On the Structure of the Universe

Contents:

1. Introduction

The standard model of cosmology comprises several scientifically convincing elements as a theory of the formation, evolution and structure of the universe, from the primordial phase through to the formation of black holes in particular. At the same time, the “Big Bang” model has fundamentals flaws:

- The formation of the universe, whether as a singular Big Bang, as a renewed expansion of a collapsed predecessor universe or as an explosion of a temporary, local energy condensation in a hypothetical quantum space, is beyond the boundaries of known physics and a theory describing such a state will never be accessible to an experimental test.
- The increasing rate of expansion of the universe contradicts the initial conditions postulated by the model, in particular, and the GTR (General Theory of Relativity) in general. The attempt at an explanation by introducing a free parameter called “dark energy” is not convincing and raises new fundamental questions.
- The anomaly in the rotational behaviour of galaxies and clusters of galaxies is explained with the help of a further free parameter called “dark mass”, which cannot be derived from the overall theory and is not understood. The two parameters comprise around 95% of the universe, by far the largest part, and determine its structure and evolution.
- The formation of a universe of matter and the lack of antimatter cannot be explained.

The main flaw in the current model of the cosmos, however, is the fundamental contradiction between the theory which describes an expanding universe and the gravitational collapse demanded by the GTR for practically all conceivable distributions of matter and energy, i.e. a contracting universe. The actual state of our universe with its “flatness” and extraordinarily homogeneous mass distribution is extremely unlikely in the Big Bang model and cannot be explained.

The dynamic model of the universe presented below is part of a fundamentally new approach which describes the macroscopic world, the world of our daily experiences and the microscopic world, (see also "On the Structure of Matter" http://vixra.org/abs/1201.0118) self-consistently and without contradictions.
It is based exclusively on known principles and mechanisms of nature such as energy conservation and increase in entropy, does not require a Big Bang and therefore no state outside the known laws of nature, removes the fundamental flaws of the Big Bang model and explains all the phenomena not understood so far.

2. The fundamental idea

The universe is a complex entity whose energy is zero at any point in time and at any location and it thus represents another form of nothing. It is assumed here that the energy is also symmetrical and that there are two types of energy: positive energy (+E) and negative energy (-E), which correspond to the terms “electric” and “magnetic”. The two types of energy can produce the same work.
Tiny “energy grains” of Planck dimensions comprised of equal proportions of positive and negative energy are produced spontaneously in the nothing in an endless process. These “energy grains” begin to move and form a complex energy flow which continuously condenses and moves in a spiral towards a central black hole (CBH). The condensation of the “energy grains” leads to the formation of electromagnetic quanta. Matter (mass) is formed from the greatly condensed radiation energy in an initial phase transition. A universe of radiation and matter forms into which our observable universe is embedded. In a second phase transition, radiation and matter transform into a mass phase, a central black hole. At the back of this CBH there is a central “white” hole (CWH) from which a spiral, complex energy beam exits, in which a universe of radiation and antimatter comparable to our universe forms. The density of this energy flow continuously decreases until finally the “energy grains” dissolve again and the initial state of nothing is reached.
The universe therefore consists of two complex vortex fields which rotate in opposite directions about the same centre at an angle of 90°. It is eternal and finite, inhomogeneous and has a zonal structure.

The real universe of matter is discussed below in detail. A distinction is made between “our universe”, i.e. the partial system that we can observe, and “the universe”. The reference system is fixed at the axis of rotation of the CBL.
Figure 1 below serves to facilitate the understanding by providing an idea of the overall structure of the real universe.

