On the philosophical background of the texts

Quasi-cyclic universe

Background - Overview - Summary

In principle, a materialistic explanation and view of the universe requires, in addition to the acceptance of causality and determinism, the consideration of all physical conservation laws such as conservation of energy or conservation of momentum and angular momentum. However at present, quantum mechanical systems are often denied a deterministic basis, but there should actually be non-directly detectable, permanent influences on those systems by a continuous, ubiquitous density variation of the 'substrate of everything' - triggered by the introduction and superposition of countless emitted waves as a result of the movement of all elementary particles forming matter, as well as by photons within this substrate. Highly localized motions (e.g. in nucleons or atomic shells) can therefore produce time-averaged highly localized depletion areas or density gradients within the substrate (orbitals), which give additional force effects in addition to that of electromagnetism by means of 'dark energy' - degree of compression or density of this substrate.

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Within the presented texts the use of the Copernican principle was of eminent importance for developing of models. For this purpose, the principle modified to only cosmological references (principle of mediocrity) was used (not the one related to the position of humanity): 'we cannot represent anything special, nothing outstanding'. In its time, it made our Earth one planet among several others (development of the heliocentric system) and was later expanded to give our Sun and the Solar System its completely normal position within the Milky Way, and then again later to make this Milky Way a normal galaxy among many other galaxies (E. P. Hubble). The author has extended this principle again in order to make our entire Big Bang system a normal one among countless comparable systems in order to avoid the presently assumed starting singularity, which is necessary in the current view (astronomically detectable cosmos = universe) and would in addition have to lead to a non-acceptable eternal thermal death. In today's dominant model, there would therefore be a unique, only once given existence of 'the' expanding 'universe', which would contradict the above principle. The view that our BB system should be seen as a common, typical system of a much larger universe may be regarded as pure fantasy or speculation according to the current state of knowledge. But where would we be today if Copernicus hadn't speculated that the Earth is a normal planet in a normal solar system?

If one analyses the true and deeper meaning or expression of the term 'universe', it is an all-encompassing overall system, which must also be understood and seen in the amplification of

'everything without exception'. So could a universe be formed or emerge from something else? No, because then the 'something else' would be the universe. Could several universes coexist at the same time? No, because then the sum of all these 'universes' would be the universe and the alleged universes would be only partial universes. Since the process of reversal, the annihilation or dissolution of a universe into something else must also be excluded in the same way, there can only be one thing for a universe: it can only exist forever and ever, and any changes can only take place in parts or partial areas. A universe in the strict sense of the word can therefore have no 'age' though time passes in its interior!

However, since the sum of all astronomical findings results in an age of about 13.8 billion years for our (apparently alone observable) Big Bang system, this can therefore only be a partial universe. From this finding and taking into account the proven Copernican principle, we can only conclude that our Big Bang system can only be a completely normal such system among countless comparable ones. What does the future of such BB systems look like? Regardless of the possibly insufficiently secured accelerated expansion, however, no deceleration is definitely detectable, although any initial momentum or impulse of masses would have to be steadily reduced as a result of the mutual gravitational forces. According to these astronomical findings, all galaxies will therefore continue to move away from each other permanently also in the distant future. The galaxy density must be steadily decreasing; apparently a future eternal thermal death. A 'dying Big Bang System' thus emits burnt-out galaxies in all directions of space in its distant future.

Of course, the same must also apply to all other comparable systems as soon as the status sub-universe is accepted. All these galaxy remnants emitted by all the sub-universes (possibly then collapsed into gigantic black holes) will therefore have to meet at some point and capture each other. Time does not matter here. In the long term, this should lead to more and more growing gigantic black holes. An essential finding of modern physics, however, is the finding that no physical description quantity can grow infinitely, not even mass or mass density. The only conceivable meaningful scenario when reaching a limit mass density can only be the renewed triggering of another 'Big Bang', the transition of a now supercritical black hole (nothing, not even light, can get out of it) into a white hole (nothing can penetrate into this expanding system, we cannot observe the other BB systems in principle).

