COMPLETE UNIVERSE, DYNAMIC SPACE
&
WAVE PHENOMENA

How the natural laws and forces are applied. The fundamental concepts and relations for a rational Cosmology (Cosmonomy)

KONSTANT G NIKOL

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How the natural laws and forces are applied. The fundamental concepts and relations for a rational Cosmology (Cosmonomy)

(A cosmological theory on the structure of the Universe and matter)

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"*Asking correctly is often more than half way to solve the problem*"

W. Heisenberg (1901-1976)

Socrates to Meno: "*Would he try to find or learn as much as he thought that he knew, before tackling the question and so starting to desire to learn?*"

Plato 4th century BC

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"*See the forest not the tree*"

Preface

This is not a ready book for printing. With this digital book the author tries to publish an original cosmological theory in English. The author wrote "tries" because there is great difficulty, for these following reasons: The author has formulated all of his thoughts on a wide range of issues and his philosophy for a long time in his native language, which is Greek. The Greek language has accumulated wisdom into simple words and has many options for expression. The expression may have slight variations without hiding the similarities of meanings. The Greek vocabulary itself can be revealing in thought. But this is the language for a comparatively small population in a wonderful country... with disappointing people. A large pecuniary sum would have been needed for an impeccable translation, which the author could not afford; particularly in times of economic collapse of the state with all what this collapse brings to society. Would it have been the author's own translation, this book might have been more difficult to read and especially given that it is a cosmological theory with so many complex issues that are to be comprehended. It might happen that few sentences would be read as jokes and so that the expectations for reliable solutions and answers would be diminished. At this point, I have to thank *Constantino D. Chatzistavridi* for his interest, for his patience and for trying to correct my first own translation. Maybe it looks funny, but I want to thank a little also the Google's translation service, which I often utilized to get quickly a sample of translation and then make corrections with the extra help of some dictionaries.

The volume of the book or the increased number of pages should not discourage a hurried reader. Major parts of the book are summaries and suggestions for what we need to think and calculate. The cosmological theory has been unfolded in almost thirty years without having been completed yet. A lot of abstracts have been published in illegible webpages. The cosmological theory in Greek language has been included in three volumes of printed pages. A lot of excerpts, which contain the most important moments and the necessary thoughts, have been selected. Some excerpts and chapters of the book do not have their proper order so that the necessary passage of rational thought and the consistency of reasoning would be obvious. This is another reason why a reader who has positive intention, again will have a difficulty following and understanding the new

theory. More physics would be helpful here so that even those readers, who are not physics teachers, can follow the theory. Unfortunately, the number of pages in this book is already wasteful and the school physics is at least assumed as a prerequisite. For many reasons, this book was very difficult to write. But it is extremely easy to be read by any bona fide reader who has an inquiring spirit and wants to understand the world in a multifaceted and coherent way, as the world is with its natural phenomena inseparable from each other.

It is emphasized that the cosmological theory has been formulated as an unusual combination of rational thought, philosophy and physics. This theory should be not assessed as if it were only a physics theory of academics or as if it were only a philosophical theory. The professors will realize, that the cosmological theory contains physics but the mathematical tools used are of a low level and so, inadequate. The professors of philosophy will realize that it is a tedious theory being mixed with physics, while this is not necessary. Neither the ones nor the others would understand this cosmological theory. The first ones and those who are well aware of physics will benefit if they learn to think rationally and to derive their certainty not only from a mathematical result, but from the understanding of physical phenomena that they describe or explain. The others and those who have an interest for philosophical books need to update their thinking and to understand, that one cannot talk about the limits of the cosmos, about the substance of things and about the laws of nature the same way as many centuries ago without knowledge of physics or certain other sciences.

The physics in this book is on a level of an average student of Secondary Education and it is the elementary that it is needed for the modern philosophical thought. The readers who philosophize have to find courage and to be interested to incorporate more physics in their thoughts. Ultimately, if no reader values the success of this new cosmological theory, this treatise will provide, at least, an instructive work. With this work the interest in philosophy will be enhanced and also the creative thinking, while the interested thinker will have a chance to be familiar with the physical phenomena, with all the pleasure of the reading, as long as with an entertaining magazine for strange riddles and puzzles. If one want to understand the physical interpretation, will ask questions and will not rush to dispute. The mathematical investigation began more with the logic of a policeman, who collects and investigates the information and less with the expected consistency that characterizes the work of a modern physicist. The formulas of physics and the information which have been used here for the structure of matter are incomplete leaving out a lot of exceptional phenomena that have been observed in the structure of matter. The short numerical calculations indicates that the general interpretation simplifies the research and its conformity with

the observations of physics. The calculations are indicative, in order to facilitate the continuation of this cosmological research, that was initiated and unfolded by rational and reductive thought and not by accidental observations. However, this book has all the guidelines for every interested physicist in order to complete the mathematical formulation of this original and reductive cosmological theory.