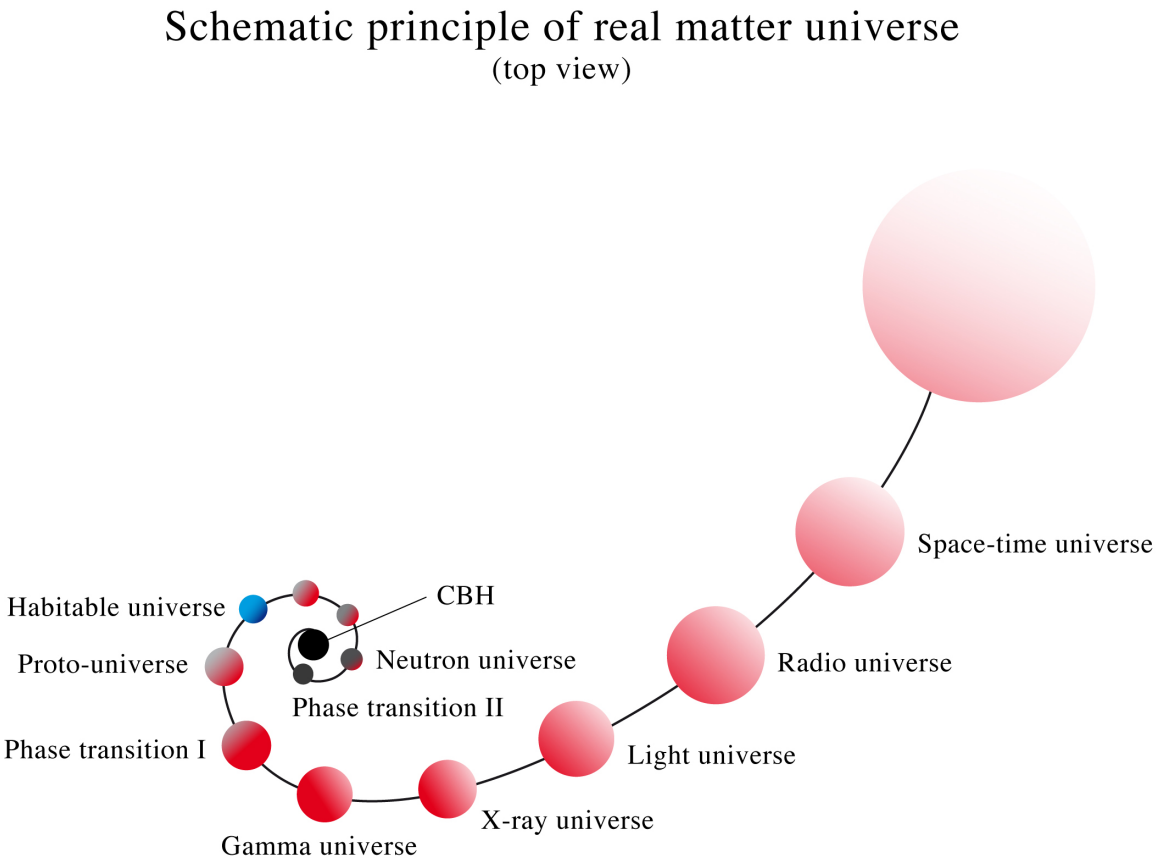

Fig. 1

3. Radiation phase

In the beginning there is nothing, a state without space, time or energy. (It is therefore not the quantum vacuum, which already has an energy density and a space-time dimension). For reasons not yet understood a change of state occurs in this nothing as a result of the continual spontaneous formation of new “energy grains” of Planck dimensions; these energy grains consist of a spiral energy string of positive energy and an equal-sized spiral energy string of negative energy, which are arranged at an angle of 90° with respect to each other, rotate about the same centre and add up to a total energy of zero. These structures correspond to the smallest possible discrete volumes of space which cannot be subdivided further. The “energy grains" are therefore electromagnetic space quanta. The formation of the space quanta sets a process in motion which is directed towards recreating the primordial state.

The space quanta start to move in one direction and the separations between them become smaller and smaller. Eventually, the continuum space is formed from the discrete space quanta. The system changes with the movement and the phenomenon of time is created. Electromagnetic space-time quanta are generated from the electromagnetic space quanta. Thus time is formed in our universe by infinitesimal, discrete, positional changes in each individual discrete space element. As these space elements condense to a space continuum, to an energy flow in the direction of the CBH, in the direction of maximum entropy, the discrete directions of the positional changes also increasingly form a continuous direction of time. Time manifests itself as a macroscopic time arrow whose direction is determined by the direction of motion of the energy flow.
The constant condensation of energy leads to chains of space-time quanta forming spiral energy strings, which in turn form new energy strings etc. A fractal emergent process is created, where the same structure forms at ever higher levels, creating electromagnetic quanta with higher and higher energy. The familiar electromagnetic spectrum develops and with it a radiation universe. At the end of this process the radiation universe is dominated by high-energy gamma quanta. A limit is reached above which the energy in the form of massless electromagnetic quanta cannot be condensed further. The result is a phase transition, and the formation of electromagnetic quanta with rest mass; mass is formed.

4. Phase transition I

This phase transition consists of two fundamental processes which result in the evolution of the universe we can observe and the laws of nature which operate in it:

- the formation of matter and
- the fixing of this matter in a real and in an imaginary world.

4.1 Matter/Antimatter

The electromagnetic quanta are torn apart by high-energy collisions (extremely high temperatures) into their components, the inwardly rotating magnetic energy spirals and the outwardly rotating electric energy spirals, i.e. into electric and magnetic energy vortices. Since they are asymmetric structures which cannot be superposed on their mirror image, they have the property of “chirality”, i.e. left-handed and right-handed forms are created, they possess a spin.

The energy is packed more densely in these spirals because they condense to mass in the vicinity of their rotational axes. Neutrinos (and a hypothetical particle, the “neutrano”) are formed as stable structures and unstable structures, which we call up quarks and down quarks.
Three of these unstable spiral fields form a new stable structure by rotating about a common centre. If the spiral fields are at an angle with respect to each other, the hydrogen atom and the neutron are formed. If spiral fields rotate parallel to each other, the property known as charge is formed.
(For a detailed description see "On the Structure of Matter" http://vixra.org/abs/1201.0118). All nature known to us in its seemingly infinite diversity thus consists of just one spiral field which exists in four modifications: right-handed and left-handed energy spirals as well as those rotating inwards and outwards. If the structures are left-handed, we call them matter, if they are right-handed, they are called antimatter. If two equally large structures of opposite chirality, i.e. matter and mirrored matter, meet, they annihilate into massless, electromagnetic gamma quanta. The high energy density means they immediately decay again into quarks and the process repeats itself. A type of permanent burning results, a so-called quark era. In the Big Bang model this era finishes because there are 10^9 antimatter particles to $10^9 + 1$ matter particles, thus resulting in an excess of matter. The cooling which results from the thermodynamic adiabatic expansion means the familiar fermions can form in the so-called primordial nucleo-synthesis and after a further cooling to around 2700 °K matter and radiation can decouple. This is where the universe which is observable to us starts as a cloud from the light elements hydrogen (75%) and helium (24%) with traces of deuterium, tritium, lithium and beryllium.
The Big Bang theory describes this phase transition as a singular, short act in the formation of matter. It is not possible to explain why there is an asymmetry of matter and antimatter, i.e. the excess of matter. The model presented agrees with the Big Bang model insofar as the universe was in a state of high temperature, great energy density and turbulent dynamics at a finite time in the past. In contrast to this, however, it views the process by which matter is formed as a type of “permanent zonal burning” which continues until the present time and continuously produces new matter. The cooling of this matter, followed by the primordial nucleo-synthesis, is explained by the endothermic process of mass formation. At first sight, this model should also mean that it should not be possible for an excess of matter to be created during the permanent burning, the ever repeating process of pair formation and annihilation.

Matter and antimatter must always balance out exactly and the process should never stop. It seems impossible for the universe we know to form. This is where the form of the energy flow plays a role, however.
Since it moves towards the CBH in the form of a logarithmic spiral, it has two important characteristics; firstly it has chirality, i.e. a certain direction of rotation, and secondly a curvature which increases exponentially towards the axis of rotation of the CBH. In other words, the curvature of space-time increases either in the clockwise direction or in the anti-clockwise direction. This curvature leads to the generation of a force which favours the formation of energy vortices of the same chirality. Anisotropic space with its asymmetric structure has an effect on the asymmetric structure of the quarks, it stamps its own structure onto them, which leads primarily to the formation of vortex fields which rotate in the same direction as it does itself. The chirality of the space-time field stamps itself onto the energy vortices. The small curvature gives rise to only a slight surplus of matter, but more and more matter particles remain from cycle to cycle, which then leads to the formation of the matter universe with which we are familiar. Measurements of the average density of matter and the background radiation can be taken as an indirect indication of the twisting of space-time. They show that the universe has an **almost** Euclidean geometry, space is therefore **hardly** curved at all. In other words: the curvature of space is not equal to zero.
The one-sided chirality of animate matter which has so far defied explanation can be understood as a consequence of the twisting of space-time.
The 20 amino acids nature uses to synthesize life always exist as a racemic mixture in inanimate matter, i.e. they consist of equal proportions of right-handed and left-handed forms. Only the anti-clockwise forms are incorporated into animate matter, however. Since the formation and maintenance of animate matter requires an energy input, molecules rotating identically with space-time would require a lower energy input and would therefore be favoured. The biological left-handedness would be the consequence and proof of a space-time curvature.
Since last year there has also been a direct proof for the twisting of space-time, however: if space-time is curved and this curvature increases exponentially, the chirality of the energy flow should become more and more noticeable in the structures which form as the universe evolves. One direction of rotation should predominate for galaxies as well, for example. And, indeed, a team of researchers at the University of Michigan investigated thousands of galaxies and found that 7% more galaxies have a left-handed rotation than a right-handed one (M.J. Longo Phys. Letter B 699, 224-229 (2011)).

