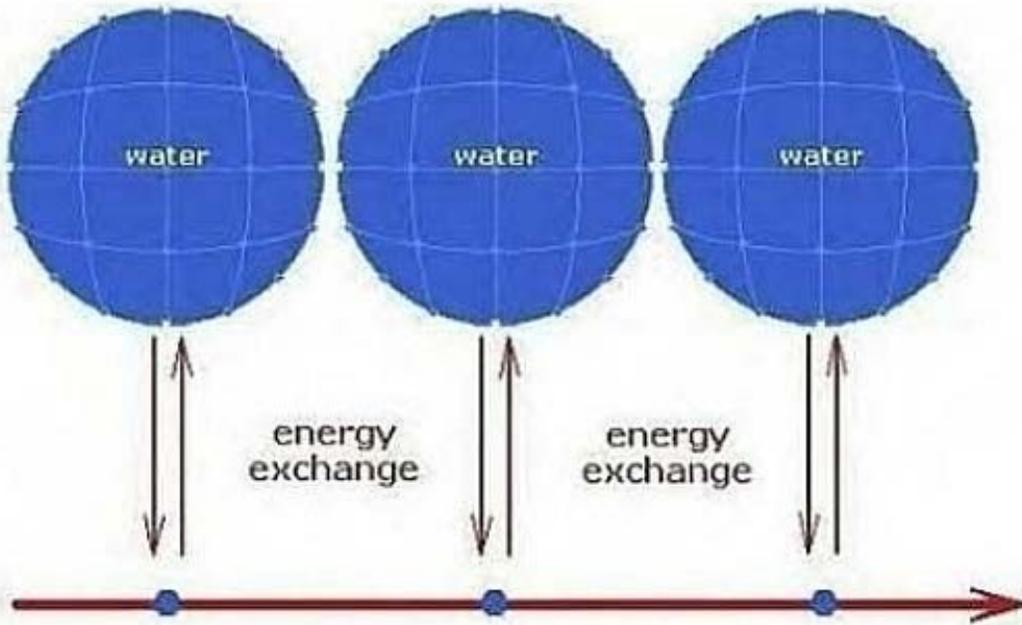


The inanimate macroscopic matter **cannot** access the atemporal global mode of spacetime: Dead matter makes quantum jumps; the living-and-quantum matter is **smarter**. Details in pp. 7-8 in [HBP.pdf](#).

NB: The gravitational energy **density** cannot be fixed at **AB** = **dt** (MTW, p. 467) due to the *Wegtransformierbarkeit* of gravitational energy: "Vanishing is an important criterion: a complex whose components are *wegtransformierbar* cannot be **physically real**" (A. Afriat and E. Caccese, p. 27 and footnote 31). Not surprisingly, "linear (or dipole) gravitational radiation does not exist" (J. G. Pereira, p. 3) there either: the *wegtransformierbar* gravitational energy is **not objective reality 'out there'**. The same applies to 'quantum state' (details in pp. 7-8 in [HBP.pdf](#)). As Asher Peres put it, "Quantum states are not physical objects: they exist only in our imagination (*global mode* of spacetime - D.C.)." If you look at the quasi-local trajectory of a single fish (timber) in a **school of fish** (marble), you will see that, at every *completed* event from the school of fish (marble), the trajectory of *every* timber/fish has been **already** defined by the negotiations between all timbers (*global mode* of spacetime) bootstrapped in a school of fish (marble). Locally (*local mode* of spacetime), all negotiations are **already** completed. Mathematically, at every *event* (*local mode* of spacetime), $\mathbf{w}^2 = \mathbf{0}$ (hyperimaginary numbers, *Relative Scale Spacetime*, Fig. 14.1), in such way that in every *negotiated "slice"* of the Universe the gravitational energy is "negative, so it **exactly** cancels the energy you think is being gained in the matter fields" (S. Carroll). Well, not *exactly* canceled, because the cosmological constant is not *exactly* zero ("the ether would come back!", M. Montesinos): "In terms of mass density, its absolute value is less than 10^{-26} kilograms per cubic meter" (J. Baez, Case 1). Point is, the same *intangible* gravitational energy (Sir Hermann Bondi) can be **physicalized** and converted into tangible energy of the "timbers" in the r.h.s. of Einstein's field equations, which in the case of gamma-ray busts may reach **five solar masses** emitted in under 60 seconds in the form of X-rays and gamma rays.

Hence every fish (timber) can safely use "**free falling coordinates**", because at every instant from its *quasi-local* trajectory the *intangible* energy (Sir Hermann Bondi) coming to it *via* the school of fish (gravitational "field") has been **already re-**converted into timber's *tangible* energy, and the entire school of fish (marble) will *always* have positive energy density, with **already re-**negotiated mass-energy conservation (by monopole GWs) and momentum conservation (by dipole GWs) -- **once-at-a-time**.

No, GR is not "classical" theory. We need **quantum gravity**. The *atemporal* cycle with *infinitesimal* duration **AB** (cf. above) is valid for the quantum world as well: at every instant 'now', the Universe is performing quantum-gravitational "observations" ($\mathbf{w}^2 = \mathbf{0}$) on itself, thanks to its *self-acting faculty*. Details in pp. 7-8 in [HBP.pdf](#). The *atemporal* cycle (global mode of spacetime), "during" which the hyperimaginary unit **w** is *not* squared, can be read only by quantum, gravitational, and **living systems** - not with inanimate dead clocks. So if some academic scholar speculates on the so-called "parameter **t** in the time-dependent Schrödinger equation" (Chris Isham, Eq. 3, p. 14), take it with a grain of salt and remind him of **the most widely known public secret in theoretical physics**:



How can you explain the emergence of visible track of water droplets in Wilson chamber, made by **energy exchange** with a single quantum particle? How can you explain the invisible red quantum arrow?

Compare with Derendinger, slides 11 and 23.

Going back to Hilbert-Droste-Weyl **red herring**, known also as "event horizon" (cf. [above](#)), don't forget that in physically realistic conditions the **time-like naked singularity** is inevitable: you cannot eliminate such beast with the so-called **cosmic censorship conjecture**. Such catastrophic event would kill the entire universe, just like the **ultraviolet catastrophe**. Yes, we do need **quantum gravity**. Look at the drawing below:



The very fact that you must introduce **metric** requires to include the endpoint 'time **zero**' at $10^{-44}m$. It is a matter of logic, first and foremost. You postulate "inflation" starting from some *pre-existing* medium endowed with *pre-existing metric* at $10^{-38}m$, which in turn **requires** the endpoint of 'no return' at $10^{-44}m$. You will need some Biblical "miracle" to resolve the *logical* paradox of '**borders** at **nothingness** at $10^{-44}m$.' It is an oxymoron, just like '**borders** at **infinity**' [above](#). You need the **dual age cosmology** introduced in [Relative Scale Spacetime](#): the *physical* time, as read with an inanimate clock, can only approach *asymptotically* The Beginning & The End (**Case IV**) placed within the instant 'now' ([Luke 17:21](#)). Hence at every instant 'now' we pass through God ([John 1:1](#)) paced]between[the consecutive instants 'now', depicted with dark strips from a [movie reel](#) in [Fig. 3](#). To understand the "absolute" time

stored in God (cf. the "movie operator" [below](#)), recall the similar case with the energy density of the vacuum. In QFT people ignore the curvature of spacetime, and only care about energy *differences* (cf. J. Baez, [Case 4](#), and the ATM analogy at the end of [MST.txt](#)). The "absolute" value of the energy density of the vacuum is **UNdecidable**, like the cardinality of the [closed set](#) of points (see [above](#)) from a closed interval (Kurt Gödel). Regardless of how much time and energy is *explicated* in terms of 'physical universe', the latter can never exhaust its **UNdecidable** omnipresent source: once created by God ([John 1:1](#)), the *physical* universe (local mode of spacetime) is **already** eternal, tending *asymptotically* (forget about "inflation") toward its Beginning & End (cf. [Case IV below](#)).

Finally, let me comment on another **red herring**, called "[gravitational-wave astronomy](#)". Consider, for example, [Alessandra Buonanno](#) and [B.S. Sathyaprakash](#), Sources of Gravitational Waves: Theory and Observations. In: *General Relativity and Gravitation: A Centennial Perspective*, ed. by Abhay Ashtekar, Beverly Berger, James Isenberg, and Malcolm MacCallum, Chapter 6, Cambridge University Press, [July 2015](#); [arXiv:1410.7832v2 \[gr-qc\]](#). The two authors thanked [Luc Blanchet](#), [Eric Poisson](#), and [Riccardo Sturani](#) for "carefully reading and providing comments on the manuscript", but since I don't know these comments, I will consider the two authors, along with their four editors, to be responsible for this **red herring**: see [pp. 25-27](#) in [censorship.pdf](#).