We need to be aware of the fact that the expression of our views briefly and the formulation of brief answers is not the same as the attempt to persuade (a listener or reader) nor the same is an attempt to prove about what we are saying. If we read a brief answer to a question, we will probably not understand from which thoughts and how these answers have been deduced. Few queries are created usually that prevent our confidence. But many people want to hear or read quickly an explanation and short answers to their questions. If they want knowledge with logical certainty and not with confidence in the person, they will inevitably need to learn the thoughts and all observations on which the knowledge have been based. This is a somewhat tiring spiritual process and in many cases it cannot be done as soon as we would like, especially when we do not have the appropriate education. Otherwise, if we are unprepared, then new questions will arise and maybe we will find some contradictions. Many others ask for more convincing answers and reach to the other end: They do not want to hear or think that a thought is not accompanied by evidence as they have learned for their science and is not well formulated. These demanding researchers and professors may say that they do not have time to lose. Even more, they can be immediately rejected and laughed. If they are researchers and they are really interested in solving some of their questions, they should have more imagination. If the whole solution to a problem is not complete and the evidence be lacking however prior to successful outcome to solving a problem, many intelligent efforts are being made. Thoughts, assumptions, remarks, estimates and calculations, even some mistakes are needed and can be of help to solve the problem. The problem may be left unresolved and a view may be left behind and without proof. However, a preparation may have been made to solve the problem and a view may have come close to the truth and needed only a small correction. Needless to say here that a new view in the mind of someone can easily show the exact opposite view and this opposite can be the right solution. Anyone who is interested in answering some questions would think more seriously if did not rush to disagree and if gave to themselves an opportunity to study an unexpected inquiring effort. Therefore, instead of asking for proofs directly and hastily rejecting somehow reactively and selfishly, one will prove their mental abilities if convincingly indicate a mistake or fallacy in the new theory or give a better solution.

With this first translation I hope at least to inform the researchers beyond the borders of my small country about the solutions that have been given to many theoretical problems, which are usually separated, while they are inseparably linked to each other. The author of this cosmological theory and editor of this book believes that anyone with knowledge of physics and mathematics of a level of secondary education and a little patience can understand some of the most incredible omissions of the top physicists all over the world for many decades! The readers will perceive these omissions and their incredible weaknesses from the first page of this treatise until the last.

The physical explanation of the structure of the Universe and matter does not only include solutions of theoretical problems and answers for curious people. Its consequences are not limited in the inquiring region of physics and astronomy. A lot of widespread views (mainly religious, political, sociological, psychological) ignore the potential solutions of this cosmological conundrum or have not taken them into account and so they will be eradicated. It will cause more amazement and overturn regarding the questions about the human logic and thought. Particularly for the skills and weaknesses of a specialized intellect, questions about the educational system, the leading role of the thought and information in human life, the observation into thought and imagination, the close relation of life with ignorance and imagination and the human possibility to make deceit a science. The immeasurable power of thought and imagination (good and bad both) for life and the advantage of human logic to shorten thoughts and generalize, to find rules and to be organize the information will be affirmed together with cosmology. Cosmology will cause amazement, agitation and mixed emotions because life as an internal phenomenon is explained in closer relation to the intellect and information and the intellect as a trait of the complete Universe. The Universe is entirely present in microscopic dimensions, while we perceive it as absent, as an image of an immense and dark space (without inertia and mechanical motion)! Finally, it will be confirmed that life without information does not exist, life without thought is pointless, while a life with thought focused on perceptible things is a misleading and accidental life. Cosmology is one pillar of knowledge that is needed for people to agree on issues about a common reality. Since until now people have disagreed easily, they have easily believed in lies and imaginary worlds and their imagination have invited religion and thereby they have had enmity and intolerance because of imagination! When the translation of this cosmological theory is corrected and summarized more successfully, then a publisher for a commercial book may be sought.

Konstant G. Nikol
Piraeus, Dec 2016 – 2018

Part 1. Rational Theory. The fundamental phenomena

Some guidelines for the physical explanation under the title "A Complete Time (or Complete Universe) and Relativity of Energy"



"It is not the external material things which achieve a balanced total (of things) and the maintenance of physical laws with their moving, the approaching, the removal, the union and their segregation. On the contrary, the completed Total and its laws preexist..."

