Why Matter doesn‘t matter, even dark Matter – only Spacetime does matter

A new Paradigm according to Kuhn in modern Description of Spacetime ?

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Abstract:

Since first action at Big Bang the universe is determined by spacetime-vacuumstructures, not by matter. Material atomic structures of hydrogen molecules or other chemical elements or particles like quarks, gluons and leptons only deviate from the basic, important concepts of nature: spacetime. This concept is an energy-structure, which lies at the base of all existing objects and interactions which are described over matter structure. So this description via General Relativity nowadays leads to the thinking of underlying spacetime-structure as the real thing, which describes the important forces of universe in first line. The existence of matter floating on space-time only distracts from the true basic description of the real world and feigns importance where only irritation exists. Natural philosophers like Cosmologists and spacetime physicists should therefore concentrate on the fundamentals that a vacuum structure of space-time provides for the explanation of the existence of the universe and refrain from and abstract from considerations of matter. This situation may lead to a better understanding of the basic structures of a quantum-gravity.

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1. Introduction: why there are no “zeros” or “infinities” in physical nature.

Plato already spoke in the Timaeus of space as the primal source of all being [1.]: *“ What nature and power should we assume it (the third species, i.e. space) to possess? Above all, that it is the receptacle of all becoming, like a nurse.*

Therefore the main theme of this article is seen: spacetime, which is our modern name for Platons imagination of an agens surrounding all being. In this respect, this text will be a relaxed, slightly philosophical chat about a rather serious physical topic.

Firstly, in advance there is no "zero" in nature and there are no "infinities". These terms are only anthropocentrical descriptions of human thinking, which come from pure mathematics and have no sense in the application to basic concepts of physical nature. There have to be distinguished between physical descriptions which excludes "zeros" and allows only a definition of "under our measuring value-area" and mathematical notations, which includes "zeros", where they refer to mathematical relationships into which they can be strictly classified by definitions, corollaries, lemmata or proofs and where they refer solely to only well definded mathematical spaces, which can't be coupled bijective to classical physical spacetime of Space-Symmetrygroup O(3,1) or quantum gravity descriptions.
With these problems old supergravity-theories and Superstring theory in its early time already had to grapple with distinguishing between these two categories [2.]. If physicists had followed Max Plancks thinking strictly from classical quantum theory and his approach to transitioning from the continuum of mathematical integral calculus to summation over discrete states where it made sense and is really defined, progress might have been made in this field some years earlier. Instead, calculus was all too often applied where it was not definable at all. Example given: integrating over a geometron or square Planck-Length. Since Planck-Length is the smallest defined length in physics, it makes no sense to integrate over a square of it, because this action would define a smaller description of spacetime, which doesn't exist in this physical formal description.

Also there are no "infinities" in physics. Two parallel lines don't meet in "infinity", because a mathematical defined phase space (e.g. of euclidian structure) is not the description of real reality.
In spacetime cosmology deals with the cosmic horizon, which is the edge of measuring empiric research, because it is the fundamental physical limitation of our senses and our perceptions. This range is actual by a radius of $R = 4{,}6 \cdot 10^{10}\, LJs$. What is behind this cosmic limitation, or if something is behind (galaxy-clusters), etc. is speculation, not physics. Physics deals with measuring and measurements and descriptions of states and interactions of physical sizes. Infinity is a mathematical concept and an artificial construct (like "zero"), which only can be applied in mathematical calculations, e.g. in limites of a series or in an improper integral over well-defined mathematical spaces with pointlike structures like "Hausdorff-spaces". Fundamental physical structures are ***not*** pointlike because spacetime deals with a geometron, which is the square of a

Planck-legth as its smallest term. This is the minimal area of space-time, which excludes all zeros. There are finite minimal systems in physical reality.
Not only that, but the algebra must be chosen in such a way that the difference between two minimal surfaces does not result in zero but again in a minimal surface.
Example given:
$2 \cdot a - a = @$, where $@ \neq 0$ is the smallest length or square and the neutral element of addition of the underlying algebraic group or where $a - a = 0$ isn't defined or something similar. But all defined conditions for this must be formulated without logical contradictions.