Just two examples from [arXiv:1410.7832v2 \[gr-qc\]](#) by Alessandra Buonanno and B.S. Sathyaprakash. On p. 5, they wrote: "The discovery of the Hulse-Taylor binary [11], a system of two neutron stars in orbit around each other, led to the first observational evidence for the existence of gravitational radiation [12-14]. The loss of energy and angular momentum to GWs causes the two stars in this system to slowly spiral in towards each other."

The loss of "energy and angular momentum" can be caused by [various factors](#), included [pulsar wind](#). Mrs. Alessandra Buonanno is Director at Max Planck Institute for Gravitational Physics and Head of the Division of Astrophysical and Cosmological Relativity, and it is highly unfortunate that she has chosen to "support" her speculations with wishful thinking, as if the loss of "energy and angular momentum" could be attributed *only and exclusively only* to GWs.

In Sec. 6.2.1 'Post-Newtonian formalism' (p. 10), the two authors claim that the Einstein field equations "can be recast in a convenient (Sic! - D.C.) form" and suggest some field that might be "a measure of the deviation of the background from Minkowskian metric".

Thanks to [Sir Hermann Bondi](#), we know that energy transport by GW is a *fundamentally* nonlinear phenomenon ([J.G. Pereira](#)), and we know from Hermann Weyl (1944) that the *linearized* approximation of GR is "**a shadow without power**". Energy transport by GW cannot, *not even in principle*, be detected with the *linearized* approximation of GR. You cannot detect the gravitational energy-momentum *inserted* in every quasi-local "fish" by the entire "[shoal of fish](#)", even with finite size of 10^{90} km, by invoking some magic "reference to the "background" or undisturbed geometry, which is there **before** the wave arrives and **after** it passes" (B. Schutz, [p. 317](#)). The *reference object* is the entire spacetime *en bloc*, and you will have to "build a mirror for gravitational waves" (A. Rendall, [Sec. 9.5](#)) **exactly** at its "endpoints" (see [above](#)). [Forget it](#).

To understand the gravitational radiation, imagine looking at a hill covered with a forest (the entire spacetime *en bloc*), where some of the trees are not vertical but leaning at an angle:



The [holomovement](#) of **red** trees produces a *swathe* resembling the wave-like movement of a [shoal of fish](#) *en bloc* ("being all in one piece", Martin Armstrong, [p. 56](#)). One could detect the swathe locally, at any **red** tree (cf. Escher's drawing [hands above](#)), provided the **red** tree is equipped with a brand new wave detector endowed with the faculty of [self-action](#): the [EPR-like correlation](#) of all **red** trees "takes place" at null hypersurfaces (see [above](#)); recall Einstein [above](#). Have you noticed the wave-like holomovement of [centipede's legs](#)? There is no local source of such waves, just as there is no local source of quantum waves. In both cases, quantum and gravitational, the amplitude of such holistic waves is dimensionless. Yes, gravitational waves exist, but - **no**, they cannot be detected with any detector based on the *linearized* approximation of GR. [LIGO](#) is [for the birds](#): see [pp. 25-27](#) in [censorship.pdf](#).

Subject: Re: Schizophrenic behavior of gravity ?
Date: Thu, 23 Apr 2015 17:13:06 +0000
Message-ID: <CAM7Ekxk7Oc_jXDRzOPTu=qwCAupSZcgRi53FONWEdPLwc2tZcQ@mail.gmail.com>
From: Dimi Chakalov <dchakalov@gmail.com>
To: Laszlo Szabados <lbszab@rmki.kfki.hu>
Cc: Steven Weinberg <weinberg@physics.utexas.edu>,
Adam Helfer <helfera@missouri.edu>,
[snip]

Laszlo,

On Sat, 28 Mar 2009 02:49:13 +0100 (CET), you wrote:

> Let's do our job, science ...

Let me try. Ten years ago, on Wed, 23 Feb 2005 17:37:02 +0100 (CET), you wrote:

> Thus, to summarize: even if we start with genuine tensorial variables,
> then certain important physical quantities turn out to be non-tensorial.

The explanation can be read on pp. 6-9 in
<http://www.god-does-not-play-dice.net/horizon.pdf>

... and on pp. 25-27 in
<http://www.god-does-not-play-dice.net/censorship.pdf>

The potential reality is widely known in quantum physics. As Werner Heisenberg stated (23 March 1927), "Die Bahn entsteht erst dadurch, daß wir sie beobachten." He tried to be more precise in his lectures 'Physics and Philosophy' (winter 1955-56), by stating that 'Die Bahn' is "in the middle between the idea of an event and the actual event, a strange kind of physical reality just in the middle between possibility and reality."

More from Erwin Schrödinger,
http://www.god-does-not-play-dice.net/Derendiger_23.jpg

Needless to say, Aristotle was fully aware of the existence of 'potential reality'. Its physicalized (Sic!) explications may not be always 'physical observables' [Ref. 1], which is why in GR "certain important physical quantities turn out to be non-tensorial", as you put it.

For example, you cannot and *must not* be able to find 'potential reality' as gravitational energy density at a point (MTW, p. 467). It's simply not there, being 'potential reality'.

Yet 'potential reality' always casts its explications (cf. Plato below), for example, as non-zero cosmological "constant" (Ed Witten complained that cannot sleep at night, poor guy), which makes people fear that "the ether would come back!",

<http://www.god-does-not-play-dice.net/Montesinos.jpg>

Also, as Thomas Thiemann noticed in [arXiv:astro-ph/0607380v1](http://arxiv.org/abs/astro-ph/0607380v1), "The puzzle here is that these observed quantities are mathematically described by functions on the phase space which do *not* Poisson commute with the constraints! Hence they are not gauge invariant and therefore should not be observable in obvious contradiction to reality."

Notice that everything said above goes back to Plato, some twenty-five centuries ago,
<http://www.god-does-not-play-dice.net/Plato.jpg>

All you may need is to follow your advice: "Let's do our job, science ..."

D. Chakalov

[Ref. 1] Holger Lyre, Does the Higgs Mechanism Exist? [arXiv:0806.1359](https://arxiv.org/abs/0806.1359): "Gauge transformations possess no real instantiations."

Idem, The Principles of Gauging, [arXiv:quant-ph/0101047](https://arxiv.org/abs/quant-ph/0101047): "The reality of gauge-dependent potentials implies a mystic influence from non-observable physical beables to observable ones."

Addendum

Regarding the proposal from Plato ([Plato.jpg](#)), notice that we have instantaneous 4-D "shadows" in every instant here-and-how from the "movie reel", with physically unobservable **Lorentzian aether** placed in the "dark strips"]between[the 4-D instants of the "movie reel": the *transience* of time is **not** physical phenomenon. Nothing in GR can be used to detect the fundamental *flow* of 4-D events (**Heraclitus**) with respect to the unobservable **Lorentzian aether**: LIGO is for the birds (censorship.pdf, pp. 25-27). Thanks to the "speed" of light, the **WPO** axis shown in the balloon inflated by "dark energy" (p. 6 above) is being nullified ($w^2 = 0$) -- once-at-a-time, as read by your physical clock. The "dark strips" ([Plato.jpg](#)) of unobservable **Lorentzian aether** correspond to **squared** hyperimaginary unit $w^2 = 0$ (cf. **Erwin Schrödinger**), which is why the **re**-assembled -- once-at-a-time -- physical continuum of 4-D events (*local* mode of spacetime) is **perfect**. The latter is like **re**-assembled horizontal "flat" steps from a ladder, in which Einstein's Equivalence Principle (M. Montesinos, [Fig. 23](#)) holds **perfectly** -- once-at-a-time -- while the physically unobservable, due to the "speed" of light, "vertical dark strips"]between[the horizontal "flat" steps define the "vertical" direction of the law of nonconservation (**H. Ohanian**) viz. the non-zero cosmological "constant" of the "ladder", with mass density roughly $7 \cdot 10^{-27}$ kg per cubic meter (J. Baez, [Case 1](#)). Hence Nature defines the mass-energy content at every point, **once-at-a-time**. Simple, no?

