

Dynamic Universe and the Conception of Reality

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Abstract: The article gives an overview of the structure and ontological implications of the Dynamic Universe theory. It inquires whether the theory should be taken as a serious candidate for a new theoretical framework, comparable to Newtonian approach in its own time. Classical physics justified the particle-mechanistic outlook and the world was seen as a huge clockwork until the beginning of 20th century when quantum physics and relativity theory challenged the previous metaphysical presuppositions and obscured the common world view. Dynamic Universe decisively breaks out from the particle-mechanistic context and provides an alternative perspective to reality – a new holistic framework with new set of assumptions and legitimate presuppositions applicable to all natural events and things. If we have a theory whose scope and profound simplicity surpasses the capacity of present theories – a theory which manages to handle correctly all the known physical and cosmological phenomena with minimum amount of postulates and with no fitting parameters – it should be carefully studied with all its features and consequences.

Since antiquity the growth in physical understanding of reality has characteristically been related to achieving a proper perspective and further knowledge on the interrelations between such concepts as mass, energy, motion, space and time. Dynamic Universe once more successfully changes the perspective and provides a new connection between these perennial concepts. By introducing a hidden motion into the 4th dimension it reveals an unexpected sight to the internal structure of the universe.

1. Introduction: Revising the conception of reality

Each culture is fundamentally overshadowed by its understanding of reality. What is the ultimate nature of all the different things we encounter and how are they related together? This cultural inheritance defines the general orientation of individuals who seldom question the view they are adapted to. The main features of an accustomed paradigm are difficult to overcome but nevertheless the common world-view in western culture has changed radically in antiquity and at the turn of the modern era. At these turbulent times also the deepest metaphysical questions are reflected on and understanding about the basic nature of reality may move on.

Modern picture of reality was decisively triggered by physics at the turn of the modern era. Newtonian framework stimulated all fields of research with its objective method suitable for particle-mechanistic world. Ideas of atomism, reductionism and determinism were supposed to be applicable to all relevant problems. Also philosophers had to take seriously the new concept of matter even if it was insufficient to enlighten mental phenomena. Descartes introduced the idea of substance dualism which set the stage for subsequent discussions. Advocates of idealism and materialism emerged and the schism between the hard science and humanistic concerns still continues. It can hardly be solved if the general mechanistic-deterministic outlook of the world does not change.

The advancement in understanding the nature of reality has historically happened as an interplay between science and philosophy. New empirical findings may affect the underlying metaphysical assumptions, the deepest ontological and epistemological views concerning the foundations of reality and knowledge. These assumptions invariably coordinate and motivate the research activities whether they are explicitly recognised or not. Yet they may change when natural science finds new invariances and interconnections in nature. More sophisticated theories give support for or against certain metaphysical views. Modern physics started from the particle-mechanistic basis which led to many successes

culminating in the ability to manipulate individual atoms in quantum- and nanotechnology. Further examination related to the constitution of matter gradually revealed also more and more unsuspected events which show that everything is not reducible to individual building blocks moving in spacetime. Complex holistic phenomena observed in quantum physics or self organising systems give evidence for such internal relations and emergent phenomena which cannot be understood within the particle-mechanistic framework, the clockwork universe alleged by Newtonian physics.

The common metaphysical and methodological principles related to the Newtonian approach cannot any more provide further insight into the constitution of reality. The interpretation of quantum mechanics has remained unsettled almost for a century as the new phenomena cannot be explained on the previous basis. Yet the complex phenomena encountered in physics are facts concerning reality. They are interesting new findings whose relevancy is sadly dismissed by the instrumentalists who refrain from using theories as windows into reality. They lose the historic opportunity to achieve a better understanding of reality which might also allow a preferable view on how humans are related into the larger scheme of things.

There is a genuine call for a new conception of reality, for a new paradigm comparable to Newtonian approach in its coherent structure and exact general method applicable to all natural events and things. The advent of such a comprehensive framework is admittedly improbable and it may be greeted with disbelief. Very few would ever vote for a profound paradigm change to take place and many dismiss the very idea of getting further understanding concerning the nature of reality. All the trials to unify quantum mechanics and relativity theory lead to complicated and highly abstract mathematics which is impossible to conceive in common terms. Nevertheless, it is known that planetary mechanics was facing mathematical complications and increasing number of epicycles before Copernicus made his breakthrough. Since antiquity the growth in physical understanding of reality has characteristically been related to achieving a proper perspective and further knowledge on the interrelations between the concepts of mass, motion, space and time. Copernicus' findings overruled the Aristotelian view on the universal lawfulness, but the final hierarchy of these perennial concepts has not been decided yet.