Quantum-gravity algebra excludes the meaning of "zero" but deals with minimal, finite terms. This is something that takes some getting used to, which is why it's so difficult for many physicists to follow this new paradigm. But this description of the quantum vacuum radiation field of spacetime is possible, if we consistently follow the program, that Planck first developed, when he treated the radiation field of an oscillator first quantum mechanically and not in a stetic continuum.

2.The Anti-Machian idea of local caused inertia:

The antimachian idea of how inertia is locally coupled to spacetime is becoming more and more accepted in the physical societies compared to the long-outdated idea that, influenced by Einstein, permeated the theoretical physics of General Relativity Theory (GRT) for many decades. This is a new paradigm after Kuhn [3.], which slowly replaces Mach's ideas in the minds of the physical world. Even Einstein [4.] , who was strong influenced by the idea of Mach , built this idea in GRT only in as a heuristic principle and not a real fact, because he knew how "weak" it is in its interpretation. Wheeler [5.] set the alliteration: "Misty and murky is the meaning many are making of Machs principle". This sentence shows the very lot of interpretation possibilities which this Mach-principle underlies. This sentence can also be related to the interpretation to explain dark matter …
Also its used in Superstring theory related to M-theory in an adapted form.

First let us repeat what the Machian idea is [6.],[7.]: *the inertia of matter should be caused, directed and controlled by all other existing matter.* This idea never shows up in all described exact solutions of General Relativity with come from the Einstein-equations but Einstein was very influenced of this idea from Machs Book about mechanics, so he tried to put it in a logical way into his equations.

Why can't the real world be Machian? There is a simple answer of this problem, since cosmic expansion was observed once by Hubble. The assertion of this assumption can be proven by simply examining the opposite event. This is obvious but it is shown in the following logical conclusion of premise, assertion and proof:

Conclusion:

1. Premise: define the term of inertia: There we have **Newton's First Law of mechanics**:

It is also called **lex prima**, the principle of inertia, or the law of inertia. The principle of inertia makes statements about the motion of physical bodies in inertial frames of reference:

Definition 1:

"A body remains in a state of rest or of uniform rectilinear motion unless it is forced to change its state by acting forces."

Original text in Latin:

Corpus omne perseverare in statu suo quiescendi vel movendi uniformiter in directum, nisi quatenus illud a viribus impressis cogitur statum suum mutare. [8.]

Comment: It must be added to this statement of Newton that when there is a change in movement, speed or direction, a resistance to the movement occurs, which we call inertia. And the question now is: is this resistance caused by all other existing masses (Mach's effect), global by an extern quantum field (like Higgs-field) or by local spacetime in way of quantumgravitational process with microscopic/macroscopic coupling?

2. Assertion or assumption: suppose local inertia on masses is caused by all global matter.

3. Proof of opposite event: the universe expands [9.] and but then galaxies disappear beyond the cosmic horizon, thus leaving the causal sphere of influence that allows for a delayed interaction to local earth-bound processes. This also applies vice versa from our terrestrial perspective. This reduces the coupling of the global masses to the local masses, and the inertia should decrease locally. Such a process .would have to be measurable and thus physically verifiable or falsifiable according to Popper [10.]. Since there are a great many galaxies about at least a hundred billion of them or more (without double-counting through gravity lenses), statistically speaking at least one disappears behind the cosmic horizon per short, humanly measurable unit of time, say a year. If this effect exists, it must be verifiable. Some 13,7 billion galaxies must have disappeared behind cosmic

horizon since First Action of Big Bang if the inflationary expansion phase is now ignored as a first approximation. If such an effect can be measured or the effect isn't under the measuring limit today, there must be the logical supposing for now, that the world today isn't classical Machian. □ Q.e.d.

3. The pure geometrical description of space-time:

If the universe is not classical Machian, can then there be another form of coupling something to local inertia without classical causal transmission of energy processes (for example via classical emitted gravitational waves between matter masses)?
The answer is : yes!