4.2. Complex world

The complex nature of the universe is demonstrated by the formation of mass. The radiation universe as a type of “proto-universe” divides into two worlds which are inseparably connected with each other, a real one, which we perceive, and an imaginary one, which is our permanent companion.

While massless electromagnetic quanta know neither time nor space, neither real nor imaginary worlds, massive electromagnetic quanta are fixed in “their” space-time. Specifically this means, for example, that there is a neutron at the imaginary “back” of a hydrogen atom, and a hydrogen atom at the “back” of the neutron.

With the electric vortex fields of the up quarks energy flows from the imaginary universe into our real one. The past of this energy is in the imaginary world, its present and future are in the real world. The time arrow points into our real world. The energy is positive. For the magnetic vortex fields of the down quarks the energy flows out from our real universe into the imaginary universe. The past and present of this energy are in our world, the future in the imaginary one. The time arrow points in the opposite direction away from our universe. The energy is negative.

Our world can therefore be described as a complex entity whose 4 observable real and 4 not observable imaginary space-time coordinates are arranged perpendicular to each other and have the same origin. This is also the reason why the complex (!) wave function of bosons arrives back at the initial state when rotated through 360°, whereas it becomes negative after 360° for fermions, i.e. massive particles, and a rotation by a further 360°, i.e. a total of 720°, is required in order to arrive at the initial state. The imaginary state is described as a rotation through 360°.

5. Radiation/mass phase (observable universe)

5.0 A two-speed universe

The phase transition to the radiation-mass phase ends with the decoupling of radiation and matter. The radiation has approximately a black body temperature of 2700 °K and forms that part of the energy flow which continues to move towards the CBL with the speed of light. A few massive particles will also have speeds close to the speed of light and - sometimes supplemented by particles from collapsing stars, supernovas, jets, black holes and collisions of galaxies - form the main component ((85% protons, 14% helium nuclei) of the high-energy cosmic radiation.

It is obvious, however, that the turbulent collisions mean the average speed of the matter particles should be significantly below the speed of light (momentum conservation law), the general direction in the energy flow being maintained.
A two-speed universe is created. And thus a process starts which is identical to the free fall of a body from a great height on Earth: Earth's gravitational force means the body's speed and acceleration constantly increase with decreasing distance. Velocity and acceleration (!) are functions of time and the distance from Earth as the source of gravitation.
This is precisely the same in the universe which we can observe and which can be taken to be a mass point in the energy beam.
The illustration depicts an idea of our universe's change of state in a reference system which is fixed at the CBH.

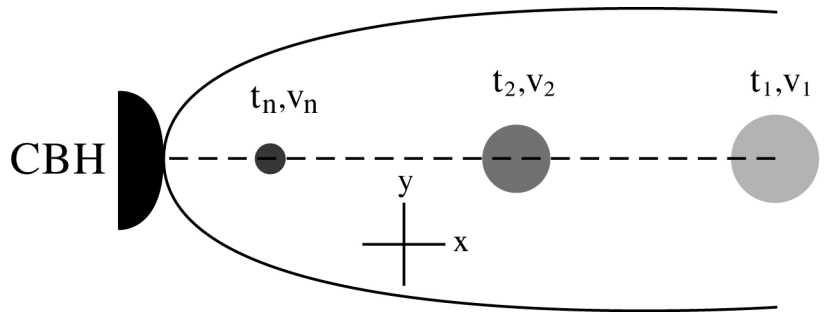

Fig. 2

The attractive force of the CBH causes our universe, depicted by a circle, to move towards it in free fall with increasing velocity v and increasing acceleration. v_2 is higher than v_1 and v_n higher than v_2. Three fundamental states can be assigned to these velocities:

- a phase of the formation of proto-stars and primordial galaxies
- a habitable phase and
- a dark phase.

It is thus possible to assign an age to our universe; the time from the primordial nucleo-synthesis through to today. According to the standard model this is around 12 to 15 billion years.

If one considers the dynamics of the entire matter universe from a hypothetical hyper-space, it presents itself as an eternal, time-independent entity with stable, stationary zonal structure:

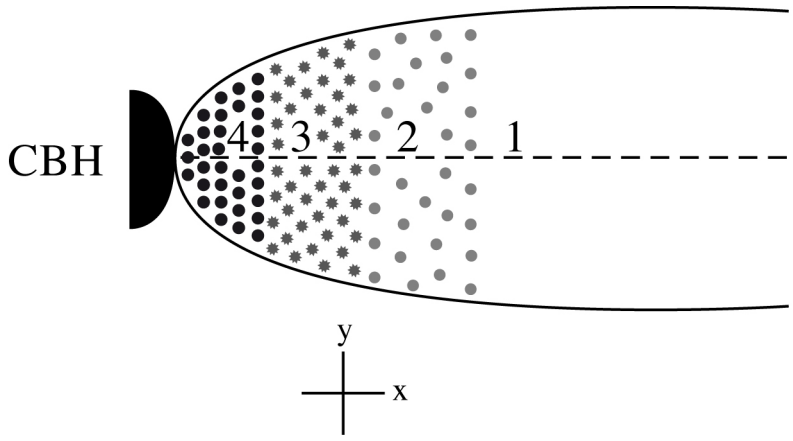

Fig. 3
1- radiation phase, 2- proto-phase, 3- habitable phase, 4- dark phase.

The processes already discussed thus lead to the formation of stationary, stable zones in the matter universe through which our universe passes in its individual evolution phases. Our temporal universe is an element of a timeless universe. The zone in which our universe is formed, i.e. the formation of the first proto-stars and primordial galaxies with low concentration of heavy elements, plays a subordinate role for the understanding of the interesting cosmic phenomena so that it is not explained in more detail. The same applies to the dark zone, where all suns are burnt out, and the galaxies condense to black holes.

