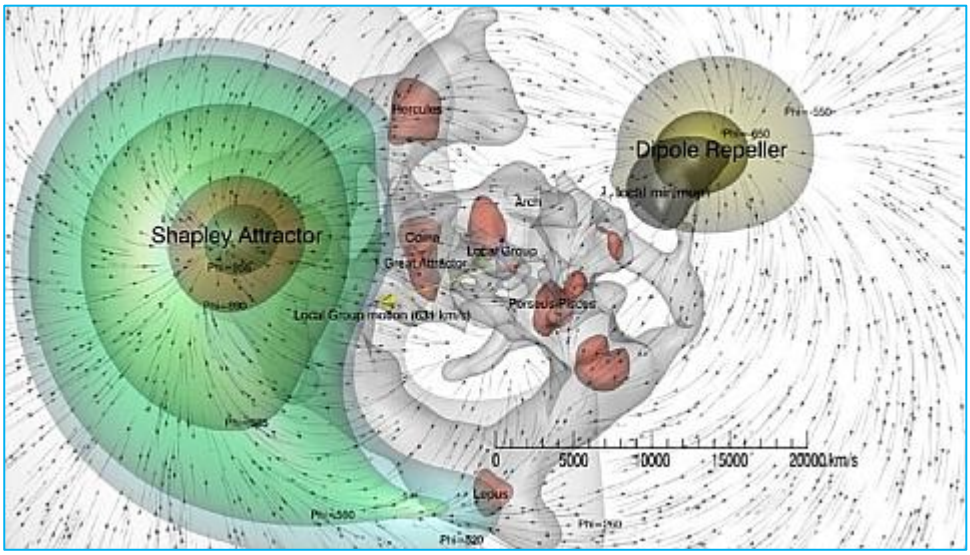

Gravitational Holomovement and Rotation

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Abstract

We model the *physicalized* manifestation of the Universe as bootstrapped 'Brain of the Universe' and seek evidence for brain-like functional organization of the observable universe, resulting from the **Holon** of the Universe facilitated by space-like correlated gravitational holomovement and rotation. The orthodox model of gravity, based on "tangent vectors" and "curvature of spacetime", is replaced with the proposal that the *physicalized* clocks and rulers are very flexible 'jackets' (cf. John's jackets parable in CEN.pdf), which can slow down or speed up viz. shrink or expand, leading to perfectly correlated Brain of the Universe living in so-called 'relative scale' (RS) spacetime. The question of Universal Mind, complementing the Brain of the Universe, pertains to physical theology and the doctrine of *trialism*, and was examined in previous publications (e.g., Sec. **6** in spacetime.pdf).

1. Introduction

Perhaps the best way to launch a new theory is to compare it to the one it seeks to replace. Here I will briefly criticize the ideas of the orthodox model of gravity by focusing on gravitational radiation bounded by gravitational "mirrors" at null-and-spacelike infinity, and the nonlinear transport (if any) of energy-momentum and angular momentum by gravitational waves (gw_miracles.pdf and GW150914.pdf) and torsion waves (if any).

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Let me begin with pointing out that the coupling of gravity to matter (Fig. **1**), as suggested in today's textbooks, is marred by mysteries and controversies, to say the least.

Which goes first, matter or geometry? Is their mutual determination "instantaneous", resembling EPR correlations? How is the *next* matter-geometry negotiation prepared, to produce gravitational radiation 'in time'? If gravity is not a *bona fide* 'force', how could 'the grin of the Cheshire cat *without* the cat' (Fig. 1.1) *interact* with the 'cat' (Fig. 1.2) placed in the right-hand side of Einstein's field equations?

Fig. 1.1

Fig. 1.2

Now, the proponents of "GW astronomy" claim that the massless ($\mathbf{T^{ab} = 0}$) 'grin' (Fig. 1.1) would *only* (Sic!) produce *metric* perturbations of the 'cat' (Fig. 1.2), e.g., squeezing and stretching of a plastic bottle, but here's the catch: the 'cat' (Fig. 1.2) is not a light beam, and it will inevitably gain *or* lose energy-momentum, angular momentum, and **stresses** (ref. [**10**] in gwa_rip.pdf) by gravitational radiation, after which the massless 'grin', which has nothing but Weyl curvature, will become a brutal physical **force**. Or some gravitational "ghost", if you prefer GW parapsychology.

Moreover, the observable universe has *perfectly* correlated structure (e.g., the Dipole Repeller) endowed with large-scale rotation and preferred axis of rotation, which simply cannot fit in today's model of gravity. There are no GW "mirrors" at null-and-spacelike infinity, in the first place. We face a brand new kind of 'open system' (ref. [**8**] in CEN.pdf) that defies the strong energy condition (SEC) and hence **all** energy conditions.