Supposed can a transfer-coupling via non-local quantum action in fundamental gravitational quantum vacuum, which lies at the bottom of all existence: a gravitational, non-local spin quantum network, for example. This system is the underground of classical spacetime and may describe in a consistent form the "causing" of local inertia via coupling to local spacetime structures on the size of a Planck-level. Another theme of discussion is to bring in the Higgs-field, which causes the masses of the weak Vector-Bosons of symmetry group SU(2) and the Higgs-mass, which is encoupled from electromagnetic photon with description of U(1) at low energy-denses and low coupling constants in classical standard-model of matter.

If these assumption is made and the Higgs-field is excluded, then inertia is a local caused process by quantum gravity coupling. This possible fact means that spacetime is primary in description of universe and cosmic processes and not matter. Matter is only firework, only show. One has to look at the deeper structure of spacetime itself, on the vacuum-energy structures of gravity field-equation. And thus also Life is just a small speck of dirt on the wall of the universe. Without any matter for evolution of cosmos.
It is an almost anthropocentric and wrong standpoint to mean that matter has any evidence in the universe. It hasn't. But indeed, vacuum-energy has. The expansion of universe is characterized by cosmological constant more than through matter-tensor which can be global neglected in cosmic description because there is not enough matter in universe to determine its past, present or future, not even, when dark matter comes in handy. Matter doesn't matter, even dark matter. ***Spacetime does matter!*** Matter is only an algae slick on the surface of ocean of spacetime! Why should the

laws of an algae slick be the laws of the ocean? Why should ordinary quantum description describes also the basic laws of being, gravity? What have the symmetry groups of standard particle - and interaction model of U(1) x SU(2) x SU(3) to do with gravity, which exists as a basis for all other interactions and does not couple to them at weak energy densities? If this coupling exists really at high energy densities in time near of first cause at Big Bang we don‘t know and we also don‘t know if this information is important. Known are only the gliding coupling constants of the three matter-interactions, which approach each other with increasing energy densities near first action of Big Bang. If there is also a coupling of gravity to this three matter-interaction constants is not really known but only supposed. But gravity is different from matter-interactions, because of its dealing with the primary ground spacetime, where the theater of matter only on this primary ground takes place.

There are many models and exact solutions of GRT, which deal only with empty spaces, but which doesn‘t mean real empty but only without matter term for their description. In modern quantum gravity, spacetime fills itself with a vacuum structure and even in classical Einstein-GRT, empty space has an energy density because the field excites itself, even without the influence of matter mass, due to the existence of nonlinear field equations of gravity. Like a magician who distracts his audience from the truth with his tricks, the presence of matter fools the fundamental research of spacetime and diverts it to unnecessary descriptions that lie exclusively on the surface of the truth and therefore only fools the observer. Since antiquity, from Aristarchus of Samos through Copernicus [11.], Kant [12.], Bruno [13.], and Laplace [14.], the construction of humanity's worldview has been based solely on descriptions of matter. Stars, planets, the position of the Earth and the Sun, and the first discovery of extragalactic objects confound the senses and their technical extensions, such as radio - and optical telescopes, while the underlying spacetime can only be traced locally in the phenomena of black holes but this research isn‘t easy to do except of theoretical concepts because there aren‘t enough empirical data. Despite all the efforts of astronomers, we still don't know exactly what happens to information at the edge of black holes, and what quantum gravitational interactions take place there. Because we know today, that Lie-groups of classical gravity description of General Relativity are neither Schrödinger-quantizable nor Dirac-quantizable.

The world of matter is beautifully colorful and obvious when the inquiring human opens his eyes - but behind its external beauty it conceals the inner truth of the underlying space-time agent, (and spoken with Shakespeare) on whose stage the play "matter" is first performed - but without a stage there is no theater: *"We are such stuff as dreams are made on, and our little life is rounded with a sleep."* [15.] And the sleep is a symbol for spacetime and the stuff of dreams is only matter.