5.1 Habitable zone

The following explanations therefore concentrate on the currently observable state of our universe, on the universe we live in, on the habitable evolutionary phase of our universe.

As a closed system our universe moves in an irreversible sequence of states towards an equilibrium state of maximum entropy, towards a “thermal death” in the form of a CBH.

When it entered into the habitable zone, our universe was in the state K_1, which is determined by the density of the energy flow, the curvature of space-time as well as the velocity v_1 and the instantaneous acceleration g_1 relative to the CBH. Our universe currently has the state K_2 with the corresponding current quantities.

In the future, it will have the states K_n with v_n and g_n, until it leaves the habitable zone at some stage in order to "dock" onto the CBH with the speed of light at the end of its existence.
The relative velocity and relative acceleration of our universe therefore increase continuously in relation to the CBH in the direction of the time arrow, its speed relative to the speed of light of the radiation continuously decreases. Or expressed in another way: the position of our universe in the force field of the CBH changes, the potential of this field becomes higher and higher as time progresses.
This is therefore the reason why velocity and acceleration play such a fundamental role in the processes of nature which we can observe. The physical consequences of the Special Theory of Relativity (STR) thus go much deeper than the formal description of the relation between velocity, mass, space and time. It turns out that the STR describes the future states of our observable universe. As the velocity of our universe increases, more and more energy condenses to mass, space shrinks and time expands. When the speed of light is reached, mass becomes infinite, space and time cease to exist. One must bear in mind that the STR describes the evolution of our universe from a reference system within our universe, however. If the evolution of our universe is observed from a hypothetical hyper-space, i.e. if the reference system is outside our universe, we see a universe which is moving towards the CBH at ever increasing speeds and continuously shrinking to a finite lump of matter which will eventually be assimilated by a finite CBH.
If a satellite is given a high velocity, we simulate a future state of our universe with a tiny subsystem of the total system universe. The system is in a "quasi-universe" of the future. The higher the velocity, the further away is this quasi-universe from our current universe, the closer it is to the CBH, the stronger the future characteristics of our universe show up.

5.2 Universal constants

We have seen that a location in the total universe with the state K, which represents the above-mentioned state variables, can be assigned to our universe at any point in time.

Since K is a function of time, the state variables change as well and thus the universal constants defined by us (a process which we cannot observe, because we ourselves are a part of the system).
The universal constants are therefore all functions of K and are actually changeable quantities. Their current values are an instantaneous snapshot of an episode of our universe which in cosmic terms is probably relatively brief. They are in no way representative of the state of the whole universe. This also explains the "fine tuning" of the universal constants which never fails to surprise and which makes the formation of animate matter possible in the first place. In the long evolution of the universe, the fundamental principles and mechanisms according to which nature organises itself and whose observable regularities we call laws of nature, always remain the same. The "universal constants", on the other hand, change continuously, leading to a brief episode, a short-term constellation, in our universe which creates life if the local conditions are favourable.

5.3 Dark energy

Observations which are interpreted as an accelerated expansion of the universe have meant that the Big Bang theory has had to be extended by a further free parameter, so-called "dark energy". It is assumed to amount to around 70% of the substance of the universe and to generate a type of anti-gravitational force which drives the universe apart with increasing strength, i.e. causes its accelerated expansion. A number of models connect the "dark energy" with the cosmological constants or the vacuum fluctuation. Its physical character remains unclear, however. Moreover, the assumption that the "dark energy" accelerates the expansion of the universe further strengthens the contradiction between the Big Bang model and the GTR (According to calculations by Roger Penrose, the formation of the Big Bang universe is less probable than the formation of a black hole by a factor of e^{10} to the power of 123).
In the model presented the "dark energy" turns out to be the energy of the CBH, and the force which does not cause our universe to increasingly expand, but shrink, turns out to be the gravitational force of attraction of the CBH.
The present state of our universe is thus in complete agreement with the GTR and the gravitational collapse, e.g. the formation of the CBH, which it demands.

5.4 Inertia

A strong indicator for the existence of a CBH and the associated gravitational field is the inertial force. In order to describe the properties of mass, two types of mass are distinguished: gravitational mass and inertial mass. The gravitational mass is the source of the gravitational force and the inertial mass the source of the inertia, i.e. the inertial force. It has turned out for all bodies investigated so far that the two types of mass have the same value. The whole GTR is based on this equivalence, called the equivalence principle. The gravitational effect is permanent and omnipresent. It is therefore assumed that inertial fields also exist, in a similar way to gravitational fields, which have a certain field strength at any time and any location. It has not yet been possible to find the source of such a field. It is assumed to be in all the masses of the cosmos. If this were the case, such a field could never change fast enough as a consequence of a local event, such as the braking of a train, to explain the generation of the inertial force. On the basis of the Big Bang model science has no answer to the question about the source and the physical character of the inertial force.
With the model presented the inertial force also turns out to be a gravitational force which is generated during the acceleration of a mass by a sort of new positioning of this mass in the force field of the CBH. Inertial forces are a measure of the temporal change in the potential acting on masses in the force field of the CBH. Consequently, inertial mass is gravitational mass.

5.5 Red shift

The interpretation of the red shift as a result of the spatial dilation and expansion of the universe plays a crucial role in the Big Bang model. All other elements of the theory such as background radiation and inflation follow from this understanding. If the red shift no longer provides the proof of expansion, the whole model collapses. On the other hand, an alternative model which does not provide another convincing explanation for this red shift has no scientific value whatsoever. If the observed electromagnetic spectra are shifted towards red in an expanding universe, then in a shrinking universe this should at first sight result in a blue shift, but not a red shift as well. However, the table below shows that a red shift can also be the consequence of the increasing acceleration of our universe as it moves on a spiral orbit towards the CBH.

Let us take a simple example for this: two bodies move under the same law of motion ((v = g*t , where g = g_o*t, g_o = 3 m/s^2) on the same trajectory with increasing acceleration towards one point. They start their motion 2 seconds apart:

time s	v body1 m/s	v body2 m/s	$\Delta v_{1/2}$ m/s	$\Delta v_{t/t+1}$ m/s
0	0	0	0	
1	3	0	3	
2	12	0	12	12
3	27	3	24	12
4	48	12	36	12
5	75	27	48	12
6	108	48	60	12
7	147	75	72	12
8	192	108	84	12

The difference in speed between the two bodies increases by 12 m/s second for second. Seen from the position of the second body, the first body “flees” with ever increasing speed.
If it were to send out signals, they would be red-shifted at the second body (the receiver). Hence, the greater the difference between the starting times of the two bodies, the greater their separation, the greater Δv and thus the red shift becomes.