D. Chakalov

April 29, 2015

Last updated: May 21, 2015, 10:41 GMT

Subject: Re: 4-manifold topology and related topics

Date: Thu, 30 Apr 2015 01:37:34 +0300

Message-ID: <CAM7Ekxnjv2mLVNSPqTWcbBcxLW2ov6WSyF+J+-2PDcOGNn7fDA@mail.gmail.com>

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Dear Gábor,

Thanks for your reply.

> On Wed, 29 Apr 2015, Dimi Chakalov wrote:

>

>> P.S. Just three remarks. In [arXiv:1503.04945v3](https://arxiv.org/abs/1503.04945v3), Gabor Etesi stated
>> that "we have the strong conviction that in the classical physical
>> world at least, every physical event (possibly except the initial Big
>> Bang) has a physical cause which is another and preceding physical
>> event."

>>

>> **1.** The classical physical world (say, the size of the solar system) is
>> many orders of magnitudes smaller than the observable universe, and
>> does not include the quantum world.

>>

>> **2.** The initial "Big Bang" leads to insoluble logical contradictions:
>> see [pp. 8-9](#) in the text at the link below.

>>

>> **3.** Every event "has a physical cause which is another and preceding
>> physical event" only in classical physics. In quantum-gravitational
>> physics we have the broader case of causality (dubbed 'biocausality'),
>> explained on [pp. 6-11](#) in the text at the link below.

>>

>

> If I understand your remarks well then I think we are on the same side: the
> result in [arXiv:1503.04945v3](https://arxiv.org/abs/1503.04945v3) gives the chance that at macroscopic scales
> even classically the standard concept of causality breaks down: I
> constructed a space-time which is stably non-globally hyperbolic. I think my
> strict mathematical results open up the possibility that a broader concept
> of causality required already at the classical level...

Regarding **(3)** above, please check out the broader case of causality (dubbed 'biocausality'), explained on [pp. 6-11](#) in the text at

<http://www.god-does-not-play-dice.net/horizon.pdf>

The standard concept of relativistic retarded causality does hold, but in biocausality (suggested in [January 1990](#)) the selection of the *next* state of the physicalized (Sic!) universe is negotiated (cf. Escher's hands at the link [above](#)) jointly by the *potential states* (Aristotle) of its (i) history and (ii) potential future. Due to the "speed" of light, we can make physical observations only on the end results from this negotiation, only on 'irreversible past of physical reality' cast on a *perfect* continuum of 4-D events: the "dark strips" from the "movie reel" in Plato's proposal

<http://www.god-does-not-play-dice.net/Plato.jpg>

are physically unobservable Lorentzian aether at absolute rest. See Addendum on [p. 11](#) in the first link. Thus, the classical notion of causality is obtained in the limiting case of biocausality, in which the feedback from the potential future is vanishing small.

I think the possibility for spacetime engineering, by tweaking the atemporal negotiation of the *next* state of a physical system, is immensely important. Currently, people can perform it only at a very vestigial level, camouflaged as "magic" -- see the demo on p. 10 in

"Any sufficiently advanced technology is indistinguishable from magic" (Arthur Clarke's Third Law). Perhaps we only need Mathematics.

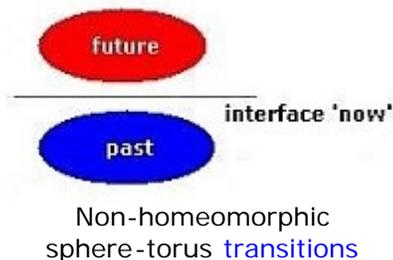
All the best,

Dimi

D. Chakalov
chakalov.net

Note on Physical Theology: Case IV

The **squared** hyperimaginary unit $w^2 = 0$ (see [Addendum](#)) corresponds to *physicalized* potential reality, which "collapses" -- once-at-a-time -- over particular numerical point (apart from 'zero & infinity') from the real number line (topological manifold of [dimension 1](#)), but this "point" is actually the very *interface* between the potential reality (**future**) and physical reality (**past**) shown on p. 6 [above](#). Namely, the *interface* 'now' has [dual topology](#): manifold of [dimension 1](#) in the **past** ($w^2 = 0$), and *potential* reality (**future**) with *indefinable* topology, in which the hyperimaginary unit w is *not* squared (see below). The *potential* reality is made of Platonic 'ideas *per se*' (cf. [pp. 7-8](#) in HBP.pdf), which makes its non-Archimedean topology *indefinable*: one cannot claim that the *idea* of a [proton](#) is "smaller" than the *idea* of a galaxy. Finally, keep in mind that the [Noumenon](#) (*Das Ding an sich*) *creates* potential reality and exists as omnipresent **non**-reality. It (not "He") can never be exhausted, and will *create* potential reality during an *infinite* evolution of the Universe. It cannot "collapse" on *any* real number but only on the joint ideal point 'zero & infinity' (Case **IV** below), known as 'the perfect monad *without windows*' ([Leibniz](#)).



Case **I**: $w \rightarrow 0$: classical physics

Case **II**: $0 < w < \infty$: quantum gravity & [life sciences](#)

Case **III**: $w \rightarrow \infty$: hyper physics (?)

Case **IV**: $w \equiv 0 \equiv \infty$: [physical theology](#). At every interface 'now', we pass through the Noumenon of God ([Luke 17:21](#)).

We need to extend the [number theory](#) to include its predecessor -- the hyperimaginary numbers -- and to introduce a brand new notion of 'absolute zero', which complements 'zero *something*' (an empty set of *something* missing) and is applicable to the "absolute vacuum" (Case **IV**) of the Noumenon ([John 1:1](#)).

We cannot construct any "causal boundary" ([Bob Low](#)) at null infinity. We need new Mathematics to describe how *each and every* spacetime point from the **closed** interval 'two-pint beer' [above](#) belongs to the interface 'now', being **wrapped** with the joint ideal point 'zero & infinity' (Case **IV**) -- check out the [no-boundary proposal](#) at my [website](#). Hence at every instant 'here and now' we pass through God ([Luke 17:21](#)).

Possible application of physical theology for [spacetime engineering](#) (e.g., [REIM](#)) in [pp. 4-8](#) in [sheeple.pdf](#). It's not "[magic](#)". With exception of Case **I**, the *physical* presentation of the Universe is modeled as 'the [Brain](#) of the Universe'.

D. Chakalov

April 30, 2015

Last updated: June 1, 2015, 15:34 GMT

Subject: UNSpeakable cognitive vacuum
Date: Fri, 1 May 2015 15:34:57 +0300
Message-ID: <CAM7EkxmpS5ib5d74mTDvG5qhgWwB3EGUXQOH7Z9owNq6v5pChQ@mail.gmail.com>
From: Dimi Chakalov <dchakalov@gmail.com>
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Jorge Pullin <pullin@lsu.edu>

Gentlemen:

Can you attach particular meaning (cognitive "particle") to the drawing attached? If you can, I would say that you did it by "looking" at some UNSpeakable cognitive vacuum, and then pulling out the appropriate meaning (cognitive "particle") from it.

Likewise, the quantum-gravitational vacuum remains always in its unobservable Macavity state,
http://www.god-does-not-play-dice.net/#Macavity_always

Its "appropriate meaning" defines the mass-energy content at every instant 'here-and-now' -- once-at-a-time.
Details on pp. 6-13 in
<http://www.god-does-not-play-dice.net/horizon.pdf>

If you are not fluent in GR, see the same Macavity-like vacuum as *the* quantum state,
http://www.god-does-not-play-dice.net/Fig_8.jpg

More from KS Theorem (I wouldn't dare to elaborate, since according to [Prof. Chris Isham](#) I look like "just another crank").

Keep in mind that the two vacuums, cognitive and quantum-gravitational, are complementary presentations of one and the same entity, so we actually have One Macavity-like vacuum. We are like the Eskimo trying to understand the elephant's trunk by measuring it with two complementary devices, "nose" and "arm": see pp. 7-8 in
<http://www.god-does-not-play-dice.net/HBP.pdf>

Feel free to pass this email to anyone interested in Mathematics. I am not allowed to publish papers at arXiv.org: see pp. 25-27 in
<http://www.god-does-not-play-dice.net/censorship.pdf>

Which is actually not a problem, since I am independent researcher. Does a fish need a bicycle? If you understand the meaning of the last sentence, you can certainly understand the mass-energy "meanings" in quantum-gravitational physics (included the so-called Higgs boson). Plato called them "shadows",
<http://www.god-does-not-play-dice.net/Plato.jpg>

Good luck.