The title

The title "Theory of Complete Time and Relativity of Energy" was first published as a subtitle by the Greek publication of the philosophical book "The Theology of Science" in January 2000. This title more aptly and popularly is equivalent to "Theory of the Complete Universe and Dynamic Space".

Generally

The cosmological theory of the Complete Time and Universe begins rationally with the concept of an autonomous and stabilized Universe within the limits of a maximum period, in diametrically opposed to the dominant of the "Big Bang theory", which has been projected for many decades. The Universe (as a whole) did not begin from a Big Bang, on the contrary it has always been and always remains the same with the dynamic presence of matter that constantly interacts with the physical space! All things are considered formations by rapid energy oscillations on a constant amount which lastingly returns to equilibrium.

The rational basis of the cosmological theory

In the "Complete Time" Theory, the Universe is defined as a totality of all things together including what has happened in past and what will happen in future, and this broad definition is supplemented by the following logical claim: "within the limits of a maximum total time" or "always the

same Universe within the limits of an entire time". The Universe in cosmological theory of "Complete Time" - no matter how we perceive it in our own place and time and by our own biological body - is autonomous, self-existent and complete within the limits of a maximum total time (or within a maximum period of time).

On one axiom only

This theory claims a self-existent Universe, in which all things change without changing their whole. From the first thoughts, this theory interprets the existence of natural laws, with an incipient and shorter interpretation, the need of the whole cosmos to maintain itself. It is founded on a first thought containing the general concept of cyclic time and period and inserts limits to change for all phenomena. This theory more broadly interprets the natural laws as fundamental phenomena with minimum and maximum limits on their changes, and same limits everywhere in space and always in time. These limits (in time, length, speed, rate of change, amount of energy, etc.) are linked to the principle of conservation of energy and ultimately to the initial assumption of the theory, which is stability of the complete Universe.

1.1. A misleading assumption for the theoretical research

Normally, the book had to begin with an introduction where there would be a brief review about cosmological research and some fundamental phenomena, as some philosophers and most recent researchers have written about. At this time such an introduction is omitted in this first presentation of a new cosmological theory translated into English. We go straight to the newer theory. References to other research efforts will be very few. A worldwide fallacy has begun since the 1920s with the conjecture of the “Big Bang” Theory. Hubble's astronomical observation on the increase of wavelengths of light coming from the most distant galaxies (redshift) was reckoned as a confirmation for an expanding universe. First a logical conclusion was deduced that "since galaxies are moving away from our own galaxy, thus all observers will notice the same phenomenon". The leap in absurdity occurred with the thought that "since the galaxies are moving away from each other, therefore all galaxies were somehow together at a same point". Even illiterate people may ask: If all galaxies are moving away each from other or if the free space expands, does this observation imply the certain conclusion that the whole astronomical cosmos was sometime compressed at one point? So will we immediately rule out something else, while we

think so easily that space-time and astronomical bodies were at one point compressed? Could the galaxies not be moving away from each other without never having been compressed at one irregular point? It's incredible, but in science all logical cases were immediately ruled out. This reasoning employs an irrational leap. Since then, nearly 100 years have passed. Researchers have employed very few observations (major only four observations) for this metaphysical Explosion, as if the time for astronomy and physics had frozen. While most observations reveal the absurdity of the "Big Bang" and problems for the observing structure of the universe have furthermore arisen, some researchers are trying in recent decades to escape with new theories, such as the theory of the "multi-verses" (inflation as it has been called) and contriving new phenomena (such as dark energy and unobserved particles).

Almost 100 years of cosmological research with science fiction and a deceptive view about the total creation of the cosmos have passed; a failed and puerile view like the geocentric view, which ignored the logic of concepts, discouraged research, left many unanswered questions and in addition did not respect the laws of physics – especially the fundamental principle of energy conservation. And all these obstacles have prevailed for many decades up today, because some researchers in the early 20th century tried to philosophize according to their own axiom: That nature is a plurality of individual bodies, which are moving according to the laws of mechanics and thus we need to explain all phenomena mechanistically: According to mechanical motions and to the forces of separated bodies, even life itself. Mechanical motion, that is, pull or push an obstacle forward, turning the body so that it does not fall on the other, if it collides, then its course will change or it will be broken... For physicists the main difficulty was the large number of material bodies, the technical difficulties of measurement and the complex calculations.