Tuomo Suntola in his Dynamic Universe –theory (DU)ⁱ once more successfully changes the perspective by introducing a hidden motion into the 4th dimension. The theory is able to handle correctly all the known physical and cosmological phenomena with minimum amount of postulates and with no fitting parameters. The precision and scope of the theory seems to surpass the capacity of present ones and it also gives a plausible model of reality. Thus the Dynamic Universe should be carefully studied as a serious candidate for a new theoretical framework. The powerful basic principles of the theory provide a possibility to grasp amazingly profound questions and thus the theory is pregnant with fundamental metaphysical implications whose explication might provide a leap into a better understanding of reality.

According to Thomas Kuhn a proper paradigm shift typically means a complete gestalt shift; a new paradigm is incompatible with the old one and assumes the world as being made of different kinds of entities. The form of relevant questions may change as things are approached from different perspective. In the DU framework many of the annoying features in present theories do not exist any more. We do not need to worry about the uncommensurability or puzzles of quantum and relativity theories as they do not contribute to the new description. Yet the situation does not lead to relativism. DU certainly is more than just another instrument for organising observations. Its holistic structure and new interconnections undoubtedly reveal some real features in nature which permit the handling of a wider variety of phenomena under one and same mathematical formalism.

From the philosophical point of view perhaps the most significant and unexpected result is the solution DU provides for the age-old controversy concerning the relation between parts and the whole. In antiquity, the general outcome in natural philosophy was that reality was an organic whole capable of regulating itself. The outlook was overturned at the turn of the modern era when everything was supposed to be reducible to countless tiny particles that obeyed strict deterministic laws. In the DU, the schism between atomism and holism can be reconciled because the new concept of mass allows the elementary units to be seen as a result of an energetic diversification of the whole.

2. The historic controversy between atomism and holism

Extended debate on natural philosophy started in antiquity. The early natural philosophers discarded mythical explanations and concentrated on universal principles, natural causes and invariances. The Milesians looked for a basic substance whereas Heraclitus asked for a more abstract basis, *logos* to take care of the continuous change of everything. Pythagoras trusted in mathematical harmony. Numbers, quantities and their relations would be the basic operators behind all the appearances. But on the basis of strict logic Parmenides then questioned whether anything that is eternal and invariable could ever produce any change. The relation between being and becoming, one and many, temporal and eternal become central for subsequent natural philosophy. How can the continuously changing sense world be explained on the basis of something that is eternal and changeless? The answer of Empedocles and the Atomists was that change was caused by eternal atoms out of which all the things were composed. The change was brought in as the atoms were continuously rearranging themselves, joining together and disassembling. For them mechanical materialism was enough to understand reality. Soul and the gods could be explained by consisting of especially long lasting arrangements.

At the bloom of ancient thinking Plato and Aristotle discarded the particle-mechanistic conception defended by the Atomists. They did not believe that “dead” matter could ever explain organic phenomena or the activity of humans. In addition to matter some kind of organising form or essence was also needed. *Materia prima* as such was something indefinite. It was not detectable until it was connected to an organising form. Plato believed that the eternal forms inhabited an upper world of ideas and they were reflected in the sense-world objects whereas Aristotle argued that the forms were hidden potentialities that were immanent in the actualised objects. Aristotle was a great scientist and systematizer who refuted the claim of Parmenides that change is unintelligible. In the fourth century B.C he studied the relations between time, space and motion and the close connection between weight and movement of elemental substances. One of his concerns was the study of lighter and heavier in terms of the speed of falling bodies.ⁱⁱ