D. Chakalov

--

Attachment: [unspeakable.jpg](#)



Click the image for more cognitive "particles" of the same type, resembling [baryons](#) composed of different [quarks](#). Simple, no?

Note

The phenomenon of *invariant* meaning (see [pp. 7-8](#) in HBP.pdf), such as the invariant meaning of 'google' above, is similar to the [genidentity](#) ([Kurt Lewin](#)) of particles of the same type (e.g., the invariant properties of [protons](#)), as in both cases we operate with the underlying 'potential reality' that has **zero** probability for direct observation: see 'the colorless octopus *per se*' ([REIM](#)) and Erwin Schrödinger below. Compared to [protons](#), the cognitive "particles", such as the *physicalized* google drawing above, have much greater **flexibility** (not "**uncertainty**") in delivering the same *invariant* meaning with/by their *physicalized* presentations; the similarity is that in both cases we have *physicalized* ("colored") presentations of "**colorless**" *potential* reality harboring either the invariant *meaning* or the invariant properties of elementary particles (cf. John Wheeler below). The spectrum of *physicalized* presentations of quantum particles is bounded by the quantum-gravitational vacuum (Case **III** above), and we predict a [new family of Higgs-like bosons](#) with spin-0 and spin-2, engaged in "**self-interaction**" at around 14 TeV and "self-energy" contribution to the [cosmological constant problems](#): "Why is the universe larger than a [football](#)?" (Ivo van Vulpen, [p. 40](#)). The solution is provided [below](#).

Let's go to the foundations of Quantum Mechanics.

Observables

Quantum mechanics:

We are interested in the probability that an experiment measuring quantity \mathcal{A} gives result a . Quantum mechanics prescribes:

- To consider the operator A (observable) corresponding to \mathcal{A} ; a is an eigenvalue of A .
- To look for a basis $\{|u_n\rangle\}$ of the eigenspace of the eigenvalue a .
- For a system in state $|\psi\rangle$, to calculate the amplitudes

$$\mathcal{M}_n = \langle u_n | \psi \rangle.$$

The probability is then

$$P(a) = \sum_n |\mathcal{M}_n|^2$$

if all states are correctly normalized, $\langle \psi | \psi \rangle = 1$, $\langle u_m | u_n \rangle = \delta_{mn}$.
A dimensionless number, $0 \leq P(a) \leq 1$.

The sum is over all states compatible with the result expected from the experiment.

**In general, a variable has no definite value before I measure it;
then measuring it does not mean ascertaining the value that it has.
But then what does it mean?**

Erwin Schrödinger, Die gegenwärtige Situation in der Quantenmechanik, 1935

**It means that the probability for observing the intact quantum state is zero ($w^2 = 0$),
D. Chakalov, 2015**

Thanks to the *intact* quantum state as 'potential reality', in Quantum Theory we can suggest a normalized set of *physicalizable* (Sic!) and hence observable "shadows" (Plato) cast from/by their *intact* ("blank") quantum state that **cannot** be observed as 'physical reality', just like the cat Macavity ([negative energy densities](#)). In Kochen-Specker Theorem, the *intact* quantum state shows up in such way that, apart from the trivial case of "Hilbert spaces of dimension 1 and 2" ([Ernst Specker](#)), the *physicalizable* "shadows" **cannot** form a set with fixed cardinality: there will be always *indefinable* "blank spots" belonging to the *uncolored* Kochen-Specker sphere; see Helena Granström, [p. 2](#). This mathematical fact is *entirely* different from the rejection of local hidden variables by [Bell's theorem](#), because the latter does not reveal the **non-colorizable**, *intact* quantum state with **zero** probability for observation.

See Erwin Schrödinger above and his letter to Einstein ([November 18, 1950](#); emphasis mine): "It seems to me that the concept of probability is terribly mishandled these days. Probability surely has as its substance a statement as to whether something is or is not the case — an uncertain statement, to be sure. But nevertheless it has meaning **only** if one is indeed convinced that the something in question quite definitely **is** or **is not** the case. A probabilistic assertion presupposes the **full reality** of its subject."

Needless to say, the academic scholars from my email [above](#) cannot agree, otherwise they will have to rewrite many of their renowned academic papers. But keep in mind that the *intact* quantum state keeps the [genidentity](#) (Genidentität, [Kurt Lewin](#)) of quantum particles. As John Wheeler acknowledged, "No acceptable explanation for the miraculous identity of particles of the same type has ever been put forward. That identity must be regarded, not as a triviality, but as a central mystery of physics" (MTW, [p. 1215](#)).

Consider, for example, a proton. Suppose there are roughly 10^{82} protons in the observable universe. What makes

them 'the same' is that they all are *physicalizable* "shadows" cast from/by their **single intact** quantum state of 'the proton *per se*', which always has **zero** probability for observation.

Now let's look at the mass of a **proton**. To quote from Alex Dolgov, [arXiv:1206.3725v1](#) (emphasis mine):

So the **proton mass** should be 15 MeV minus binding energy, instead of 938 MeV. The solution of the problem suggested by QCD is that vacuum is not empty but filled with quark [11] and gluon [12] condensates: (35), having **negative** vacuum energy: (36).

.....

The value of the vacuum energy of the quark and gluon condensates (36) is practically established by experiment. To adjust the total vacuum energy down to the observed magnitude, $\sim 10^{-47}$ GeV⁴, there must exist another contribution to vacuum energy of the **opposite sign** and equal to the QCD one **with precision of one part to 10⁴⁵**. This new field cannot have any noticeable interactions with quarks and gluons, otherwise it would be observed in direct experiment, but still it must have very same vacuum energy. This is one of the greatest mysteries of Nature.

I believe this "new field" (Alex Dolgov) is the *intact* quantum state of 'the proton *per se*', so it does **not** have the "very same vacuum energy" — it is *potential* reality which always has **zero** probability for physical observation. Of course, the [academic scholars](#) will disagree, despite the fact that nobody can suggest any *physical* mechanism, with duration at least 10²⁹ years (proton's *lifetime*), for producing 10⁸² protons with such fantastic *precision* of **one part to 10⁴⁵** that can only match the *precise* cancellation of the energy density of the vacuum, leaving only one part in 10¹²⁰ to *accelerate* the "expansion" of spacetime (see the inflating balloon on p. 6 [above](#)): "the worst theoretical prediction in the history of physics!" (Anthony Lasenby *et al.*, p. 187). More from Einstein [above](#).

Yet all people, including the academic scholars [above](#), deeply believe that CERN has discovered some "god particle" by smashing protons: "The Standard Model does not predict the mass of the Higgs boson itself and therefore it must be measured experimentally" (CERN, 17 March 2015). English translation: 'We have no theory to predict the mass of the Higgs boson itself and therefore it might be guessed only with experiments based on wishful thinking or with [crystal balls](#), whichever comes first'.

If people from CERN disagree, they have to demonstrate some sort of "effective theory" by **recovering** the proton's **mass** 'bottom—up', based on their [experimental results](#): "The combined mass of the Higgs boson is $m_H = 125.09 \pm 0.24$ (0.21 stat. \pm 0.11 syst.) GeV, which corresponds to a measurement precision of better than 0.2%."

Again, CERN smashed protons to "discover" the Higgs boson mass, so if they have *any* theory whatsoever, they should at least be able to **recover** proton's **mass** (cf. [Particle masses](#), MJBridger, April 9, 2015).

That's the proof of the (Higgs) pudding. Of course, their first off task is to solve *the* most widely known public secret in theoretical physics, [ever since 1911](#).

The total cost of "finding" the Higgs boson ran about **\$13.25 billion** (€11.83 billion), so obviously the academic scholars at CERN have humongous amount of money — all taxpayers' money — to play with their Higgs parapsychology. They already dream of a new Barbie, seven times as powerful and several times bigger than the LHC, "[with a circumference of 80 to 100 kilometres](#)": the Future Circular Collider. Their enormous paychecks are guaranteed, along with their medical benefits and pensions, so why would they bother to *think*?

They have all they want: **money**. **Billions** of taxpayers' euros.

BILLIONS.

As Johann Makowsky put it (*The Jerusalem Post*, 19 April 1985), "Overfunded research is like heroin: It makes one addicted, weakens the mind and furthers prostitution."