As children we learned simplistically how the structure of matter is and that there are electrons within the atom moving in orbits around the positively charged nucleus. One of the questions in a child's mind was how by such a structure of matter, where innumerable tiny atoms are connected and indeed through the electrons, which move ceaselessly, complex things are finally formed that seem to be somewhat stable. How do tiny quantities that move incessantly acquire a more complex and stable form? This question can be asked even if we did not know the indeterminism that quantum physics has introduced into the structure of matter making the question even greater! Eventually, the researchers were forced through different and difficult observations and by different questions to correct the original and simplified concept of the atom's structure, which could generally not satisfy a child either. In order to solve the particular problems created by experimen-

tal measurements and to explain many new and strange phenomena the researchers came to a more sincere view about the structure of the atom, since now this structure is not described by mechanical movements... as if it were the one of separate bodies. It is indicative of how physicists had hypothesized on the structure of matter, having become accustomed to the image of complex bodies and repeating what they had learned. One of the first descriptions of the atom of matter has been called "raisin bread model". This description was supported by an excellent (and *Nobel Prize Winner*) physicist, *Joseph Tomson,* who discovered the electron somewhere in 1904. This was an improved description compared to the previous attempt by the philosopher and pioneer researcher John Dalton. The description of *Dalton* (somewhere in 1805) was approaching the ancient view of *Democritus* and the electric charge was ignored in its own description. *Dalton* reinstated the rational theory of *Demokritos* through laboratory observations on chemical reactions and through the behavior of gases. But he added some laws and prerequisites to explain the stability of chemical elements and some proportions in reactions and their chemical compounds, according to the measurements which he achieved with the scientific instruments of his time.

In the *Newton* era, the role of electromagnetism in nature was unknown. Since then, few researchers have slowly realized a different reality consisted of waves. At the beginning of the 20th century, many physicists and technicians were fascinated by the phenomena of electromagnetism and their imagination was stimulated (*Nikola Tesla* is representative example). But for almost all the researchers, the whole world was the world of separate bodies and the external forces which are applied amongst them. This common view of separate bodies and movement in the sense of mechanical application has so far been the insurmountable obstacle against the development of cosmology. Moreover, the launching of modern cosmological research without rational thought and without general principles has not helped to observe these natural phenomena that can not be explained by a meeting of bodies, while it has allowed fantasy, irrational interpretations and the contrivance of new natural phenomena. People who do not investigate cannot imagine what else can exist without being tangible as a body. And if they imagine it, then they can easily imagine spirits, souls, and magic forces. And still almost nobody can believe that the free space is the total energy of nature (a quantity of energy in the state of equilibrium by standing waves). The total energy of the world appears as an empty space, because this energy does not affect matter by large distances, but in microscopic dimensions. And it affects in microscopic dimensions, because the "movement" of the free space is fast fluctuations and waves in extreme very short wavelengths and not the Newtonian / mechanical motion of the bodies. **The disturbance of the balance creates wave effects**. The wave motions are varied and their

speeds can be extremely high. Some of these energy fluctuations we detect them as particles, as matter and as distant forces. The world and its laws can not be explained by the separate bodies and their masses. Instead, the phenomenon of mass and particle formation must be explained by phenomena that are not localized as bodies within space.

Some physicists took courage, when they realized with the help of the most sophisticated instruments the view of many philosophers: That the cosmos in the depth of inter-galactic space but even in microscopic dimensions appears uniform, with many similarities, common phenomena and same laws. Behind the variety of styles, variations, deviations, forms and the myriad details lies a common reality or a common principle. Not at all original is their thought.

1.2. The first thoughts with the most abstract concepts

Unlike this reckless point of view - that the cosmos is a plurality of individual bodies and forces exerted by one body on the other - a young man in the 1980s did not hesitate to rely on thoughts by applying few rules of logic. As earlier philosophers had done, he began with observations about the characteristics of nature, which are indistinguishable to our eyes, but which are detected by simple abstract thoughts from everyone:

1. In the diversity of the nature, no separate thing could be assessed as a primary or a sufficient reason to explain the cosmos. No particular thing is an independent cause or the final result. We forget, then, every one of the innumerable things of the perceptible cosmos and not get bogged down in trying to count all the individual things and giving a name to every one of these. Relax!

2. There is a whole cosmos (the Total Being, so as we would say in the philosophical terminology), while everything else is a part of a larger global cosmos. Regardless of size, shape and the number of smaller parts.

3. We will not search for the Creator of the Universe and thereafter for the Creator of the Creator. Simpler and more optimistic for the research is to think, that the cosmos is self-existence as a Total and maintained by itself. (Beware, do not rush! This thought does not imply the absence of a divinity or that a divine pattern is missing, as many people think for the universe's autonomy).

4. It is meaningless to think about the time, without any things. The

time is not something other than movement. Where is movement and change, time counts. Without any change or motion there is not time, or the time is very slow. Changes and movements correspond to intervals and to energy changes.