In this envisaged model concept, a philosophical basic assumption, a principle of 'meaningfulness' for physical/cosmic processes, has again been incorporated in order to avoid the dead end of a state of uniqueness or an eternal thermal death. If black holes could accumulate mass at will and did not completely change into radiation from a limit mass on, a multi-BB system would again only result into eternal thermal death, instead of a much more meaningful quasi-constantly lasting, quasi-cyclic new emergence and decay of Big Bang systems. However, a fundamental problem arises if the currently

accepted Standard Model of Matter (STM) with elementary quarks as its basis had to be chosen as the basis for the structure of our matter. Even a quark-gluon plasma expected in this model, no matter how highly compressed, would not be able to abruptly switch completely into electromagnetic radiation as the mass density increases continuously. This requires a structure of our matter in equal parts of both, matter and at the same time antimatter particles, as is the case in the alternative Direct Structure Model of Matter (DSM) presented in the texts with composite quarks of orbitalised, highly relativistic electrons and positrons. The resulting great advantage is also the omission of the presently assumed, completely incomprehensible matter-antimatter asymmetry (10^{9}+1 : 10^{9}) in the initial 'universe' (the matter surrounding us today would thus be only a tiny remnant in the presently accepted model). In the case of supercritical mass density, on the other hand, the electron-positron quarks assembled in the DSM would now have to be squeezed into each other and therefore, as required in a meaningful model, completely annihilated, triggering a new Big Bang.

In addition, important, proven other basic principles with a philosophical background were also needed and used. These include for instance the so-called 'economy principle' (better known as Ockham's razor), which allows an evaluation of alternative description models. It makes it possible to give priority to the model of different alternatives that has the lower complexity and the smaller number of basic assumptions and parameters. It is used as support and strengthening within the rival confrontation of the much simpler and easier understandable DSM based on composite quarks (required base units plus antiparticles: electron, neutrino and photon; basic forces: electromagnetism, gravity) with the currently established STM with quarks assumed to be elementary (required base units plus antiparticles: electron, muon and tauon / electron-, muon- and tauon-neutrino / up-, down-, strange-, charm-, bottom- and top-quark / W-, Z- and Higgs-boson, as well as gluon and photon; fundamental forces: electromagnetism, gravity, Weak interaction, Strong interaction1 (between Quarks), Strong interaction2 (between nucleons)). In the DSM, the nuclear bonding forces SW1 and SW2 are realized solely by highly relativistic exchange electrons; (non-relativistic) electrons shared by atoms are referred to as chemical bonding and not as another fundamental force.

It should be noted that both structural models of our matter are internally consistent and both can explain all experimental findings, albeit in different ways of interpretation and explanation (for example, muons are interpreted as independent elementary particles in the STM, but appear in the DSM as fragments of the composed quarks with corresponding excitation of the orbital system). The clear experimental evidence for the existence of exactly three quarks in the nucleons (with the respective possible occupation states proton or neutron) was achieved by electron wide-angle scattering at 21 GeV. With such experiments, however, no clear statements can be made about what structural units it could be, i.e. whether they are again composite units or whether the quarks

are elementary particles. Only a certain indication of renewed substructures is given by the fact that wide-angle scattering occurred in these experiments, i.e. the electron wavelength of about 6×10^{-17} m used should be somewhere close to the structure size of the quarks. On the other hand, quarks as elementary particles should actually be many orders of magnitude smaller (for elementary particles, in principle, no size measurement is available and only a maximum possible, conceivable upper limit of size can be specified) and they should therefore not cause wide-angle scattering at a wavelength of this dimension.

Since it is well known that the universe and of course also physics behave 'reciprocally' with regard to the extremely opposite dimensions, i.e. the largest possible structures are clearly predetermined by the properties of the smallest possible conditions and structural units, an enlightenment of the realities in these smallest dimensions is of eminent importance for the development of a meaningful world view of the universe - to its past as well as its future. An advance into this area of the 'smallest' is inevitably associated with a break in the presently proven procedure of physics: experimental observation >> model >> theory >> prediction >> their experimental verification. If we want to obtain more details about the structure of elementary particles, photons or further information about the 'substrate of everything', only the photons and elementary particles themselves remain as the smallest possible 'probes' in experiments, which in principle cannot provide any further direct experimental information in this very special case.

As a means of choice, therefore, only strict logic with methods such as trial and error on the basis of pragmatic imagination and most accurate consistency considerations, taking into account all proven, supporting physical but also philosophical basic laws and basic ideas, remain in order to arrive at models of the greatest possible simplicity and at the same time maximum explanatory ability. Surprisingly, seemingly self-evident terms such as 'elementary' or 'elementary particle' proved to be initially blocking hurdles, but ultimately also offered then the opportunity to achieve progress in understanding the most basic and fundamental processes. These terms initially suggest the impossibility of any further questioning and seemed to allow only descriptions of associated properties.