How come the cosmos does *not* break down? We should have observed all sorts of severe catastrophes (if we were around to see them), but none of them has happened. The situation strongly resembles the ultraviolet catastrophe, and calls for new physics.

Let's try Arthur Koestler's Holon. As Wolfgang Pauli remarked, "Das noch Ältere ist immer das Neue".

2. The Holon of the Universe

The so-called 'matrix' (p. **3** in hi_numbers.pdf) has the peculiar feature that it is both 'one' and 'many'. We suggest that all 'matrix' belong to the Holon of the Universe. The Holon is not physical reality but **Res potentia**. It stores the *intangible* energy from gravity and fixes the entire spacetime *en bloc* (Slide **12**). Without the matrix(es) nested in the Holon, no quantum particle, such as the proton, could be assembled (Slide **10**). Let me try to explain by comparing the current model of spacetime with ours (cf. spacetime.pdf).

The topological dimensions of spacetime can only be suggested by imagination, and in special relativity we try to imagine a light beam that will introduce particular *structure* known as Minkowski diagram. So far so good, but then people suggest a 'spherical cow' approximation in terms of vacuum GR, which by definition contains only a massless 'grin without the cat' (Fig. **1.1**), and speculate about *real* "black hole" hidden by some "event horizon", which is Russian poetry. No apparent, trapping, isolated, dynamical, evolving, causal, Killing, non-Killing, universal, Rindler, particle, cosmological, or "putative" horizon (reference upon request) can solve the *teleological* problem of the mythical event horizon.

Moreover, in the real world of the 'cat' (Fig. **1.2**), it is impossible to produce a perfect "event horizon", so even one single time-like naked singularity will **inevitably** kill the entire cosmos — *reductio ad absurdum*. You will need a quantum theory of spacetime "singularities" (ref. [**21**] in CEN.pdf) to speak about *any* "black hole". I will be happy to explain in details, if needed.

In our model of spacetime, the topological dimensions are **re**-assembled **by** **re**-created dynamical events 'here and now' (Fig. **4** in CEN.pdf): both the 'grin' and its 'cat' (Fig. **1**) are *flexible* 'jackets' (p. **3** in CEN.pdf). The back bone of the *physicalized* universe is the Holon made by nested matrixes. We use *Res extensa* and *Res potentia* (Slide **13**). It's a **bundle** (p. **3** in hi_numbers.pdf). Hence we could in principle reproduce (Sic!) **all** effects of gravity, not just the fact that an apple can fall and hit your head, as observed by Newton.

Namely, the *physicalized* clocks and rulers are very flexible 'jackets', which can slow down or speed up viz. shrink or expand, leading to *perfectly* correlated *physicalized* universe, at **all** length scales (p. **77**; see also pp. **30-32** and pp. **80-83** in gravity.pdf).

As an example for spacetime *matrix*, consider the invariant spacetime interval. No physical process alone could *assemble* 'one second', say. In metrology, its operational definition is "the duration of 9,192,631,770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the caesium 133 atom" (Wiki), but such "definition" is only a vague description of a **totally** unknown phenomenon, which can assemble an *exact* finite time interval. Surely an invariant 'one second' cannot be assembled *only and exclusively only* by the 'cat' (Fig. **1.2**). We need the *matrix* for 'one second' as well: it's a **bundle**.

So what kind of stuff makes a *matrix* that can produce *identical* 'one second'? Sir Arthur Eddington suggested in 1927 that "the stuff of the world is mind-stuff." I strongly suggest replacing 'mind' with *Res potentia* (pp. **2-3** in hi_numbers.pdf), because the matrix only *resembles* the human memory: once created, it can never decay or disappear from the Holon — the "memory" of the Brain of the Universe.

Again, the matrix is not 'mind' nor anything labeled with *Res cogitans*. It is *Res potentia*, "just in the middle between possibility and reality" (Heisenberg, Slide **7**).

3. The Origin of Gravity

Gravity is *always* accompanied by rotation, and extragalactic astronomy has discovered amazing correlations among distant structures (see above). The most reasonable, in my opinion, assumptions are that some new gravitational law governs the *self-organization* of astronomical bodies, based on gravitational *rotation* and two tug-of-war manifestations of gravity in *dynamic equilibrium* — centripetal attraction and centrifugal repulsion. As Jim Lucas explained (October 15, 2015): "If you are observing a rotating system from the

outside, you see an inward centripetal force acting to constrain the rotating body to a circular path. However, if you are part of the rotating system, you experience an apparent centrifugal force pushing you away (Fig. **2** – D.C.) from the center of the circle, even though what you are actually feeling is the **inward** centripetal force that is keeping you from literally going off on a tangent."