5. We will not search for how the cosmos was in the past and thus without end. Only if we assume that the entire cosmos is always the same and stabilized, only then the search for the first cause has prospect to come to an end. Coincidentally, then the cosmos as a whole (super-total) is revealed as permanent precondition to all that can be happen among its parts. The stability of the whole nature becomes a global law so that laws exist! The stability of the Common Total enforces and adjusts its parts so that the overall stability will never be canceled.

6. Movement of an object / body requires a relative immobility of its component parts and an absence of disturbance of their association. Bodies in nature are not as simple as they are in our imagination!

1.3. Definition of the Universe and the introduction of a maximum time

This cosmological theory has started from a reasonable definition and with only one conjecture: The Universe was defined as a unified set of things, not just these that exist here and now (from our point of view). In the concept of the whole cosmos (or the Universe) the things that have been (in the past) and the things that will exist (in the future) were included. The concept of time was defined according to the common perception that it is the "before" the "now" and the "after" in things that are changing or moving. If one thing were always unchanged and if we did not perceive any movement, then we would not say that time counts. Time is inseparable from the moving and it is not just an abstract concept in our thoughts. We say that “time has passed” and we mean that some things have changed or moved. Has the time passed? So things have changed or moved. If things are slow to change, time passes slowly. It would not make sense to measure time, if nothing ever changed. Physicists before *Einstein* used *Newton's* absolute time for the world. Everyone sees with their own eyes that many "times" are counting and not just one for the whole world, as we easily imagine. This same observation of "multiple times passing" we can be read in *Aristotle's* physics (4th century BC). But eventually Aristotle kept the concept of a common time that counts for all things together.[i]

It is usually a myth of those who narrate the history of physics that peo-

ple (so generalized and ignorant of history) think about time exclusively as a flow from before to after without return (as linear). It is also written in the same myth that people think about the effect with the notion of causality (exclusively from a previous action). With such myths they try to justify in science recklessness and mistakes of earlier researchers. The mistakes, a failure, even bias are not missing from the intellectual effort of someone who made a discovery or had success. But let's not deviate from our study. From which view does the conclusion about myths in physics follow? Since ancient times many people have ignored these carefully articulated thoughts about time and causality, as well as of the free space. Most of all, however, people since ancient times have expressed thoughts about the repetition of many natural phenomena and about the repetition of the whole cosmos. Until today, despite the apparent intellectual power of science and technology, many people think of the outcome without the terms called "cause, causality and determinism". Most people express both views without realizing it: Sometimes they find causality, while they sometimes appreciate expedience. Most people still think of a spiritual law that physicists did not need to think of in their own research, but in philosophy has been called "expedience".[ii] That is, people believe that a lot is happening in their lives and in nature without a reason and an explanation or they believe that fortune was determined by the deliberate action of imaginary entities or with the laws and plan of God. Some who write about the opinions of other people cannot apprehend that all people do not think according to their own level of education and with the experience of a life limited to luxurious lounges and laboratories. They write instead following the fantasy that the history of their science has determined the history of all the societies of the world.

Some things in nature are shared, they last and change at a uniform pace or in the same repetitive way. For example, the day of the Earth and the season change. We prefer these in order to agree about a rate/pace of time measurement. After the first thoughts (on the most general definition of the universe and about time) it was requisite to add a limit in time for the definition of a stabilized Universe. This characteristic is the only conjecture of this theory and, of course, it can easily be challenged before we think about the consequences imposed (with a such characteristic). A stabilized Universe necessitate limits in a maximum time interval and conversely. After many years of formation of the theory, it turns out that the conjecture that I easily made at an early age facilitates theoretical research and it is the solution to all the problems of cosmology and the initiation for its mathematical formulation: The conjecture was this: We will not think about what was the Universe at an earlier moment or in an earlier phase and thus infinitely without end. We will not think about things that had been before and which had been the cause of the things that followed. We will not look for the cause of

the cause and the Creator of the Creator. If we want an optimistic prospect of research, then there will be only one solution: Consider that the Universe is stabilized within a maximum time. That **the Universe is always the same, over a maximum period of time**. From this point of view, all fundamental physical phenomena are rationally deduced without laboratory research, as we will see.