The different, instantaneous acceleration of the bodies is therefore ultimately the cause of the red shift effect.

The Figure below illustrates this relationship when observing galaxies.

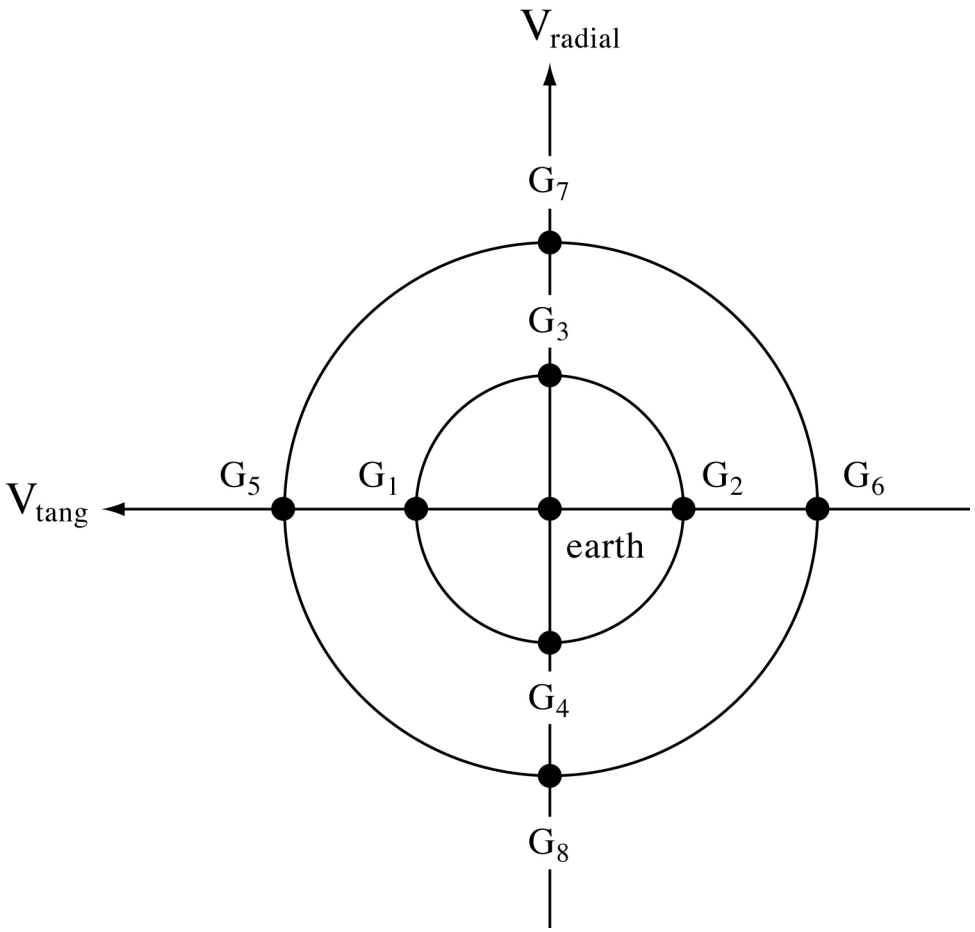

Fig.: 4

Since our universe is part of the spiral energy flow towards the CBH, it approaches the latter with the tangential velocity v_{tang} and the radial velocity v_{rad}. For reasons of simplicity it is assumed that the two velocities are equal so that the galaxies G_1 to G_8 are arranged in a circle. Galaxies G_5 to G_8 here are twice as far from Earth as galaxies G_1 to G_4. At an arbitrary point in time, the velocity of the galaxy G_1 is higher than the velocity of Earth, and Earth always moves faster than the galaxy G_2. The distance to Earth and the velocity difference Δv remain the same, however. The galaxies therefore only appear to flee. If one considers the galaxies G_5 to G_8, at twice the distance there is double the velocity difference 2 Δ. Δv is therefore directly proportional to the separation, or expressed in general: the relative velocity v of galaxies increases in direct proportion to their distance D. This gives Hubble's law: v = H * D with the Hubble parameter H as the proportionality factor.

Hubble's law is based on the assumption of a homogeneous and isotropic universe. Since in reality the tangential velocity of our universe is probably

larger than the radial component, the velocity changes as a function of the distance do not lie on a circle (sphere), but an ellipse (spheroid) with the major

axis in the direction of the radial velocity. This means that galaxies with the same red shift can have different separations from us. Hubble's law thus only mirrors the real spatial conditions in the observable universe with qualifications.
The increasingly accelerated motion of our universe in the direction of the CBH, combined with its contraction, is misunderstood as expansion.
The Hubble parameter H of around 70 $km*s^{-1}*Mpc^{-1}$ is therefore not the rate of expansion, but the rate of contraction of our universe.
It must be noted that the production of the red shift by the contraction of our universe can do without such a questionable element as space expansion faster than the speed of light.
The mechanism described can possibly also explain the phenomenon of the strongly differing red shifts for Arp's connected galaxies. They would not be the result of different velocities, but different instantaneous accelerations of the connected galaxies.

5.6. Cosmic background radiation

The background radiation together with the red shift count as the ultimate proof for the Big Bang. As an effective marketing tool it is therefore called the echo of the Big Bang, but it is at best a proof for the decoupling of radiation and matter at a black body temperature of around 2700 °K. In the Big Bang model the background radiation is generated more or less in a flash of radiation and then cools due to the expansion of the universe to the 2.7 °K measured today. It thus becomes colder by a factor of 1,000. Precision measurements show that the temperature of the radiation is distributed extremely uniformly across the complete sky and deviates regionally from the mean by only 0.001%. If one calculates back with the factor 1,000, this results in a spread of around 0.03 °K when it is generated. It is difficult to imagine how only such extremely small temperature differences should occur in an explosive flash, which then must also explain how matter can clump together in regions to become stars and galaxies.
In the model presented, the background radiation is generated at the end of the continuous extinction of the matter/antimatter burning, at the moment matter and radiation decouple, as a permanent, stationary process which continues to this day. This is a far better explanation for the minimal variation of its temperature and the extraordinarily homogeneous distribution of matter in the observable universe. The cooling to 2.7 °K is not caused by the expansion of space, but by the permanent increase of the velocity of our universe relative to the origin of the radiation. It is therefore a Doppler effect. The receiver is moving away from the transmitter.