The Greek thinker and philosopher Democritus (ca. 460 - 370 BC) developed the first early ideas about the term 'elementary' and connected this term with an indivisibility, which has been handed down to us by the term 'atoms' (the indivisibles), which is taken for granted today and a matter of course. He recognized that the matter surrounding us cannot, in principle, be a continuum, since there must necessarily be the possibility of flowing, streaming, changing shape or breaking and tearing, which requires the imperative necessity of building up all matter from smallest structural units, the atoms, the indivisible. He postulated the smallest indivisible structural units in a vacuum with various geometric shapes in order to explain the diversity of all phenomena. From today's

experimental possibilities, however, we know that the 'elementary structural units of matter' generally occur with radial symmetry or at least dominantly with this symmetry, which now requires much stronger demands on such terms as 'indivisible' or 'elementary'.

If there are basic units of matter with similar geometry or symmetry and these have different effects or properties, they must necessarily differ in their 'construction', i.e. have a different 'construction plan' (e.g. electron - positron). However, this in turn means that they must be 'made' from a suitable building material, which thus has even more elementary structural units. The term 'elementary particles' can therefore only be linked to indistinguishable, unique structural units. At this point, the thought structure of Democritus is also affected, because in order to achieve the different shapes of its 'atoms', ultimately and in principle more fundamental building blocks would have to be used to produce the various forms of shape. In today's physics, there is obviously still sufficient acceptance to assign the term elementary particle even for extremely different structural units, even if, as in the STM, differences of more than seven ... ten orders of magnitude are existing alone for their mass. But also in the DSM there is still the difference between electron, positron and neutrino and these particles must ultimately continue to be used or referred to as 'elementary particles' - against better knowledge and forced by historically grown reasons, just as we have to do for our definitely divisible atoms.

At this point, the question arises which kind of medium could now be taken into consideration as a building material of the 'elementary particles' that are still named that way today? Ultimately, only the 'substrate of everything' remains, which historically has already been called aether and today is practically mostly considered as unacceptable, unnecessary or outdated. But this should be a fallacy, because the very necessity of this 'building material' forces this acceptance. But such a medium is also needed as an indispensable, necessary carrier of electromagnetic waves/photons or gravitational waves; to explain the take-away effect of 'space' around rotating masses (frame dragging); to explain 'space curvature' or gravity; to understand the non-decelerated expansion of our Big Bang system and the so-called 'dark energy' that is needed for its explanation; as a fluctuating basic medium for a fundamental understanding of the general basis of quantum mechanics; to explain an always and everywhere constant limit velocity for light and matter (necessarily given by a medium and its properties) or an explanation of the existence of the smallest structures of the 'physical space', the Planck length.

Therefore, forced by the above considered phenomena, the necessary conditions for this substrate are severely narrowed. As a result of the reality of Planck length, it must be a medium formed by smallest (presumably truly elementary) structural units, which, at least in our current cosmic environment, should have a mean distance of just this dimension and they should be freely movable. Since there is definitely the presence of a 'vacuum energy' in our environment and there is an non-

decelerated expansion in our Big Bang system, these most fundamental basic structural units (called Aea - aether atoms in the texts) should repel each other, whereby their distance increase leads to an energy reduction and their average distance-reduction leads to a total energy increase of the substrate and thus these assumptions give an almost trivial explanation for the presently non-understood and mysterious 'dark energy'. The medium thus also has properties related to a kind of elasticity, which is required for the propagation, the 'carrying', of transverse waves (electromagnetic waves, photons) and represents overall an 'electrofluid medium' (most comparable to a compressed pure electron 'gas', i.e. being dominantly temperature-independent).