Thus, many theoretical problems are avoided with this definition of the Universe and the introduction of a maximum time. With such a definition of the Universe I thought and wrote provocatively in the first steps of the theory the phrase that everyone is asking me and I smile: "time has finished". Does this phrase not contain a contradiction in its meaning? Only the famous professors are allowed to proclaim their impressive fantasies and we have to listen to them seriously? I wanted to provoke, but also to show my opposition to every theory for a total creation of the nature in the past. The time is finished for the total of cosmos, since the total of cosmos includes the cosmos in the past and the cosmos in the future (no matter if these worlds do not exist according to us). The time is never over for the individual things, but there are boundaries of beginning and end. So simply, with these first thoughts, when the electrons were described to me as particles moving in orbits, then I imagined rings and stationary waves. The planets also move in orbits and are in a certain position at a certain moment. For example, I was thinking and was saying to myself: Our planet Earth per ≈ 365.25 days is in all the positions of an elliptical motion. The Earth is never in a standing position of its orbit except in our imagination! In my view, the motion as well as the tangible bodies had become part of reality and not something separate from things or only conceivable in our minds. In order not to get confused, we will leave out this last thought (about the motion).

I was looking for examples to show that it is not absurd to talk about "finished" time and "circular" time. I did not have difficulty finding the first examples immediately. Stationary waves (for some physicists, the term is not correct), are phenomena of movement and at the same time immobile. I also used the example of a toy such as the spinning top and I said that the spinning top balances because it rotates. In electronic technology there were some other impressive examples. I quickly noticed the weakness in *Heraclitus*' wise saying "Everything Is Changing," which everyone repeats from habit: I did not see with my own eyes everything changing so that they disappear and disperse like a cloud of dust. I saw things changing and at the same time not changing or not changing completely. The water flows into the river and is renewed, as *Heraclitus* said, but we refer again to water, to a property of the liquid elements, to a strip of land within which the water flows in a steady path. This is the other half of the truth and it needs an explanation. The river does not disappear in front of our eyes, nor does it be-

come a river of lava. We see signs of continuity, consistency, smoothness and balance. Despite many differences, humans are born from humans, planets and stars are repeated in space, the same chemical matter is farther away in space, and many phenomena are repeated. The phenomena of periodicity in nature and circular processes were signs that should not remain unexplained. Thus, movement and change were not necessarily subversive, destructive, without continuity, without return and chaotic, with the meaning of disorder (as implied by those who had their reasons to display a nature without anything stable). Even the duration in existence of a thing or of nature, which seems like a simple phenomenon, it is not a result of accidental changes. **The phenomenon of balance is not explained by the phrase "everything is changing"**.

The thoughts through which the cosmological theory (for a complete and simultaneous universe) began to be formulated were still clearly rational thinking, without close relation to a curriculum of physics. However, they are the simplest and most necessary thoughts with the common vocabulary, with minimal concepts in thinking and without the knowledge of some experts. It is important to can think without exclusions, without blind faith in what we have read or heard and by making use of our own experience without our thinking to be entrapped in some words. It is important to have questions and to doubt in order to think of something different and to detect the inadequacy of our knowledge. These were some first thoughts about cyclical time and the limits of the cosmos. By defining the Universe as a stabilized set within a maximum period of time, I easily escaped from many eternal philosophical problems, such as about the questions:

What was the universe back in time?

How will the cosmos result to be?

Has the cosmos a Creator?

Is there an initial cause?

Is there a sufficient cause for all what's going on?

If the cosmos was formed out only of matter, then what is the matter and how is it sustained?

Had matter and particles existed before the cosmos?

How are the properties of particles (with which different things are assembled) preserved and how do particles achieve to be constructive?

These questions were the first to disappear off my mind and I easily gave the first rational answers. But above all, by avoiding these misplaced questions the thinking was emancipated through the right questions for the re-

search and optimism and persistence for the search for their answers were given.

1.4. Time and movement is not an illusion

But I had to solve an equally difficult problem that I created with this definition of a stabilized and complete Universe: How do we perceive that everything moves and changes? Is this an illusion? It would be easy to rest my mind by saying, like *Eleatic philosophers* (and as few modern professors), that we have an illusion of movement and time. But I had the view of *Descartes* that we are not victims of deception of nature or of God. I was thinking, we were part of this nature and we have be created with natural processes and natural phenomena. Even if I said that we have an illusion of time and movement, I would still be trying to give an explanation. How is this illusion created? Luckily it was not needed... **Time and movement is not an illusion**, since the nature had been there before we were born, just as the Earth had existed before me. "I am not the whole cosmos. I'm a part of the cosmos. So I am in connection with some other parts and together with these parts we are a whole. Through biological ways we are conscious of the existence and interconnection of these parts ..." This was one of the first rational thoughts as it was unfolded by the general definition of a Universe with all possible ways. And it had conformity with personal experience. We said about time as a measurement of moments in a motion or a change of some parts. But in nature many moves and changes are made simultaneously in different regions. As there are many different things that move and change. Surely, neither the relativity of time was an illusion. All things do not move and do not change at the same pace, nor with the same speed and all things do not take the consequences of the actions at the same time. Things that are nearby will be affected first or faster. Things distant will be affected later or slower. Some things will never be affected because of the long distance or because they will have ceased to exist... The distance in space is also a distance in time. If time and movement are hallucinations then the natural world is in our imagination. The nature from its smaller parts to the astronomical bodies exists because the things are moving and interact with other things at some time intervals.