5.7 Dark matter

Newton's law of gravitation and the GTR predict that the speed of small celestial bodies which rotate about a massive star decreases as a function of their distance to the star in a specific way. The corresponding calculations for our solar system are confirmed extremely well by observational data. A rotational anomaly is observed for galaxies and clusters of galaxies, however: the orbital velocity of the stars or the galaxies decreases much less with increasing distance from the centre of gravitation than predicted by theory. Since the theories are repeatedly being confirmed extremely well by other observations, few scientists doubt them. Rather, a "dark matter" is postulated, a matter which cannot be observed and which permeates all space, and whose additional gravitational force not only keeps the stars and galaxies further out on their orbits at the velocities which are "too high", but has made the formation of galaxies possible in the first place.

This “dark matter” is said to make up 25% of the entire universe. The search for this matter has shown that the mass of objects which radiate very little or not at all, so-called MACHOs (Massive Astrophysical Compact Halo Objects) and neutrinos, is by no means sufficient to explain the phenomenon. The assumption is therefore that a weakly interacting massive particle exists, a WIMP (Weakly Interacting Massive Particle) which forms the main component of dark matter. Such a particle has not yet been detected despite an intense search.
The model presented pursues a principally different approach to clarify the anomalies in the rotational behaviour of stars and galaxies. Let us return briefly to the start of the essay for this purpose. The beginning of the universe was explained with the formation of very tiny energy strings, which then form the basis for a type of primordial quantum, the space-time quantum, i.e. the structure with which the space-time continuum was subsequently formed. Energy has thus become space and time. Reversing the conclusion this means: space-time is a form of energy.
An energy density must be assigned to space. Space can thus be dense or less dense. This immediately explains what is involved in the terms expansion of space, contraction of space and space curvature. It is the description of space densities which differ in space and time which lead to gravitation. The space-time energy hypothesis goes far beyond this relationship, however. Let me only remark here that if the electromagnetic radiation consists of space-time quanta, and space-time is a form of energy, then the relation $E = m*c^2$ applies. Space-time can convert into mass and mass into space-time. Mass would be strongly condensed space-time. Space-time quanta would therefore be the fundamental structure which can explain the development of the whole universe with space, time and matter.
If space-time is energy, then it must be taken into consideration in gravitational processes. “Dark matter” is therefore nothing more than the contribution of the energy of space-time to the gravitational interactions of a system. When considering processes which neither occur at speeds close to the speed of light nor at high gravitation, it is sufficient to only take into account the volume taken up by the space as energy equivalent. For cosmically small distances between two bodies this quantity is practically zero and can be neglected. For distances of the order of light years the space between two gravitating bodies makes a noticeable contribution to the mass/energy balance, however.
In concrete terms this means that in the conventional approach the mass equivalent of the space between two gravitating bodies must be added to the mass of these two bodies. In the GTR the energy equivalent of space must be taken into account in the energy-momentum tensor.

The recalculation of the Pioneer anomalies (the two space probes are currently around 400,000 km closer to the Sun than theory predicted) on this basis will show whether the observed orbit dynamics support the space-time energy thesis.

5.8. The time paradox

The essence of time consists in change. Time (the time in question is the physical time, not the time sensed subjectively) is only a measure for the change of systems relative to each other from the view of a particular observer, i.e. relative to one coordinate system singled out from an infinite total number of possible reference systems. Time as an objective phenomenon of reality does not exist.

On the one hand, the world of our experience shows that a time arrow exists, that time is asymmetric, irreversible, that it describes a sequence of events, "flows" from the past via the present to the future.

On the other, all laws of nature known to us and their theoretical descriptions, such as quantum theory, classical dynamics and the theory of relativity, are based on a symmetric, reversible time; laws of nature do not know a time arrow, have no preferred direction for time. They apply without limitation, regardless of whether the time "runs" in a process from an event/state A to an event/state B or from B to A.

The key question is therefore: what does a time direction stipulate, and why are the fundamental laws of nature symmetrical in time, nevertheless?

We know that the direction of time is closely connected with entropy. More accurately, it is the other way round: our experiences have caused us to supplement the law of energy conservation with entropy as a further physical state variable in order to characterize the order of a system. Increasing entropy means increasing disorder, the maximum possible entropy is synonymous with the state of equilibrium of a system. All processes in our universe occur spontaneously and autonomously on the thermo-dynamic level if the entropy of the final state is higher than that of the initial state in the system observed. Or in other words: all spontaneous processes start in a state of relative order and end in a state of relative disorder, the equilibrium state of the system. It must be that way, because the overall system "our universe" moves from a state of low entropy (as space-time universe) towards a state of maximum entropy (as CBH).

In the model presented the time arrow is thus the logical consequence of the energy flow from the initial state of our universe as a space-time universe towards the final state of our universe as a CBH.

The time arrow points in the direction of the energy flow. It is the proof that our world is not yet in the most probable state, i.e. “thermal death”, that it has not yet reached the state of equilibrium (i.e. the CBH). As has already been explained, our universe passes through a sequence of states which result from its position in the force field of the CBH as it approaches the CBH. We can simulate a future state (with higher energy density) in a subsystem with the aid of velocity and acceleration, i.e. by supplying energy $E_0 + E$ to it. We cannot return with a subsystem to a state which lies in the past, because we cannot remove any energy $E_0 - E$ from a subsystem. It is therefore impossible to reverse time or the time arrow.

To answer the question regarding the time symmetry of the fundamental laws of nature, it makes sense to again illustrate the essence of these laws and to discuss their scope of validity. This leads to more far-reaching questions: what do we understand by laws of nature and how do we define their range of validity? We said that the things we call laws of nature are (usually mathematical) descriptions of the invariable mechanisms of nature’s self-organisation. The deeper we enter into the essence of nature’s processes, the more it becomes apparent that all nature in its seemingly infinite diversity is based on a single universal mechanism: on magnetic vortices of negative energy which “pump” space-time from our real universe into the imaginary universe accompanying us, in which the energy flows towards the centre and the time arrow points towards the centre; and electric vortices of positive energy, which flow away from the centre, where the time arrow points away from the centre, space-time is “pumped” into our real universe. If several vortex fields exist, they try to orientate themselves such that positive and negative energy flows “short circuit”, i.e. they entangle. This mechanism is fundamental for all natural processes and varies only in the scale and density of the energy flows. It leads to a local surplus or shortage of space-time, in association with the appearance of the different interactions. A massless electromagnetic quantum and the complete universe thus operate according to the same mechanism.