There are constructed a lot of spacetime-models which consist from pure geometry and are exact solutions of GRT gravity-field equations [16.]. Wheeler in particular has repeatedly enriched space-time research with his geometrodynamic models [17.], but there are also other descriptions of cosmic models that are not really empty but free of matter. In these spacetimes the vacuum structure or a field of gravity waves, which changes the curvature dynamically, especially local but also global, plays the greater role of importance. We must change our views on ontology if we are to come to terms with the pure vacuum of spacetime and consider the existence of matter as irrelevant to the evolution of the cosmos. While matter only presents a beautiful appearance at the surface, we must deal with the fundamental structures of the ontological possibilities of our existence – that is spacetime quantumgravity structure. Only by this description and by dealing with this topic we can understand the first cause of the Big Bang through the laws of quantum gravity and thus also the foundations of our own ontological existence.

4. Why vacuum does matter, but matter does not:

In extrem situations with very big curvature or strong oscillating spacetime, gravity can generate matter particles like electron-positron pairs or may be quark-gluon-plasmas. This undoubtedly happened in the very early days of the universe, but it was merely an unintended side effect, an accident of early cosmic history, so to speak. The main purpose of the Big Bang was not to create matter, but to *unfold* space-time. Matter is essentially superfluous because it does not determine the fate of the cosmos and the cosmos does not actually intend matter. God may be say: “Matter? I Didn’t Do It On Purpose, When I Created The Cosmos, It Was Just An Unimportant Side Effect, An *Unintended* Side Effect, It Means Nothing At All. But It’s Nice To Look At It, So I Let It There … But It Means Nothing ...” Or he takes the statement: “I Only Made Spacetime … But Matter Made The Devil! This Is The Sinfall!” Or we can think of the following situation: “.... and God said, "Who Needs Matter?" The devil timidly spoke up with his index-finger in the group of angels, surrounding God, and said cautious: " Excuse me, My Lord, but I need matter." (And he grinds his teeth inaudibly).
" So Ye Shall Have It! It Will Be! But Thou Have To Remember: What I Give, I Can Also Take Away!" “ (God always speaks with capital letters because He is God).

Actual the universe is expanding under decreasing acceleration, how the newest measurements seem to show. But it is determined by vacuum values like cosmological value of Λ in Einstein-fieldequations of gravity, which is also somewhat sensationally today called "dark energy” . Today,

however, it has been shown that it could possibly be a function of the radius of the world and the rate of expansion velocity of the universe like Hubbles parameter, and therefore should be regarded as a dynamic function not as a constant [18.]. In this case it seems from observations, that the universe in its global characteristics is determined by physical vacuum functions and not by matter. Since we are, human mankind is made of matter, we find it an important thing. Also our human senses, their technical developments through our instruments and our actual research paradigms in astrophysics or astronomy are often calibrated to the perception of matter and not to this of vacuum energies, which will eventually determine the fate of whole cosmos a lot more than matter will do. So instead of imposing a model of the "ideal fluid" on the universe, as is often done in the research and investigations of exact solutions of general relativity describing galaxies and their higher agglomerations, it might be more sensible to try to grasp the basic vacuum structure and describe the cosmos using it. Perhaps the real descriptions of the existing world could then come a little closer to us than has happened so far because we can't see the forest for the trees by only dealing with phenomena of matter. It is like the situation of a man in a dark, lightless cellar with dark eyeglasses or blind, who wants to grasp the spatial structure of the cellar only by feeling the objects in there.

Quantum gravity loop-description tries to this - but it hasn't really made much progress in recent years, except for reproducing the Hawking-Bekenstein relationship for the thermodynamics of black hole surfaces [19.]. The same applies in principle to superstring theory, which has at least achieved the same thing but can’t find the real description of standard-model symmetry groups U(1) x SU(2) x SU (3) for matter-fields of electroweak and colour-forces [20.] .
Matter doesn’t generate space structures, it only forms them. Spacetime structure is formed by itself over nonlinear selfcoupling of vacuum-gravity fields according to a classical field equation of vacuum:.

$$R_{\mu\nu}-\frac{1}{2}\cdot R\cdot g_{\mu\nu}+\Lambda\cdot g_{\mu\nu}=\mathrm{T}_{Vac} \qquad (1.)$$

which determines the vacuum structure of spacetime over cosmological constant or function, Ricci tensor and Ricci scalar. At the opposite site of equation there is a vacuum constant or function, which describes in coupling with Λ the basic spacetime structure without matter. All these equations are, of course, only a very rough approximation, and therefore actually wrong, because

they still use infinitesimal calculus instead of discrete calculations of difference applications or summations over discrete and finite, countable quantities. In this case they only describe the classical surface of gravity like is defined in ordinary General Relativity, not a quantum gravity form.