D. Chakalov

May 3, 2015

Last updated: May 20, 2015, 13:36 GMT

Subject: [Case_ID: 1047427 / 5393398] 08 Outstanding problem with an on-going project |
08.01 European Research Council or Frontier research
From: Europe Direct <no_reply@edcc.ec.europa.eu>
Date: Wed, 6 May 2015 13:57:57 +0200
Message-ID: <554a01c59bf7a@edcc.ec.europa.eu>
To: dchakalov@gmail.com

Dear Mr Chakalov, Thank you for your message. We would like to inform you that, due to its specific nature, your enquiry has been forwarded to the relevant service in the European Commission for their input. Therefore, the answer may take up to 15 working days according to the Commission "Code of good administrative behaviour". We apologise for any inconvenience this may cause you and hope to contact you again with a complete reply to your enquiry as soon as possible. Kind regards, EUROPE DIRECT Contact Centre/ Research Enquiry Service

Date: Tuesday, 05/05/2015 13:56:49
From: "Dimi Chakalov" <dchakalov@gmail.com>
Subject: [Case_ID: 1047427 / 5393398] 08 Outstanding problem with an on-going project |
08.01 European Research Council or Frontier research

Community Research and Development Information Service (CORDIS)
Challenging General Relativity
http://cordis.europa.eu/project/rcn/104490_en.html
Project reference: 306425
Funded under: FP7-IDEAS-ERC
From 2012-08-01 to 2017-07-31
Total cost: EUR 1 375 226
EU contribution: EUR 1 375 226

Dear Sir or Madam,

There are widely known, ever since 1922, mathematical facts, which prohibit the so called "black holes". It is not a matter of opinion. Please check out

<http://www.god-does-not-play-dice.net/horizon.pdf>

I utterly disagree with wasting taxpayers' money for chasing ghosts -- not only "black holes" but "Higgs boson" (CERN) and "gravitational-wave astronomy" (ESA) as well. Please refer to the text at the link above.

I stand ready to [elaborate](#).

Yours sincerely,

Dimi Chakalov

Subject: The proof of the (Higgs) pudding
Date: Fri, 8 May 2015 03:39:54 +0300
Message-ID: <CAM7Ekx=NmY22jJSqEAwQiOV05o1AE81KpFzqYOASmpAbfhL=yw@mail.gmail.com>
From: Dimi Chakalov <dchakalov@gmail.com>

To: SERGIO.BERTOLUCCI@cern.ch,
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Dear Colleagues,

I am totally against wasting taxpayers' money for "Higgs boson": see [p. 17](#) in

<http://www.god-does-not-play-dice.net/horizon.pdf>

Please reply professionally.

Sincerely,

D. Chakalov

--

"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 of as yet unknown structure](#)."

Albert Einstein, *Philosopher-Scientist*, ed. by Paul A. Schilpp, Tudor Publishing Company, New York, 1951, p. 75

Note

The proof of the (Higgs) pudding -- [what's in a proton?](#) -- requires *potential reality* (cf. Cases **II** and **III** [above](#)) for which the contraposition from classical physics -- something either **is** or **is not** -- **does not hold**. Einstein dubbed it "a total field of as yet [unknown structure](#)." All the details from Aristotle, Heisenberg, and Schrödinger are [widely known](#), at least to the fifty-one recipients of my email above. In the framework of Margenau's interpretation of quantum mechanics (Advantages and disadvantages of various interpretations of the quantum theory, *Physics Today* **7**(10), 6-13 (1954), [p. 10](#)), in [QCD](#) the *possessed* observables, such as mass and charge, become 'potential reality' as well. The inevitable endpoint of this transition to *potential reality* is the quantum vacuum in which all *physicalizable* (Sic!) explications, carrying the same **invariant "meaning"**, exist as 'potential reality'. The ontological status of [virtual particles](#) "during" their *non-physical* presence is 'potential reality with **zero** probability for observation'. Hence you can solve *the* most widely known public secret in theoretical physics, [ever since 1911](#), and explain [what's in a proton](#) -- the proof of the (Higgs) pudding. Good luck.

D. Chakalov

May 8, 2015

Last updated: May 18, 2015, 08:47 GMT

Subject: G.M. Graf, General Relativity HS 08

Date: Thu, 7 May 2015 16:18:53 +0300

Message-ID: <CAM7EkxkRqrPOc-Nwo6wLzKhTgBZ8BSqEt1GJdVB8=_UUGM+QQA@mail.gmail.com>

From: Dimi Chakalov <dchakalov@gmail.com>

To: Gian Michele Graf <gian-michele.graf@itp.phys.ethz.ch>, gmgraf@itp.phys.ethz.ch

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Charles Torre <charles.torre@usu.edu>,
Gary Horowitz <gary@physics.ucsb.edu>,
Carlo <rovelli.carlo@gmail.com>,

<http://www.itp.phys.ethz.ch/research/mathphys/graf/gre.pdf>

Dear Dr. Graf,

You said that you welcome comments.

You cannot define a "neighborhood of \mathbf{p} " (p. 1) to derive Eq. 3.14 on p. 28: the expression "near \mathbf{p} " is poetry. The same applies to the text on p. 32: "That one can be transformed away by (3.14) at any point of spacetime. The "equivalence of gravitational and inertial mass" is now automatic: the mass just [does not appear](#)."

The reason why "neighborhood of \mathbf{p} " and "near \mathbf{p} " are poetry is explained at my website. I have sent you many times the links, but you never replied.

Very briefly, you cannot define spacetime continuum of points \mathbf{p} *relationally*, with 'neighborhood of \mathbf{p} vs \mathbf{p}' . If \mathbf{p} was an apple and you were examining a bag of apples, then 'neighborhood of \mathbf{p} ' would be 'not- \mathbf{p} ' (e.g., air between apples), and you must add 'the bag itself' to 'not- \mathbf{p} ', so you could speak of an apple \mathbf{p} with respect to 'not- \mathbf{p} ' ([air between apples U the bag itself](#)). Then the *set* of apples \mathbf{p} will have denumerable cardinality and cannot make a continuum due to 'not- \mathbf{p} ': reductio ad absurdum.

Thus, we have only one option to define the [spacetime point \$\mathbf{p}\$](#) : as an *interface* between irreversible past and potential future. Needless to say, the *interface* \mathbf{p} will have brand new, *dual* topology: both "closed", relative to its irreversible past (here the [contracted Bianchi identity](#) holds perfectly well, along with Eq. 3.14 on p. 28), and "open", relative to its potential future: see [pp. 10-13](#) in

<http://www.god-does-not-play-dice.net/horizon.pdf>

I will be happy to [elaborate](#), should you or any of your colleagues are interested.

Sincerely,

D. Chakalov

=====

Subject: "There are cities there. Our loved ones are there. God is there."
Date: Thu, 7 May 2015 14:44:02 +0300
Message-ID: <CAM7Ekxn_ECYEAhAeeWpYiHo18Oe7ovpsA8m-CFhH_Wi3Bp=Vqw@mail.gmail.com>
From: Dimi Chakalov <dchakalov@gmail.com>
To: David <dajohnso@yu.edu>
Cc: [snip]

David Alan Johnson, [arXiv: 1505.00812v1](https://arxiv.org/abs/1505.00812v1), p. 60

David, I think the question of God is very serious: see the "dark strips" in the movie reel in <http://www.god-does-not-play-dice.net/Plato.jpg>

I think the issue is strictly mathematical,
<http://www.god-does-not-play-dice.net/horizon.pdf>

Please let me know if you would be interested. If not, we can have our discussion when we "take off the [train](#) and [go home](#)" (see below).

Dimi

A man has a dream that he is traveling in a [train](#), having no idea or recollection how he got there. The train just goes on and on, at some point it stops, some people get off, new people get in, and the train continues. The man has no idea what is the meaning of this whole train, where it goes, and why. At one point, the train again makes a stop, new people get in, but the man knows that this is **his** home station and should get off, which he does. At this moment he awakes and says, 'what a stupid dream, it makes no sense whatsoever'.



Subject: Red herrings by Jorge Pullin, [arXiv: 1505.02089v1](https://arxiv.org/abs/1505.02089v1) [gr-qc]
Date: Mon, 11 May 2015 15:12:41 +0300
Message-ID: <CAM7EkxnyRZfOQSuB4tcsvtuOCccSbfbMeYrNJxmLWcDnhQ4T4Q@mail.gmail.com>
From: Dimi Chakalov <dchakalov@gmail.com>
To: Feldwebel Hans Georg Schultz <pullin@phys.lsu.edu>
Cc: Karel V Kuchar <kuchar@physics.utah.edu>, Chris Isham <c.isham@imperial.ac.uk>, Charles Torre <charles.torre@usu.edu>, Stanley Deser <deser@brandeis.edu>, Robert M Wald <rmwa@midway.uchicago.edu>, Robert Geroch <geroch@midway.uchicago.edu>, Charles W Misner <misner@umd.edu>, Jim Isenberg <isenberg@uoregon.edu>, Malcolm MacCallum <m.a.h.maccallum@qmul.ac.uk>, Abhay Ashtekar <ashtekar@gravity.psu.edu>, Rodolfo Gambini <rgambini@fisica.edu.uy>, Ulrich Sperhake <sperhake@tapir.caltech.edu>, Javier Olmedo <jolmedo@phys.lsu.edu>, Jose M M Senovilla <josemm.senovilla@ehu.es>, Alan Rendall <rendall@aei.mpg.de>, Helmut Friedrich <hof@aei.mpg.de>.