Someone else would still say that time is also a psychological phenomenon and as people of this planet we measure time according to earthly principles. The habit is not always a random result or because of the madness of the living organisms. Normally, living organisms use many natural phenomena and get intimacy and ability of recognition, since many natural

phenomena have a long duration or are permanent or often repeated and many physical processes are repeated with the same laws. For example, the ability of living organisms to see is thus evolved into a "habit", since a radiation zone affects their environment and their biological bodies. The biological processes do not ignore the natural phenomenon of sunlight and, as we know, there are many ways to exploit this radiation zone. And the natural phenomenon of sunlight is again created and repeated in many other suns of the astronomical world.

We observe that different times are "running" and at different rates, corresponding to the many movements and changes. With this thought, it seems like my concept of a maximum (and common) period of time is canceled. But if time were only relative and was pass at a different rate depending on the speed of movement or the rate at which one thing changes, then synchronization and simultaneous coexistence would be accidental phenomena in nature. This thought about relativity of time is another form of wording, as the thought that everything moves and nothing is immobile. These two observations correspond to each other, since in one case we are talking about measuring the motion while in the other we are talking directly about the motion (without measuring). If the speeds of the movements are different and if each thing changes at a different rate, then the time measurements can be made with any unit of time we choose. No unit of measurement will be wrong and we choose a unit which it is easier for us. We will have a unit of time for all things, but the rhythms that change things are different, we like it or not. We do not say anything else, apart from that some things move faster, while others are slower, some finish first, while others are last and some start last, and again they finish first, etc. That is, as we have said abbreviated, multiple times are running and different paces and this is not wrong. But as **the general finding that all things change, cannot explain the phenomena of balance, stability and continuity, so the fact that different times are counting and at a different rate can also not explain the phenomena of syncing many actions and movements**. It cannot be explained how it is possible that many things exist contemporaneously and so many things can cooperate with one another with a common timetable.

1.5. Phenomena of equilibrium, relative stability, synchronization, continuity and evolution

In physics time is calculated in correlation to movement, length and speed. With mathematical calculations it seems that time must to be measured at such size so as not to violate the axiom of the highest speed of light.

We have seen this relativity of time with more straightforward thoughts directly to things and about the changes in nature. When physicists pose a problem with movements and speeds, there is no need for a global time to solve the problem. It must not be inferred from the equations and calculations that the light moves faster than the known speed c. But we are exploring the principles of nature and the laws of nature as a whole not the movement of a separate body. We have unanswered queries. One of the most important questions is **the very existence of laws, the fact that the same laws apply to an incredibly large part of the cosmos** and, as we have said, the phenomena of equilibrium, relative stability and continuity (while motion is everywhere).

Now, after thinking about the relativity of time and the multiple time and the different rhythms, add to the queries the phenomena of synchronization, the relatively simultaneous existence of many things and the evolution (in analogy with the preceding phenomena). We cannot overlook that natural things appear as a unity, organized as a total and within a global space. Well, multiple time counts for many things that move at different speeds and change at different rates. But the cosmos has the beauty of a jewel and an order as the *ancient Greeks* had perceived. We do not observe a random collection of things that shape a random world in a random form, and laws are not the result of an accidental encounter of things. Even the phenomenon of the duration of nature is not as simple and easy as we think. If you leave the garbage and an amount of soil at an empty space (without forces), would you ever expect them to meet and combine with each other to create something that would evolve over time and would have laws? In nature, we do not only see forces destroying the bodies. We also observe forces that require molecules to meet, build relations, build things and combine creatively with each other and a celestial world, which keeps being unbroken. We may have given names such as "gravitational force", "electromagnetic force" and "energy" and we measure quantities or sizes. But it is not at all obvious how these forces are produced and implemented by laws and how they are involved **in maintaining a quality cosmos and not simply in maintaining a global quantity** or amount of disarranged things. These observations about laws, natural order, evolution, equilibrium, and about a global space need a convincing explanation.