Aristotle's ideas on physics and natural philosophy became an integral part of the medieval way of thinking. His dealing with causes and the motion of bodies was considered superior to that of the Atomists, and his ideas could not be overcome in a thousand year. It was only in the beginning of the modern era in the 16th century when natural philosophy once again reached the level of discussion experienced in Antiquity. Copernicus challenged the Ptolemaic astronomy and found a new cosmological order and locus for the earth. Kepler highlighted the mathematical approach defended by Pythagoras and Galileo united mathematical laws with the atomistic and materialistic outlook originating from Democritus and Epicurus. Newton systematized everything into a uniform axiomatic form and his mechanics was applicable to all matter in motion. It was generally believed that Newton had revealed the true structure of the world. It was comparable to a clockwork, mechanical, quantitative and without any purpose.ⁱⁱⁱ

Thus reality was no more considered as an organism. Classical physics abandoned the Aristotelian concept of matter and returned to the idea of “dead matter” defended by the Atomists. Matter consisted of indestructible tiny particles that obeyed strict deterministic laws. Any kind of form, abstract essence and activity inherent in matter became irrelevant and mind, reason and all subjective phenomena were stripped from the objective reality. Descartes divided reality sharply into two parts: *res extensa* and *res cogitans*. He proclaimed that “neither God nor any rational soul present in the world will ever disturb the ordinary course of nature in any way”. Physics began to study the measurable world of extended objects, whereas subjective phenomena were excluded.

The world was seen as a huge clockwork until the beginning of the 20th century when quantum physics and relativity theory were born. These theories shattered the metaphysical presuppositions related to Newtonian physics. Theory of relativity connected time to space. The time intervals and spatial separations became frame-dependent and the idea that body's velocity, length or kinetic energy are invariant, real properties was obscured. Many quantum phenomena like wave-particle dualism, entanglement or statistical predictions are still more difficult to conceive within the particle mechanistic framework. Non-local phenomena simply cannot be explained with the idea of reducing everything into solid material particles. Quantum physics and the theory of relativity certainly provided further knowledge and refined handling of things but they also obscured the common world view. On the basis of these abstract mathematical theories we do not really understand in what kind of reality we are living. Against all evidence many of us still keep on thinking the world as a huge clockwork – that is even if modern

physics in many ways overstepped the limitations of classical physics, classical metaphysics still very much guides our thinking and imagination. The conventional ontological and epistemological ideas concerning objects, their characteristics and their relationships, as well as our own relationship to them, are well suited to the particle-mechanistic framework. As theories do not fit into the picture they are often considered to be just usable instruments which are not meant to provide any further understanding concerning reality; we should not worry if we are not able to understand the encountered new phenomena and locate them into a comprehensive and all-embracing scheme of things.

Yet, against all instrumentalists' bias, modern physics actually collapsed the world view created in the beginning of modern era. The foundational presuppositions of classical physics turned out to be just half-truths which are suitable in the macroscopic world. The particle-mechanistic picture of reality defended by the ancient Atomists was falsified but otherwise the perennial problems concerning the nature of reality are still very much the same. According to Thomas Kuhn deep metaphysical questions come into the foreground only when there is a quest for a profound paradigm change.^{iv} For the change actually to happen an alternative view is needed. In these circumstances the potential of Dynamic Universe theory should be studied carefully; whether it actually contains insights mighty enough to move the understanding of reality a major leap forward.

The next disposition is fragmentary and tentative. It is just meant to encourage further studies by giving hints of the marvellous ingredients contained in the theory.

3. The Dynamic universe

The Dynamic universe provides a holistic framework covering all phenomena from micro structures to cosmology. It is a precise highly structured mathematical formalism with well established physical assumptions and strict predictions. The theory provokes a new vision to the internal structure of the universe by revealing an unexpected connection between the concepts of mass, energy, motion and space. In the new hierarchy the totality of mass is a fundamental invariant which links everything together into a holistic composition. Through energy excitation, mass determines the motion, volume and time development of space, and regulates all the local structures in space. The theory re-establishes a universal frame of reference. By dealing with the common coordinate quantities which locate the exact position and time of all incidents, DU manages to give a comprehensible model of the constitution and evolution of the universe.