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1. Jorge Pullin (p. 1): "For instance, although the Schwarzschild solution was written also in 1916, the idea of black hole was not properly understood until the 1960s. It is remarkable that many of the brightest minds of the 20th century physics missed the concept or were quite confused by it. Gravitational waves, already discussed by Einstein himself in 1916, had a tortuous development (with Einstein himself coming to doubt their existence) until the binary pulsar put to rest the confusion about their existence [1]."

2. Regarding the ADM paper from 1960, Jorge Pullin wrote (p. 2): The paper then goes on to talk about gravitational radiation, in particular the definition of the wave-zone, a delicate concept in a non-linear theory. This should be put in the context that at the time there was controversy in certain circles on the existence of gravitational radiation (see Kennefick for a complete account of the controversy).

3. Regarding the ADM paper from 1960, Jorge Pullin wrote (p. 3): "It also notes that the constraints are preserved in time due to the Bianchi identities and therefore are satisfied at all future times if they are satisfied initially."

Jorge, there's no sense to play Feldwebel Hans Georg Schultz: "I hear nothing, I see nothing, I know nothing!"

1. The idea of black hole was properly understood by 1922: check out [the facts](http://www.god-does-not-play-dice.net/horizon.pdf) in <http://www.god-does-not-play-dice.net/horizon.pdf>

Surely GWs exist, but cannot be detected with LIGO and the like: see p. 9 at the link above.

2. The "definition of the wave-zone" by ADM is pure poetry: you need to place GW mirrors *exactly* at null-and-spacelike infinity. More on pp. 25-27 in <http://www.god-does-not-play-dice.net/censorship.pdf>

You never replied to my email (Wed, 01 Mar 2006 04:59:31 +0200) in which I suggested to convert the dark tunnels of LIGO to wine cellars. What else can you do with LIGO and the like?

3. Since the constraints are preserved in time and "at all future times" due to the Bianchi identities, the canonical formulation by ADM cannot, not even in principle, define any evolution whatsoever. "These are the laws of an **instant** in canonical gravity" (Karel V. Kuchar, Time and interpretations of quantum gravity, 1992, available from [your website](#)). Thus, the spacetime is dead frozen and cannot, not even in principle, accept any "dark energy" from non-zero cosmological constant -- the dynamics of *the spacetime itself* is not permitted in canonical gravity.

Nine years ago, on 31 March 2006, Stanley Deser declared "yes, I do understand GR, but cannot discuss that now." Of course, he never did.

NB: There can be no "preferred notion of evolution" in GR, simply because it is perfectly hidden due to the "speed" of light: see the first link above, and the quote from Einstein below.

How long will you play Feldwebel Schultz, Jorge?

On behalf of Albert Einstein, I extend this question to [all you colleagues](#).

D. Chakalov

"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 of as yet unknown structure](#)."

Albert Einstein, Philosopher-Scientist, ed. by Paul A. Schilpp, Tudor Publishing Company, New York, 1951, p. 75.

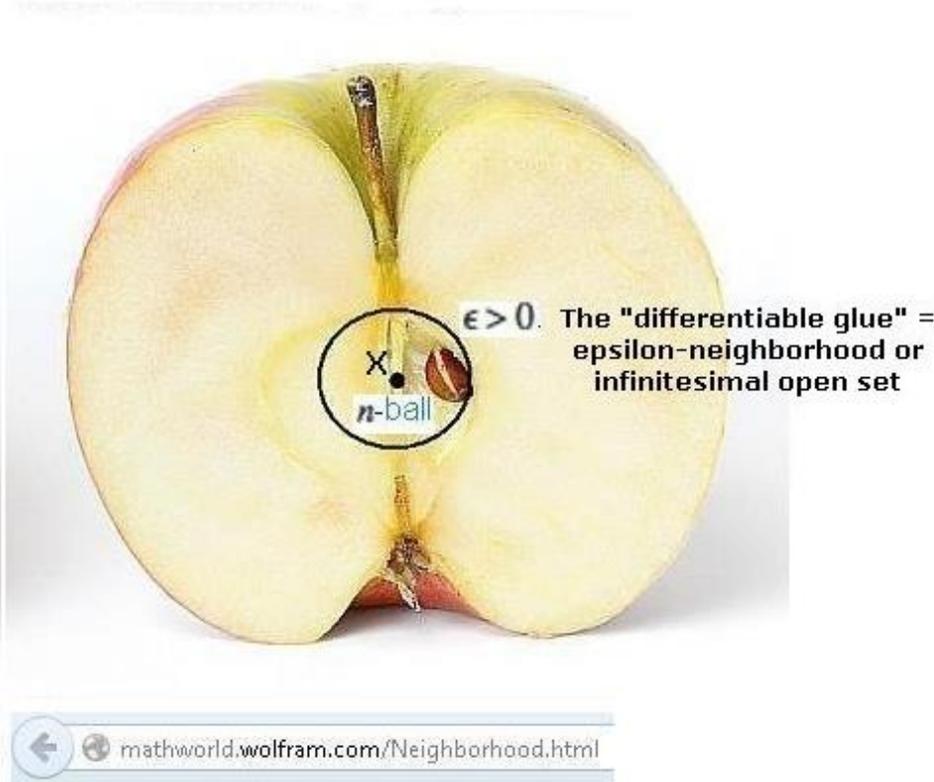
Note on the dynamics of General Relativity

Look at Plato's proposal ([Plato.jpg](#)), and imagine some omnipresent **meta** observer (cf. Case **IV** [above](#)), projecting 3-D movie on the screen, frame by frame (the principle of [locality](#)), in such way that in the *assembled* frames all physical observers will enjoy **re**-assembled -- once-at-a-time -- 4-D spacetime (dubbed 'local mode of spacetime'). The "number" of frames per second (**FPS**), comprising the **closed** interval 'two-pint beer' [above](#), is in fact **undecidable** (Kurt Gödel): the **re**-assembled 4-D spacetime is *perfect* continuum, in the sense that there is no *physical* (Sic!) reality]between[the frames/events comprising the **re**-assembled 4-D local (physical) mode of spacetime. George Berkeley referred to the *absence* of physical reality]between[the 4-D events as "the ghosts of departed quantities" (Berkeley, [Sec. XXXV](#)). True, only the "ghosts" are safely kept as 'potential reality', like the grin of the Cheshire cat *without* the cat, as observed by [Alice](#). In Quantum Theory, the *potential* reality is widely known thanks to [Heisenberg](#) and [Schrödinger](#), and in GR it may be interpreted as [reference fluid](#) and [Lorentzian aether](#); Einstein stipulated in *Äther und Relativitätstheorie* ([5 May 1920](#)) that "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."

Currently, there is no mathematical presentation of the "colorless" *potential* reality -- mathematicians utterly believe that the fundamental object 'point' does *not* have [internal structure and topology](#). They use [inadmissible poetry](#) to describe 'point' *with respect to* its '[neighborhood](#)', despite the fact that 'neighborhood' will **always** have finite size due to *potential* infinity. Hence they wrongly compare 'that which has no part' ([Euclid](#)) with something that **always** has finite size and [metric](#), called 'neighborhood', and sweep that garbage under the rug by **ignoring** the ontological difference between *potential* infinity and *actual* (completed) infinity. If you mix *potential* infinity and *actual* (completed) infinity, you will immediately face the [Thomson's lamp paradox](#). The *actual* (completed) infinity can indeed reach 'that which has no part' ([Euclid](#)) and will inevitably **stop** there, while potential "infinity" cannot, and will only tend *asymptotically* toward the endpoint denoted with **X** in the drawing below.

§1. Smooth Manifolds

The definitive modern definition of a smooth manifold seems to have been given by Hassler Whitney ([H. Whitney, 1936]), in which a smooth manifold is presented as floppy pieces of Euclidean space glued together with a sort of differentiable glue.