At this point it becomes necessary to deal with the nowadays often very unspecified use of the terms space, space-time, physical space, vacuum, true vacuum or physical vacuum - the presently usual and alone use of the terms ‘space' or ‘vacuum' is actually misleading. If we call our cosmic environment (only) 'space', we are confronted with vacuum energy and space curvature, which now forces us to consider and define space itself as a medium. However, the actually purely abstract concept of space is nothing more than the basic prerequisite for any kind of movement (free positions to occupy) and space is absolutely necessary in order to be able to introduce or accommodate structural units, matter or even media. If we were to define space as a medium, we would need again space to accommodate the 'medium space' there!? It is therefore the basic philosophical assumption of the author to regard space as the total nothingness, i.e. true vacuum (such as for Democritus), and to realize the observed physical conditions of our cosmic environment by introducing and fulfilling this truly empty space with a suitable medium.

Inside of an ’only-space’ or true vacuum, there is no possibility for changes at all, so there is no time there and no curvature of this total nothingness can be realized. In order to be able to achieve changes, i.e. realising the existence of time, within this space movable suitable structure units, a substrate of everything, must be introduced and only now we are dealing with a space-time. However, there are now problems with the term 'space curvature or space warp'. An approximately analogous effect can only be achieved by means of density gradients and is therefore necessarily associated with balancing flow phenomena. The purely static model of general relativity can no longer be maintained here. Such dynamic mechanisms with runtime effects can only produce identical results to the purely static model of GRT in the case of perfect radial symmetry. But exactly such problems are reality and known (impossibility of describing the dynamics of galaxies with GRT, the borehole-G-anomaly for measurements in the Greenland ice (cylindrical symmetry) or the impossibility of determining the gravitational constant with high accuracy using non-radial-symmetric measuring gadgets).

What would happen if a physical structural unit were accelerated in a true vacuum? (This can only be a thought experiment, because such a vacuum cannot be produced and in the absence of a

'substrate' there can be no photons, no field quanta without such a carrier medium and an electron would in addition dissolve immediately and lose its 'building material'.) Since the object to be accelerated cannot have any interaction with this very special environment, an unlimited acceleration and the achieving of any value of the speed would be possible, which would only remain finite due to the limitation of the available acceleration energy! In contrast, our physical reality, which is perfectly described by the Special Theory of Relativity, is given both by a finite speed of light limited to c and by an only asymptotic approximation to the same value of c for physical structural units of matter. While for light c is determined by the properties of the substrate (velocity for transverse waves), the limit velocity for structural units of matter is determined by the fact that they have to displace the substrate (its structural units) with any movement with limited speed to the side (i.e. transverse).

If the existence of a substrate of everything is accepted, a Higgs mechanism is no longer required for the property 'mass'. While Lorentz used an aether for the derivation of the Lorentz transformations required in the Theory of Relativity, Einstein was able to achieve this theory (including the transformations) solely by assuming the constancy of the speed of light independently of the reference frames. So far, this has often been interpreted as evidence of the absence or at least the non-necessity of such a substrate. But this is a misinterpretation. Rather, the basic assumption of special relativity, the constancy of the speed of light independent of the reference frames, implicitly presupposes exactly this existence of such a medium.

Finally, another problem of physics, hitherto non-understood, should be mentioned, which forces us to expand the simple model of the universe presented here so far extraordinarily. An electron as one of the most important elementary particles has a mass equivalent in the dimension of 1 MeV, but has a surrounding field with a total energy of at least eight orders of magnitude larger. This inevitably requires the arising or building up of the EM fields (the emission of corresponding field quanta) by means of consumption of dark energy. This necessarily requires the expansion of the substrate (provision of energy). Just this is completely self-evident within the Big Bang systems, but is now also necessary in the area of the 'periverse' - the space between and around the countless BB systems - to ensure the gravitational effect (as a side effect of electromagnetism) there as well. However, no reservoir can provide unlimited energy. I.e. such a simple model for the universe given above would only lead to an eternal thermal death.

So there must be a mechanism that can 'recharge' dark energy and compress the ever-expanding substrate again on a large scale. For an electrofluid medium, this is only conceivable via the relative motion and collision of gigantic-extended separate 'regions' (filled with the substrate) against each other (time again does not matter at all). Within the central collision zone, the substrate density can now increase enormously and enable the formation of Big Bang systems, such as we have to expect

it in the environment of our BB system. And again we have to take into account the philosophy of the Copernican principle, we (this time now as the whole periverse) cannot be anything special and therefore the universe must have countless such 'periverses'. Once these gigantic 'regions' colliding with each other have almost completely crossed each other, matter in the former collision zone loses any possibility of existence, but the 'regions' will one day separate from each other again and move on….

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