The Dynamic universe theory was created by a distinguished Finnish scientist Tuomo Suntola who has done a remarkable career in industrial technology. The breakthrough in the development of the DU occurred in 1995 and ever since Suntola has documented the subsequent expansion of the theory in series of monographs. The latest "The Dynamic Universe – Toward a Unified Picture of Physical Reality" came out in 2009. The proponents praise the wholesomeness of the approach. "The Dynamic Universe describes physical nature from a minimum amount of postulates. It accurately explains observed physical and cosmological phenomena without any fitting parameters. It develops the ideas of Einstein and Feynman into a complete theory."^v The theory has aroused interest in conferences but until now quite a few professionals have taken the trouble to actually examine the theory in detail. Even if the new theory could explain and predict all the observed phenomena, it goes against the accepted paradigm by creating an alternative perspective into physical examination. The utility and rationale of the new set of postulates and procedures may be difficult to understand from the context of prevailing theories which it aims to replace. Yet DU is difficult to dismiss. Experiments cannot decide between the standard theories and the Dynamic universe as the predictions for local physical phenomena are essentially the same. At extremes – at cosmological distances and in the vicinity of local singularities – differences arise and DU seems to work better. Even if, from the instrumentalist point of view, physics might do without DU, people with realist inclination should notice the bonus it provides by widening the horizons of the present world view.

The main features of the theory

Dynamic Universe illustrates space as a 3-dimensional surface of a four sphere. This is actually quite an old idea pondered in the 19th century e.g. by Bernhard Riemann and Ernst Mach. It was also Einstein's original cosmological view^{vi} which he had to give up when looking for static solution and introducing

time as the fourth dimension. Mixing up space and time demolished the readily understandable picture of reality but the spacetime concept was considered unavoidable. DU, however, succeeds in separating the space and time coordinates when carrying through the idea of the universe as a dynamic four sphere. Space, the surface of the metric four space, appears as a spherical pendulum tediously oscillating in the fourth dimension. It is presently in phase of expanding at the velocity of light along the 4-radius. This kind of precise dynamical geometry allows a parameter-free derivation of the primary cosmological quantities, which gives strong evidence for the factuality of DU's depiction. Ideas like dark energy or accelerating expansion of space are not needed. The motion of the whole space in an unseen direction may cause some doubt, but in Copernicus' days most people could not take seriously the idea that earth was moving around the sun as the proposal was in such contrast to everyday observation.

DU thus differs from the theory of relativity in rejecting the spacetime concept as well as the postulate of the constancy of the velocity of light. The spacetime appears to be just an unwarranted mathematical trick. In local environments the adjustment of the coordinate quantities may disclose the observations correctly but renouncing the idea of fixed measures of time and distance, which are central for human conception, obstructs the overall view of what is actually going on in reality. Neither does it promote further physical understanding; for example it does not tell why the velocity of light is observed as constant and why it is the maximum velocity in space. The dilemma gets an obvious solution in the framework of DU because of the linkage between the velocity of light and the expansion of space along the 4-radius. DU does not need the postulates of Lorentz transformation or the equivalence and relativity principles either, but the enriched framework elucidates the background and contents of these twisted ideas. In addition to the precise geometry and the postulate of an overall zero energy principle, DU just needs to fix the total amount of mass to get a universe going. Like in a pendulum the sum of the energies of motion and gravitation are equal throughout the cosmic expansion-contraction process and the total energy is conserved in all interactions in space. These postulates are very concrete and corporeal when compared to the mathematical approach characteristic to the theory of relativity.

According to the DU theory, most of the universe is outside space, i.e. the observed 3-dimensional reality whose volume and internal hierarchy are orderly expanding. The geometrical 4th dimension is inaccessible even if it constantly contributes to everything that is happening. The evolution is fuelled internally because of the active energy process in which the motion in the fourth dimension is always balanced by gravitation. The counteracting process determines the form, volume and time development of space. It also regulates the emergence of all local structures in space as during the expansion process part of the primary energy converts into material, electromagnetic etc. phenomena in space. Thus everything we observe in space springs from the abstract, immaterial realm of being. It may be non-empirical but nevertheless it is very real and definite.