One of the most general concepts of a neighborhood of a point $x \in \mathbb{R}^n$ (also called an epsilon-neighborhood or infinitesimal open set) is the set of points inside an n -ball with center x and radius $\epsilon > 0$.

A set containing an open neighborhood is also called a neighborhood.

Fig. 1

Note: The entire "apple" is called 'spacetime M made of infinite glued points X ', and people believe they *might* be able to define the set of "border points" at infinity to describe some 'closed system', define the inertial mass confined there, and "prove" its apparent positivity (Schoen and Yau). How? With mathematical poetry. They would also replace X with p and claim that "the most fundamental fact about geodesics (...) is that given any point $p \in M$ and any vector V tangent to M at p , there is a unique geodesic starting at p with initial tangent vector V " (J. Lee). And they teach students!

To understand the "colorless" potential reality and the so-called hyperimaginary numbers, see the drawing below, from George Lakoff and Rafael E. Núñez, *Where Mathematics Come From*, Basic Books, New York, 2001, p. 189 (emphasis mine):

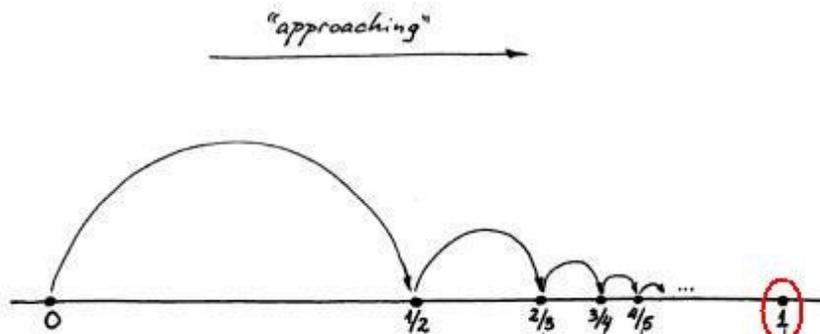
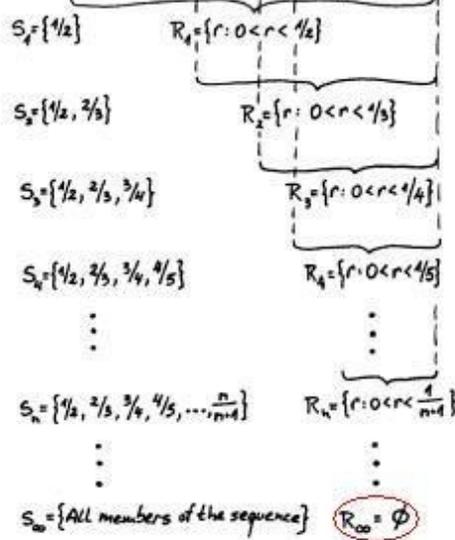


FIGURE 9.1 Here is how the Basic Metaphor of Infinity characterizes the idea of a sequence approaching a limit. The sequence here is $\{x_n\} = n/(n + 1)$. The limit is 1. In the special case of the BMI, two sets are formed at each stage. The S_n 's progressively gather the terms of the sequence as they are generated. The corresponding sets R_n characterize the real numbers between 0 and $1 - x_n$ —the portion of the real line (which remains at the n th stage) between the n th term of the sequence and the limit. At the final resultant state, S_∞ contains all the members of the sequence and R_∞ is empty. This will be true only for the number that is the limit—namely, 1. Note that, in this case, the limit does not occur in the sequence.



- This is what is implicitly meant when we say that the infinite sequence x_n "approaches L as a limit." Note, incidentally, that L can be entirely outside the sequence and still have terms of the sequence infinitely close to it.

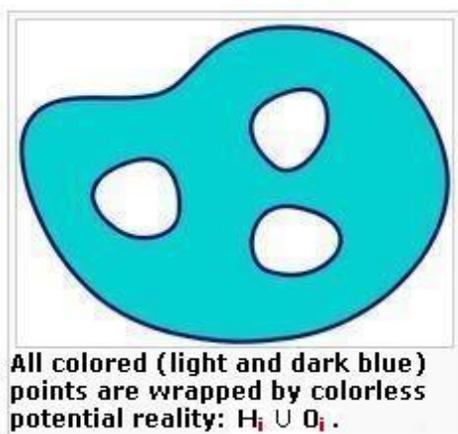
Fig. 2

Note: Every point from the real number line, such as the point labeled **1** above, corresponds to "collapsed" potential reality with squared hyperimaginary unit $w^2 = 0$, corresponding to $R_\infty = \emptyset$ obtained by actual (completed) infinity. The case of non-squared hyperimaginary unit w pertains to non-Archimedean potential reality that does not belong to the points from the real number line. It is "colorless" and does not belong to the points comprising closed intervals.

Now let's go back to 18th century, when people were very careful about Mathematics. Look at the n -ball with center X in Fig. 1 above, with shrinking radius ϵ (epsilon). Augustin-Louis Cauchy used the French word "erreur" to denote the error in reaching the center X corresponding to the point labeled **1** in Fig. 2. As George Berkeley stressed, any error, no matter how small, is inadmissible in Mathematics: *In rebus mathematicis errores quam minimi non sunt contemnendi*. If we use only Archimedean topology (recall the carpenter above), there are two and only two alternative options: (i) $\epsilon > 0$ and the limit X in Fig. 1 viz. the dimensionless point **1** in Fig. 2 can never be reached due to potential infinity, or (ii) $\epsilon \equiv 0$ viz. $R_\infty = \emptyset$ (Fig. 2) and the limit X viz. the dimensionless point **1** in Fig. 2 is indeed reached by actual (completed) infinity -- *tertium non datur*. However, both alternatives, (i) and (ii), lead to contradictions. Option (i) contradicts the fact that the limit does exist. For example, imagine two polygons, inscribed and circumscribed, and double the number of their sides: there exists an endpoint or limit of such sequence, at which the two polygons disappear, being converted into one perfectly smooth circle comprised of infinite -- actual infinity -- dimensionless points (Euclid), and you hit the insoluble Thomson lamp paradox. The same problem occurs with "the big bang". Option (ii) requires to apply metric viz. size to the very limit at point X (Fig. 1) and point **1**

(Fig. 2), just like people in metrology "define" [international second](#) to be comprised from no more and no less than 9,192,631,770 time intervals with *finite* durations. Then the elementary building block of spacetime ([Euclid](#)) will have *finite* size and duration, like the so-called [Planck scale](#) (e.g., 10^{99} atoms of volume in every cubic centimeter of space and discrete ticks of about a Planck time or 10^{-43} second, [L. Smolin](#)). **Dead end.** If you ask what is *between* these "atoms of volume" (resembling [gauge bosons](#) exchanged between particles), the answer is "nothing", just as there is no water between two adjacent molecules of water. Which goes back to the standard calculus texts of 18th century: the consecutive points of the same line succeed each other [without any interval](#).

The *only* possible solution is to use both Archimedean and non-Archimedean topology (cf. **YAIN** below), and unite options (i) and (ii) as pertaining to two ontologically different forms of reality: case (ii) belongs to *physical* reality in the **past**, in which the *physical* explication of the Universe does have *finite* size or duration (cf. the **closed** interval [above](#)), while case (i) belongs to *potential* reality placed in the **future**, in which the not-yet physicalized Universe is *infinite* -- [physical theology](#). Viewed from the physical world endowed with Archimedean topology, the *potential* reality may look like being placed "within zero" or "exactly at infinity", while in fact it is [ONE mind-like entity](#) with non-Archimedean topology, just as there is no distance between the *idea* of a tree and the *idea* of a mountain. Hence if we use the two distorted images of potential reality to "describe" the *finite* physical world in the **past** ($w^2 = 0$, see [above](#)), we hit Eq. 1 shown at my [website](#) ($0 \times \infty = 1$). The latter is of course truly paradoxical, and we need the so-called *hyperimaginary numbers* to define the *emergence* of points from the [real number line](#) viz. the *emergence* of spacetime continuum -- [once-at-a-time](#) -- as **wrapped** by one and the same *potential* reality placed *simultaneously* at "infinity" and at "zero", denoted with "colorless" $H_i \cup O_i$:



The idea of topological boundary, known from math textbooks, is [here](#).