The question about the time symmetry of the laws of nature thus becomes a question about the time symmetry of the mechanism described above, and it is obvious that although there can be a mirrored version of this mechanism, it must itself remain invariant and therefore time symmetrical.

The time arrow in our magnetically characterised matter universe points in the direction of the CBH. At the same time an energy beam moving in the direction of decreasing entropy exits from the “back” of the CBH.

A mirrored matter universe forms, an antimatter universe, where everything runs “the other way round”. In this part of the entire universe the energy flows from the CBH in the direction of nothing. The antimatter universe evolves from a state of maximum entropy to a state of minimum entropy. The time arrow therefore points away from the CBH. “Our” laws of nature apply in their time-reversed form here. The laws of nature therefore describe far more than the processes in our small observable universe, they describe the physics of the entire universe. The change in the direction of time is not called time reversal here, as it is often understood as the exchange of past and future. It is simply a direction of time which develops at an angle of 90° with respect to ours, with the consequence that all processes in this antimatter universe are not observable for us. The causality of processes, the sequence of cause and effect, is conserved in full.
All processes which we observe in nature are consequently only manifestations of a universal mechanism, directed towards the return to the initial state of the universe, towards nothing.

5.9 Animate matter

The question arises as to how the formation of animate matter with its high level of complexity is possible, how processes are possible which evolve from a state of high entropy to a state of low entropy, i.e. from disorder towards order, processes whose time arrow is virtually opposite to the general time arrow in our universe? Why does the self-organisation of nature also lead to animate matter, when it appears to be simpler to always follow the time arrow in the direction of increasing entropy? The answer is because there are processes which are driven by a local surplus of energy in the direction of increasing order, i.e. decreasing entropy.
In our matter universe all systems strive to achieve a state of higher entropy, their state of equilibrium. But what happens if the boundary conditions do not allow an equilibrium over long periods of time, if there is a surplus of energy which does not allow an open system to go into a state of equilibrium?
Then the entropy must decrease, i.e. the order of the system must increase. In other words: the input of energy, which keeps a system in a state away from equilibrium, creates a compulsion for self-organisation. Even with inanimate matter, this leads to the formation of crystals with high spatial order, to the formation of almost all solid bodies from rock to our planet.

If a surplus of energy exists for long enough, then the degree of order of matter must increase further, a form of matter must form which organises itself and reproduces on a higher level, then life must form and develop if the local environmental conditions (mainly the presence of water as a solvent and means of transport and a temperature below the denaturation temperature) allow.
The local surplus of energy thus leads to the formation of open systems whose state variables remain constant in time (stationary) due to the input and outflow of energy (equilibrium of flow) although no thermodynamic equilibrium can occur here. Life therefore requires the input of energy. If a surplus of energy no longer exists, i.e. if a living organism is not fed, the system can reach its state of equilibrium. Its entropy increases by it becoming inanimate matter, the organism dies.
Therefore the view widespread among cosmologists of life as islands of order in a huge ocean of chaos does not get to the heart of the matter, because the laws of nature also apply unreservedly to animate matter. If one wants to stay with the image of the island, then life with its low entropy is a tiny island not in but on the huge energy flow towards the CBH, i.e. in the direction of maximum entropy, which is synonymous with the state of equilibrium of the open system – the matter universe.

6. Phase transition II (condensation of radiation to mass)
As new stars can no longer form, the existing ones burn out more and more and the darkening galaxies condense into super-massive black holes, the habitable zone continuously makes the transition into a state where smaller black holes fuse with larger ones and space-time also condenses to mass.
When the energy has finished condensing, the energy beam makes the transition into one single black hole, the CBH. All the energy is condensed to mass, space and time no longer exist. The temperature reaches (almost) absolute zero. Entropy has reached the maximum state possible, there is no longer any information about the microscopic states in the CBH.

7. Mass phase (central black hole)
An entity has been formed which is black because it does not radiate, although it is chiefly a hole, a hole in our real space-time, i.e. it exists outside our space-time and can only be described in a universe of higher dimensionality.

This CBH is not an amorphous collection of matter, the spiral energy flow continues in its interior. Thus not all processes which generate differences come to a standstill. One can only speculate what that means in concrete terms. The exterior region of the CBH is probably formed by neutrons. This is where the energy is still packed relatively loosely. The mass portion forms only a tiny region about the axis of rotation of the three vortex fields which form the neutrons. By far the greatest part of the volume occupied is made up of the field portion of massless space-time quanta. As the neutrons approach the centre of the CBH, the mass portion increases more and more, until finally all the electromagnetic energy is condensed to mass.
A new type of mass forms, which continues to move as a spiral energy flow towards the centre. A state is reached here where energy cannot be condensed any further.
Another phase transition occurs, which re-emits energy input on the “back” of the CBH (sometimes called “white hole” in literature) in converted form. A spiral energy beam forms at an angle of 90°; everything “runs the other way round” in this beam, the processes already outlined run in reverse order until a state of nothing is again reached. This energy beam is the counterpart, the mirror image of the matter universe with equivalent, but reversed processes, where the entropy decreases, with opposite chirality, which compensates the angular momentum which the energy beam of the matter universe generates. A universe of antimatter subsequently forms in this energy beam.
The overall structure of the universe is therefore completely symmetric, a fundamental characteristic which is stamped onto all processes of observable nature.
The conservation law for information also applies to the CBH. The timeline of the history of our universe is already stored in the smaller black holes - albeit in a state which cannot be recognised. When united with the CBH the information leaves the real matter universe never to return, but becomes a component of the CBH in order to enter into the structure of the universe forming from antimatter on leaving the CBH.
At the beginning of our observable universe there was the state “nothing” with zero space, zero time and zero energy. At its end we find the same state, where almost infinitely high energy densities of positive and negative energy cancel each other out in the CBH/CWH (central white hole).

Unlike the Big Bang model with its singularity problem, all state variables remain finite and thus calculable in the model presented. This also applies to the processes in the CBH. Since the energy flow has the form of a logarithmic spiral, it rotates with a curvature which increases exponentially towards the axis of rotation, but always remains finite.

The illustration below provides another summary overview of the processes discussed.