The DU theory clarifies the concept of mass and its relation to matter and energy. The totality of mass is the fundamental invariant which links everything together into a holistic composition. Mass as such is extremely abstract and inconceivable, devoid of dimensional extension or form. It is the persistent "core of being" that is immanent in all events and things. A basic substance, if you like, the unseen, eternal basis of being itself. Thus mass is not an amount of some impenetrable solid stuff, neither is it a property of matter or fields but rather their cause. Mass in the DU resembles the abstract *materia prima* defended by Plato and Aristotle. It cannot be conceived as such, since it obtains reality only when activated by energy. Thus energy turns out to be reminiscent of the idea of form proposed by the great philosophers in antiquity, an inherent organising factor, eternal pattern or potentiality in things. Nothing is just matter, but it cannot be without matter either, as already Aristotle stated. The concept of zero-energy principle also incorporates the ideas of Anaximander and Heraclitus who hold that all separated elements came into being as opposite pairs, out of one undifferentiated and indivisible basis. For Anaximander it was an abstract substance called *apeiron* whereas Heraclitus defined it more quantitatively as *logos*, a governing principle which preserved a balance between various dynamic opposites, out of whose struggle everything was being born.

Everything in the changing phenomenal world, the becoming of all physical structures and their interactions, emanates from mass which is excited by energy. Mass is the most abstract and at the same time the most concrete factor behind everything – always measured in kilograms. In space, the energy of motion mass possesses in the 4th dimension is observed as the rest energy of matter. This is a natural consequence of the fact that on the surface of the expanding sphere we are at rest related to the motion. The basic form for energised mass is wavelike dark matter which in suitable conditions converts into radiation, electricity or material particles. DU relates an explicitly defined mass equivalence to all

different things and phenomena. There is no question of wave-particle dualism as basically there is no conventional corpuscular matter. Phenomena like EPR-paradox or Young's two-slit experiment can be elegantly explained. Many obstacles vanish already when DU unravels c (the velocity of light) from the traditional Planck constant. An even more crucial fact disclosed by the theory is the universal system of cascaded energetic frames whose inherent holism explains the apparent non-locality of diverse phenomena.

The cascaded energetic frames

In the DU, reality is a dynamic, structured whole which links mass, energy, space and motion inseparably together. More precisely, all the different parts of the universe are internally related to the whole via a system of nested energetic frames. The primary motion of mass with the expansion of space, balanced by global gravitation arising from the total mass in space, generates the ultimate frame, the homogenous space, whose evolution naturally gives rise to further relatively autonomous subsystems or frames, whose configuration always conserves the local as well as the overall energy balance. The frame provides both local and universal state of rest. It controls the behaviour of its parts which may contain sub-frames behaving accordingly. Thus atomic reductionism is left behind. When starting from the overall mass and zero-energy balance, the multiplicity of the units is a result of the diversification of the whole. Reality is not based on discrete bodies, the "dead" particles of the Atomists. The cause and dynamics for matter in motion has been decisively clarified.

Starting from the homogenous space, all the minor frames, which range from galaxy groups and solar systems to earth and all the individual material objects are formed at the cost of reduced local rest energy, (which means a dent in space and reduced velocity of light). There is no definite answer to what breaks the ideal symmetry of homogeneous space and leads to the accumulation of mass into subsequent sub-structures in which energy finds a localised balance and mass receives an extended form. Nevertheless, the dynamics of this unmistakable structuring is precisely presented, including an elaborated handling of local singularities and black holes. The concept of energetic frame also helps to clarify the idea of an object. It fulfils all the criteria for being called an object. Naturally, all objects are real extended structures which host a specific amount of mass and energy. Composite objects may contain various befitting sub-structures or frames but elementary particles are described as plain structures which capture the mass wave into a closed pattern whose shape determines the energy states available for it.

All the different frames or objects are relatively autonomous. They are localised and closed structures, which have a certain locus and degrees of freedom within the whole. The specific amount of mass and energy which each frame hosts is a strict share of the total energy of the universe. Thus the energy state of a frame defines its relation to the whole as well as it determines the energy states available for its sub structures. Local velocities are related to the velocity of space in the fourth dimension, and local gravitation is related to the total gravitational energy in space. The holistic approach in the DU means relativity of local to the whole. It is not relativity between observer and an object but a consequence of the limited amount of energy in space – relativity is a measure of the locally available share of the total energy.