On the other hand, options (i) and (ii) are always separated by the [interface 'now'](#). If the latter is somehow [removed](#), the "train" may stop and the *entire* Universe might go back to Case **IV** [above](#). Or maybe not. Such [eschatological](#) transition is logically *undecidable*, so God could never be reduced to science and Mathematics. It is impossible to verify whether Case **IV** [above](#) has or has not [qualia](#) from its quantum-gravitational [monads](#) (the "brain" of the Universe), so the question of 'God's thoughts' ([Einstein](#)) is also *undecidable*. [Sir Arthur Eddington](#), for example, suggested that the "stuff" of the world is "mind-stuff", explained as "the aggregation of relations and relata which form the building material for the physical world" (*The Nature of the Physical World*, Gifford Lectures, 1927. Cambridge University Press, 1928, p. 278), but here the [mind-like stuff](#), residing in the potential **future**, refers to the imaginary *potential* states of the "brain" of the Universe, not to some *res cogitans* or [qualia](#) attached to every proton or galaxy. Very tricky question. We all will find out the answer, sooner or later (better later).

Going back the "projection of the movie" [above](#): the *global* time of the movie operator (the **meta** observer, cf. Case **IV** [above](#)) will match *perfectly* every 'time parameter' read with the clocks of the **re**-assembled 4-D observers: "From one perspective, each such parameter might be regarded as a legitimate definition of (global) time", yet "these definitions of time are in general unphysical, in that they provide no hint as to how their time might be measured or registered" (J. Butterfield and C.J. Isham, p. 48). Stated differently, the *global* time of the movie operator will **collapse** ($w^2 = 0$, see [above](#)) on every individual 4-D event 'here and now' ([interface 'now'](#)) or 'frame' from the **re**-assembled 4-D movie: the two **vectors PO** and **PW** (see the inflated balloon [above](#)), which would otherwise define some global privileged 'arrow of time' and 'reference fluid' ([Brown and Kuchar](#)) and violate the [Lorentz invariance](#), are being **nullified** ($w^2 = 0$) [once-at-a-time](#) ([without any interval](#)), as read with the clocks of physical 4-D observers (local mode of spacetime).

If the [movie operator](#) (Luke 17:21) decides to [put the movie on hold](#), his global time will *not* match the 4-D frames 'here and now' but the [atemporal dark strips](#)]between[the frames, which harbor the *potential states* of matter (see [Schrödinger](#), [Heisenberg](#) and [Eddington](#) above) complementing the *physical* reality, called *potential* reality. The latter is [unphysical](#) (see 'the colorless octopus *per se*' in [REIM](#)) and shows up as [non-tensorial quantities](#) pertaining to the "vertical steps" of the "ladder" [above](#). Hence all [re-assembled](#) 4-D observers can postulate [time-orientable manifold](#), [Killing vector field](#), use [pseudotensors](#), and bravely declare "yes, I do understand GR, but cannot discuss that now" (cf. [Stanley Deser](#) [above](#)).

Why not? Because neither [Stanley Deser](#) nor any of his [colleagues](#) can explain how their *local* clocks read the [global cosmological time](#) ([Thomas Thiemann](#), [p. 2](#)) of 'the entire Universe'. The *global* cosmological time could become 'physical observable' iff the "ambient environment" (see the two-pint beer [above](#)) could act as [referential \(black\) background](#) with respect to which the global dynamics of the universe, parameterized with its [scale factor](#) (read by *local* clocks), could be defined ever since "[the big bang](#)". But then you have to explain the [\(black\) "ambient environment"](#) as well, which will promote the [Lorentzian aether](#) (see [above](#)), the [reference fluid](#), and the endpoint 'time zero' to *physical* observables, like the two [red](#) points [above](#).

Bad idea. Which is why [Aristotle](#) suggested the [Unmoved Mover](#), presented with Case [IV](#) [above](#). Hence the Universe becomes the only *truly isolated system*, endowed with *self-action* (dubbed [Aristotelian Connection](#)) and [wrapped](#) by [non-reality](#) (cf. Case [IV](#) [above](#)). The question about 'borders at infinity' [above](#) is resolved with the new zero-valent logic [YAIN](#) ([Yes-And-neIN](#)): **yes**, there are "borders" at infinity, but only within the "horizontal steps" of the "ladder" comprising 'physical reality' in the past and -- **no**, there are no "borders" at infinity in the "vertical steps" of the "ladder" comprising 'potential reality' in the [future](#). Thus, the [interface 'now'](#) has *dual* topology. The alleged "singularities" ([R. Geroch](#), [p. 526](#)) in terms of "incomplete and inextensible curves" ([J.M.M. Senovilla](#), [Sec. 2](#); see also [J. Isenberg](#), [p. 2](#)) are automatically removed by the *quantum* nature of [spacetime points](#) with *dual* topology.

We *must not* be able to *directly* observe the global "parameters" of the Universe, or else the theory of relativity will be demolished. We can only observe the [\(non-tensorial\) imprint](#) of potential reality, cast on the *physical* reality at every consecutive "horizontal" step of the "ladder" [above](#), but **not** the potential reality itself: [Der Geist bewegt die Materie](#). Now replace [Der Geist](#) with Einstein's 'total field of as yet unknown structure' (see [above](#)), and you will be ready to celebrate the 100th anniversary of his unfinished theory, suggested with crucial help from [Tullio Levi-Civita](#).

Again, keep in mind that Einstein's total field of as yet [unknown structure](#) has **dual** topology: check out the *interface 'now'* [above](#). You cannot *disentangle* the "[horizontal](#) steps" (cf. [Eq. 23](#) from [M. Montesinos](#)) of the "ladder" from the "[vertical](#)" ones viz. the *closed* topology (past) from the *open* topology (future) of the [interface 'now'](#). Again, it's a *dual* bundle.

As to the so-called [Higgs bosons](#) (the [Brout-Englert-Higgs mechanism](#)), be aware that the [Higgs recipe](#) is suggested by *ignoring* gravity in the quantum world -- [people](#) still cannot include gravity in their "[standard model](#)", and could only *believe* that the nonrenormalizable spin-2 "[graviton](#)" might be the "force-carrying particle of gravity" ([CERN](#)). Once we include gravity as quantum-gravitational *potential* reality, its vacuum (see 'the colorless octopus *per se*' in [REIM](#)) **can and must** explicate a brand new family of *physicalized* ("colored") Higgs-like bosons, with both [spin-0](#) and [spin-2](#). The latter cannot be some "[graviton](#)", of course. It will **not** break the [Lorentz invariance](#) either, even if some day Higgs' decay exhibits a *preferred* direction (cf. [Oliver Buchmueller](#)).

Why not? Because **gravity** is indissolubly linked to **rotation** as *topological* property of spacetime, from elementary particles (spin, [H. Ohanian](#)) to the [large-scale universe](#) ([Craig J. Copi et al.](#), [p. 15](#)), and we can revive Mach's principle with respect to [the physically unobservable 'rotating reference frame'](#) viz. [Einstein's G-field](#).

The joint phenomenon 'gravity & rotation/spin' is [\(non-tensorial\) imprint](#) of "**rotating**" potential reality (cf. [p. 20](#) in [note.pdf](#)), cast on the *physical* reality at every consecutive "horizontal" step of the "ladder" [above](#) -- **not** the potential reality itself. The physical *content* of every spacetime point/event (cf. [Escher's drawing hands](#) [above](#)) is **not** entirely determined by its **past**. Again, if [people](#) try to interpret the *potential* reality as *physical* reality placed in the **past** (cf. the note on [p. 75](#) in [comments.pdf](#)), the spacetime *itself* will be dead frozen: no dynamics of the spacetime *itself* is possible if you trust the current GR textbooks (cf. [Karel Kuchar](#) [above](#)). Which immediately leads to "the worst theoretical prediction in the history of physics!" ([Anthony Lasenby et al.](#), [p. 187](#)): "Why is the universe larger than a [football](#)?" ([Ivo van Vulpen](#)). Wrong question. The [dynamics of General Relativity](#), resulting from Einstein's 'total field of as [yet unknown structure](#)', is **not** entirely determined by its **past**. We need [physical theology](#).

To sum up, let me repeat my prediction from January 9, 2003: I bet \$100 that the Higgs will not be discovered. Instead, the number of quarks will jump to 8 and more, in a [Fibonacci sequence](#) (Thursday, January 9, 2003, 15:56:04 GMT). More in 'the test of the (Higgs) pudding' [above](#).

As Lord Rutherford noticed in his 1962 Brunel Lecture (14 February 1962), "[We haven't the money](#), so we've got to think!"

D. Chakalov

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