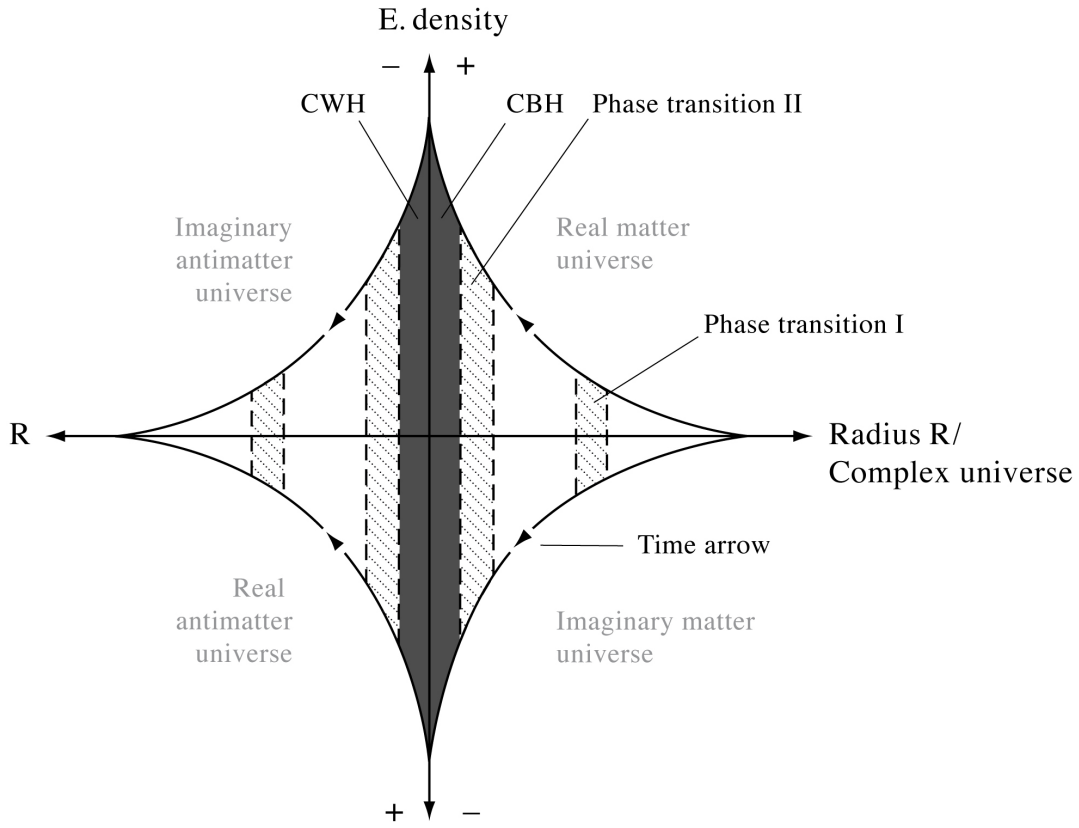

Fig.: 5

8. Conclusions

From an immense but finite number of tiny electromagnetic quanta which continuously form anew and consist of two spiral energy strings in each case with a total energy of zero, a fractal process has created an eternal, finite universe which develops dynamically and forms stationary zones in the process. It has the same basic structure as the smallest quanta, operates according to the same mechanism and still has a total energy of zero.

Only the density of the energy flows and the spatial scale have changed, from massless space-time quanta, particles of electromagnetic spiral fields where a portion of the energy is condensed to mass, through to the CBH/CWH which consists solely of mass, and whose (negative) total energy corresponds exactly to the (positive) total energy of matter.
The model thus shows a universe which is no more and no less than a “quite normal” - albeit gigantic on a human scale - massive electromagnetic quantum which obeys the laws of nature known to us. Its state, the physical reality known as the universe, can be described by a wave function, a “theory of everything”.
This of course poses the question as to whether the model of the universe presented can claim to reproduce reality, or at least to describe it better than the Big Bang model?
As we know, the idea of what we understand to be reality depends on the state of the observer, but nature and its mechanisms are independent of the view of a particular observer. A consistent description of the universe which comes close to reality thus needs to eliminate the role of the observer, i.e. to describe nature in a way which is invariant with respect to the state of an arbitrary observer.
In his description of nature, this premise led Einstein from the position of a uniformly moved observer to the formulation of the STR. Space, time and mass were shown to be relative state variables, dependent on the relative velocity of the reference systems with respect to each other. Mass turned out to be a form of energy. When Einstein extended his ideas to observers moving under acceleration, there turned out to be a link between the geometry of space-time and the masses and energies present in it. On this basis he formulated a new theory of gravitation, the GTR.
Both theories are based on reference systems within the real universe observable to us.
On the basis of such a reference system a reality appears, an observable universe made from matter, radiation, space and time with a time arrow in the direction of the CBH. This universe with a finite volume of space-time changes in time and aims towards an equilibrium state of maximum entropy.
If an observer looks onto our universe from a hypothetical hyper-space, they see two spiral energy flows which move about the same centre at an angle of 90°.

They see an open system in dynamic equilibrium where the amount of energy input as it is being formed is exactly the same as the amount which flows away from it again via the CBH/CWH. Just like in the Big Bang model, matter is finite and constant, but it is not created in one act, it is produced as continuously as it disappears again.
This universe consists of a sequence of stable, stationary zones which differ in terms of their ratio of matter, radiation and space. But time and the time arrow no longer exist, which is also shown by the wave function of the universe: since its total energy is zero, the Hubble function should also be equal to zero. From Schrödinger's equation $i*h*d\Psi/dt = H*\Psi f$ it then follows that $d\Psi/dt = 0$. The wave function is independent of time. Time does not exist in the universe as a whole; it is eternal.
If the entire complex universe, i.e. the two complex energy flows, are observed from a complex hyper-space, there exists no energy, no matter, no radiation, neither space nor time. The complex universe turns out to be a manifestation of nothing, a structured nothingness.
This means there are processes which we can observe, and processes which we can describe, but which remain hidden from observation as a matter of principle. Our observational data are therefore not representative, neither for all processes in nature nor for the universe as a whole.
It thus follows that if it wants to be close to (objective, existing independently of us) reality, a consistent mathematical description of all processes in our world ("theory of everything") must remain valid for all the reference systems above.

Clarifying the fundamental structure of the universe gives rise to new questions: does the universe consist only of two spiral energy flows, or of several spiral arms as in most galaxies? Or does it even consist of three energy fields rotating about a common centre, as is the case with a neutron? Is our universe the only one, embedded in the nothingness or in nothing, or is it only one of many elements of an even larger structure? If this is the case, do two neighbouring universes entangle just like electromagnetic quanta, which would significantly reduce the bosonic phases?
These questions will be answered by clarifying the essence of the black holes and the processes in their interior.