The main question thereby is, if whether the original starting structure is really random, because the inner states of being of the universe, concerning matter, are at least rational, because in principle they can be explained in an understandable way to (and from) humans, and thus fit into their thought structure, which is itself based on matter. Nevertheless one must not allow one's view to be distorted and clouded by the superficial existence of matter, but must ask about the actual space-time primal ground on which the matter structures only unfold quantitatively and seem only to couple weak at the basic spacetime structure at low energy densities, which nowadays occcur. There can be made several models of basic structure: a spin net, a dynamic lattice, a quantum foam, a rigid lattice where time would be defined only on the (macroscopically defined) geodesics or vibrating strings or a minimal net of cosmic strings or minimal Planck-sheets (which shall be called “metrons”) which piece together to form larger areas or allow classical gravity and its curvature to appear only as an average of finer, deeper structures. May be astronomers should concentrate their research and observation more to the spaces between the galaxy-clouds, more to the big voids than to all this matter garbage heap.

A main problem in this case is the fact, that our possibilities of measurement in the areas of this very small are not yet covered. We are still far from true short-time physics or its equivalent in the length range or at really high energy densities, where quantum gravity vacuum may play its important role. But we should concentrate by this theme less on matter, but on the possibilities of researching gravitational quantum vacua. In this way, a kind of anti-Milnean standpoint [21.] can be adopted in such a way that it assigns virtually no significance to matter but ascribes the only truly relevant physicality to its underlying structure, which does not degenerate into the description of pure geometry, but must actually be described via real, measurable vacuum fields – not via idealizations of purely mathematically defined geometries, which don’t exist in reality [22.]. Since Einstein and Wheelers geometrodynamics there is a mental program to describe the base of phenomena purely through spacetime but the fault was made that the idealization of pure geometry was done and it was not seen, that space-time is a real dirty, physically entity with measurable substructures and not a white table of geometric point-space [23.]. Also the measure as foundation of physical sizes must be based on expressing all measurands using fundamental constants. This

choice will be put to the test, however, if the constants currently considered fundamental turn out to be time-dependent functions on large time scales. This problem couples with fundamental symmetries according to Noether [24.],[25.]. In sense of Kuhns changing of mental paradigms in scientific research this planning of concentrating on vacuumstructures not on matter, should be realized.

5.Conclusion:

So at last (but not least) lets finally make an appeal to all cosmologists, astrophysicist and all other nature-researchers in this field, who aren't already quantum gravity experts: Come down!
Come down from the Olympus of pure geometrical descriptions or infinitesimal-calculus. Come down to the real world, come down to the ground, come down to the bottom, come to the cabaret, where gravity and spacetime is dirty, rocky and ugly. Come down to the place, where reality stuff is rough (but tough to handle) because when the going gets rough, the tough get all the hardest stuff (not matter), have then to deal with it. You are welcome! Come down to the place, where spacetime has a rip-length and a tear resistance and an ontological end of existence (all things have an end, only sausages have two) and where is no smooth white table of pure geometry or infinitesimal-calculus and no idealized constructions of sterile symmetries. To handle gravity you must think like an engineer not like a mathematician. Get your hands dirty: welcome to the mud. Welcome to the pleasure-dome [26.]. There are no zeros and no infinities!
And now I have come to an end, too with the adapted word: Misty and murky is the meaning, many are making of matter!

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8.Verification:

This paper is definitely written without help from a chatbot like Chat-GPT 4 or other artificial AI-tools.

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