Fig. 2

We conjecture that rotation/spin is *topological* property of spacetime (Fig. **9.2** in CEN.pdf) and that the **inertia** of bodies (p. **89** in gravity.pdf) arises "from the gravitational field of a **moving** (Fig. **1** in CEN.pdf – D.C.) universe", as a result of "the **interaction** of matter with the rest of the matter in the universe" (Dennis Sciama, 1952). What *we* experience is the **inward** centripetal force (Fig. **2**) that corresponds to our 'weight' on Earth, which will be smaller if we are walking on the Moon, and can disappear if we orbit Earth in free fall.

Many issues here need explanation. Universal *topological* rotation means that the *physicalized* universe only acquires **local** "spin" in terms of **local** centripetal attraction and centrifugal repulsion, whereas the **global** 'merry-go-round' is not observable, just as the global cosmic time. Secondly, gravity is not modeled with some "curvature" but with variable '**r**ate of time' ($\mathbf{R_t}$) fixed by the spacetime matrix (see above): it "shrinks" the spacetime metric to produce **local** centripetal attraction and/or "inflates" the spacetime metric to produce **local** centrifugal repulsion (p. **89** in gravity.pdf), until the tug-of-war manifestations of gravity reach dynamic equilibrium, and their net effect is **zero**.

In a way, the *self-organization* of astronomical bodies resembles a holistic school of fish (Fig. 3) in which the gravitational properties and dynamics of every **local** fish are being **negotiated** (Fig. **1** in CEN.pdf – D.C.) with the entire 'school of fish' (cf. ref. [**11**] in hi_numbers.pdf), i.e., "with the rest of the matter in the universe" (Dennis Sciama, 1952).

Fig. 3

Nowadays people believe that the metric space of the universe is *absolutely* fixed, which leads to *absolute* spatial structure, from 1.6×10^{-35} m (Planck scale) to the "largest" object beyond the observable universe. But I am relativist and do not accept absolute structures. Instead, I proposed at my website 'relative scale' (RS) spacetime (p. **77** in gravity.pdf).

Consider two observers, Alice and Bob, at the length scale of tables and chairs, and a table with length **1m** in front of them. In RS spacetime, the **matrix** (Sic!) of the table will *shrink* toward the Small and *inflate* toward the Large. So if Bob is co-moving with the table, he will **always** inhabit *the same* spacetime/table in front of him. Relative to Alice ($\mathbf{R_t} = \mathbf{1}$), however, Bob's table will *shrink* to the size of a proton and beyond, while *at the same instant* (Sic!) the same Bob and the same table will *inflate* to the size of galaxy cluster and beyond, after modulating Bob's **matrix** with $\mathbf{R_t} \in (\mathbf{0}, \infty)$. Yet the table will **always** have "invariant" length **1m** to both Alice and Bob, in their respective domains.

Who has 'the right meter', Alice or Bob? **Wrong** question. Their RS 'meter' and 'second' are not observer-independent quantities, but *flexible* 'jackets' (cf. John's jackets parable in CEN.pdf) determined by their *atemporal* (Slide **3**) matrix.

In my opinion, RS spacetime is **the only way** to unite quantum theory with gravity, since they will be "separated" only to Alice, while Bob will be *both* "small" like a proton *and* "large" like a galaxy, and will EPR-like correlate the entire RS spacetime *en bloc* (Fig. **3**). For in RS spacetime **gravity** is determined by the same spacetime matrix that creates the *entire* spacetime (Slide **12**), only applied **locally**: shrink the RS metric to produce "cold dark matter" or inflate the RS metric to yield "dark energy", in dynamic equilibrium.

Needless to say, all this is a very brief exposé of the origin of gravity, which one day will (hopefully) be expanded to the mathematical theory of spacetime, based on the so-called hyperimaginary numbers.

4. Conclusion

I believe it is safe to say that the only thing we know for sure about **inertia** is what it is **not:** "The equality of inertial and *active* gravitational mass then remains as puzzling as ever. It would be nice if the inertial mass of an accelerating particle were simply a back-reaction to its own gravitational field, but that is not the case" (Wolfgang Rindler, p. **22**). The experts in gravitational physics stubbornly continue to describe **inertia** as some "fictitious force", because the gravitational "field" cannot be a *physical* field, like in the case of electromagnetism. I tried for many years to explain that, although gravity is not physical field, it is not *classical* field either. Unfortunately, nobody showed any interest. Many people can fly in the air by temporarily switching off the inertia of their bodies, but in our society the only digestible stereotype for REIM is "magic". Hence the alleged GR experts are "safe": academic scholars are *serious* people, which is why they are not interested in "street magic". How about extragalactic astronomy? It will be also "magic", if they try to explain the facts with the current GR textbooks. So they keep quiet as well.

Can't win. The only available option, it seems, is to fly over Thames in London, so that many people and journalists will pull out their smartphones and record REIM. Then perhaps they will ask questions and I will offer them this brief online paper. Then perhaps they will request the opinions of their trusted academic scholars, who finally will have to get professional, and the ball will start rolling. Which is why I decided to write this paper.

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