In the DU, conservation of total energy links local interactions to the rest of the space – providing a solid theoretical basis and a quantitative expression to Mach's principle and a natural explanation for the relativity of observations. Because of global gravitation all the relatively autonomous local structures, the material objects in space are united to the whole. The structured rest energy of matter (caused by the energy of motion in 4th dimension) is always locally distributed in space whereas the counterbalancing energy of gravitation is due to all the rest mass in space. Thus there exists a complementarity between the local and the whole for objects. They are located in a specific position but because of global gravitation they are also omnipresent. The frames interpenetrate and sub-frames are throughout in inherent immediate contact with the parent frame, ultimately the hypothetical homogeneous space. In a way, the parts are "aware" of the whole universe through global gravitation.

The complementarity allows reconciling of the old schism between atomism and holism. Because of global gravitation there exists a holistic aspect in reality, which allows it to be considered an organic whole capable of regulating itself. Yet the whole divides itself into autonomous parts whose behaviour is strictly regulated and follows exact mathematical rules. Basically, the trick is to reveal the proper distinction between matter in motion, and mass and understand the twofold energetic diversification of the

latter. The mass that manifests itself in corporeal objects is always related to energy. Balanced excitation of energy creates space, motion and all the conceivable structures which consistently remain internally related to the whole.

4. Conclusion: implications for the world view

The conception of reality is a result of human deliberation. The previous assumptions and presuppositions can be questioned or altered on the basis of new findings and better theories, typically offered by natural science. DU seems to exceed present theories in its capacity to deal with physical phenomena, and its structure appears to be coherent and well-founded on sound postulates. Confirming the correctness of the theory with detailed examination would be essential – worthwhile both for physics and philosophy of science. A concurrent theoretical framework of this size provides an excellent opportunity to test and employ the tools philosophy of science has produced for evaluation and comparison of theories. The study of DU could also enlighten the topical discussion concerning the relation of theories to reality; in what sense do theories create reality or correspond to it? And naturally the situation provides a proper chance to examine the revising picture of reality and the mechanism of paradigm changes.

A general approximate interpretation of the DU formalism is in many ways obvious like was the case with Newtonian mechanics. Everybody could easily understand the basic features of the theory when the world was described as a huge clockwork. It is no more difficult to conceive a cosmic pendulum with contraction and expanding phases. The fact that space is described as a 3-dimensional surface of a pulsating 4-sphere provides room for additional relations which are impossible to locate into mechanistic-deterministic reality. The details of the theory provide indispensable material for accurate philosophical explication, which may lead to new metaphysical hypotheses and better understanding of reality. Especially the clarification of the concepts of mass and energy gives a real chance to continue the age-old philosophical discussion concerning the proper character of this evolving corporeal reality we observe and live in.

DU starts from the idea of a complete unbroken whole, which is contrary to the present tendency to extrapolate global phenomena from local rules and observations. Particle-mechanistic view is based on the idea that there exist merely external relations between individual particles. The whole emerges as a sum of the elementary units and no immediate internal connections are acknowledged. In the DU, elementary units result from the diversification of the whole, and local conditions are determined by the large-scale structure of the universe. The dynamic composition of the theory gives an opportunity to bring back the idea of form or essence cherished in antiquity. Because of energy excitation, there exist an inherent activity within matter bearing similarities to the ideas of Plato and Aristotle. Reality, macrocosm, once again contains a more refined layer or aspect, which can be reflected in the constitution of humans, the microcosms. Cartesian dualism is overstepped. Mental phenomena need not be stripped from the objective reality as was thought in the beginning of modern era when the idea of mechanical “dead” matter was adopted.

During the last centuries there has been a strong faith in atomism and mechanical materialism, but in physics a more holistic trend has strengthened since the study of electromagnetic phenomena and the concept of field, long before the idea of quantum holism. Yet the holistic tendency in DU is much more coherent and penetrating providing a new comprehensive perspective to material phenomena and reality. A new framework which breaks out from the particle-mechanistic world can once again, like Newtonian framework in its time, stimulate both physics and philosophy. The new principles can be applied to innumerable practical problems, and their explication provides room for new metaphysical ideas and philosophical discussion. In addition to Plato and Aristotle, many philosophers like Spinoza, Leibniz or Hegel have been in search of form and unity. They have tried to justify the view that passive mechanical matter is not enough to explain all the phenomena we encounter, and thus something that is active, rational and conscious should also have a locus in reality.

This kind of profound discussion, typical for the great system builder philosophers, has not been in fashion in philosophy in recent times. The task of clarifying the concept of reality and its most important attributes is mainly left to physics, whose empirical method may be limited. Nevertheless, physics has managed to specify the contents of the terms mass and energy. Newton connected mass to inertia and distinguished inertial mass from gravitational mass, even if he equalled them. Newton was not able to give

inertia any clear cause, but Ernst Mach in the end of the 19th century proposed that inertia of a body would arise from its relation to the totality of all other bodies in the universe. Albert Einstein arrived at the famous equation $E = mc^2$, which states that the energy E of a physical system is numerically equal to the product of its mass m and the speed of light c squared. Einstein proclaimed the formula to be “the most important upshot of the special theory of relativity” and it certainly is very useful in many cases, but what does it actually mean? The equivalence of mass and energy has caused a philosophical controversy on its real meaning and ontological consequences. Can mass and energy really be conceived as the same property of physical systems and in what sense mass is “converted” into energy?^{vii}

On the basis of present theories we are not able to answer these ontological questions. We do not actually understand where the relation between mass and energy comes from, no more than we know whether the fields should be considered real entities, or what is the actual shape and destiny of the universe. Especially, the ontological status of energy is blurred. Is it some kind of stuff, or property of things like velocity, or is it just a useful theoretical fiction, a bookkeeping device.

In classical physics energy describes accumulation of force, the work that has been done into a system. Its reality can be questioned as we are not able to define an absolute value or distribution for energy. Conservation laws are applicable only for closed systems and thus, on the basis of present theories, we are not able to identify what kind of thing energy is.^{viii} DU considers reality to be a closed system, the three dimensional surface of a 4-sphere, containing a universal frame of reference, which allows the amounts of mass and energy be compared in an absolute manner. Thus energy can be a real property of objects, whose locality can also be maintained. Energy belongs to the objects in a way it exhibits the essence of them. Mass and energy are clearly separated. Energy, in a manner, triggers or forms the abstract indefinite mass giving rise to extended detectable things: matter, radiation, electromagnetic phenomena, and all possible forms of closed vibrations.

In the DU, the famous equation of Einstein gains a more precise form taking into account the frame where phenomena are studied. DU also gives a clear vision of the long-term development of space. During the expanding phase the energy of motion, the rest energy of matter, diminishes paying back the debt it owes to global energy of gravitation. The process defines circumstances in which new structures or frames are born. The frame establishes the amount of energy and degrees of freedom available for its parts and it also provides a local and the universal state of rest.

This kind of rich tapestry of relations including the idea of balanced activity and inherent unity of everything would certainly be helpful in understanding humans and their relation to the larger scheme of things. Also humans naturally consist of many energetic frames, and belong to various kinds of them. We are able to host specific states of energy and, like all ontological structures, we are in a complementary manner connected to reality. Our internal aspect is ultimately connected to global gravitation which unites all the relatively autonomous local structures or material objects in space. In the DU the origin of gravitation is no more a mystery. By being the attracting energetic aspect of excited mass, it gets an understandable locus and role in totality.

The concept of global gravitation might be useful in explaining consciousness. It makes more understandable old philosophical ideas, like Leibniz's *monads*, which are able, in variable grades, directly reflect reality or the *world spirit* of Hegel. When related to gravitation the spirit might be coming more conscious about its own nature, as in the present energetic phase the global energy of motion is converting into gravitation causing increased structuring in space. DU certainly provides interesting analogies which might be used in modelling human psychology and mental phenomena. Humans with all their characteristics are influential parts in the evolving whole. They naturally “feel” the impact of totality in their bodies, and gradually they may understand its structures better. In addition to external frames there may be numerous mental frames, internal bonds which are more difficult to notice than the external objects conceived from outside. Discerning all the frames, however, is essential for getting control over them. Only, when finding out a local state of rest, one is able to “tune” into a more fundamental and energetic frame.

– In a particle-mechanistic world there are no internal relations, whereas DU gives an option for an access from local and relative world to a more fundamental reality. In a sense it restores the concept of aether which in Greek mythology originally was the personification of the “upper sky”, space and heaven.

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