It is stressed that it took many years in these useful rational thoughts about "circular" and "finished" time to appreciate that my mind had gone to the field of modern physics. I was talking about a stabilized Universe within a maximum period of time and for many years I did not realized that I had insert a mathematical relation in my philosophy: the maximum time period. Which oddly it reminded me of the "age of the universe". Since I had accepted experience and did not explain the moving as an illusion, the nature

continued to change in my theory and was not immobile. The maximum time period - as I was writing with rules of logic that can easily be disputed - is divided into smaller times. The shorter times are not numerically infinite, because if they were numerically infinite, then their total would not be a limited maximum period of time. So simply, I concluded that there is a minimum time, in opposition to a maximum period of time. The beginning of creation was not for the whole Universe neither outside the Universe nor before the Universe! The beginning of the Universe was within it and I had to find it somewhere.

Where will we observe in nature the minimum time moments? There, where time is shorter or quicker and in the minimal parts of things; it was obvious to me. If we took away almost the whole cosmos in our thinking, there would be something less, the minimal. The Universe has a constant beginning and is maintained at its minimum moments. But the complete Universe does not miss in its minimal moments! And where is it? Since we do not see a complete or simultaneous universe! Indeed we do not see a complete and simultaneous universe, but we see a free and isotropic space ... Free space is a phenomenon literally hidden and intangible, but this presupposes a complete and simultaneous Universe. The material world was interpreted by dynamic relations and rhythmic processes at extreme high speeds, while the free space was identified with simultaneous and balanced energy. Soon, many other phenomena were correlated to a stabilized Universe. The principle of conservation of energy was one of the most important inferences. This principle is drawn as a conclusion when we begin with the definition of a Universe that is ultimately always the same within a maximum period of time. On the contrary, the principle of conservation of energy is sacrificed and remains as a metaphysical phenomenon within every theory about an inexplicable creation of the cosmos.

These first logical thoughts (for a rational cosmonomy) stopped being only theoretical, when more signs were searched for in experience and thus they became more convincing. These considerations had entered into the field of physics and the first phenomena were quickly detected, which could confirm a cosmos full and always the same. Firstly, it detected the phenomenon of astronomical (free) space. The complete Universe appears absent as a free space, while the world of material bodies is created and maintained by the tiny connecting parts, which we call matter. **Free space and structural elements are the general traits of the existence of all things**. But this time, the ancient notions of an empty space and matter did not remain as separate phenomena without detailed description for their permanent connection in the thought of a modern philosopher and electronic technician who has a good relationship with physics. **The “empty” space was identified with a quantity of energy, by the simultaneous presence of the**

cosmos as a whole. The matter was identified with rapid changes in this global amount of energy, which remains in balance. One of the first theoretical results with the minimum number of thoughts was that the energy conservation principle coincides with the principle for a stabilized and always overall same cosmos. All signs were encouraging... Separate things do not compose nature, but they are instead formed because they start with a common amount of energy and some mathematical processes (which are imposed on wave phenomena). The particles and the structural elements are not present separately and self ruling, but they are quantities "formed" by the fluctuations and by the tiny waves of a common amount of energy. And this common amount of energy is not out of nature so that we cannot investigate it. We detect it as a free space along with effects of some so-called forces that they have been named gravity and electromagnetism. If it appears easily and everywhere that something important happens for creation of the world, this is manifested in microscopic dimensions and by electrical and magnetic phenomena and not by the motion of the celestial bodies. The technology became space-based and human imagination was overcome by exploiting the knowledge of these striking phenomena.

1.6. The general principle for the explanation of physical processes and structural elements

The tip of the thread in the skein of thoughts, the beginning of the theoretical revelation of the fixed relations between time, matter, motion, space and energy is easily achieved when we refer to all things as whole using the abstract word "Universe" and if furthermore, this definition of the Universe is modified, expressing a broader meaning. When we include generally and vaguely with the word "Universe" all things from the past until the future and not just those which appear in our present. If then we add something in this definition about the Universe, and say that: The Universe is one and the same within the limits of a maximum total time. This brief view is the key to the explanation of all the major issues of philosophy and physics.

Perhaps for the first time, a philosophical thought about the beginning of the Universe is formulated along with a quantitative relation, which is regulatory and determinant for all things and with immediate demand to seek the logical consequences of this quantitative relation of the things. And, for first time, such a general thought that refers to the nature as a whole is linked with mathematics and with the prospect of exploring the phenomena in order to ascertain the logical consequences of this quantitative relation and with the reasonable expectation, that we will make measurements and calcu-

lations. Because the original logical thinking introduces **a quantitative relation, such as the maximum time period**. The time is something that concerns all the individual things. Which means that the maximum time period somehow affects all things, inflicts certain relations between them and in some way causes some effects in individual things. We can search for these. The author of this fundamental thought did not let such an opportunity for theoretical research be lost and he continued his hard efforts, since it didn't happen that a physicist was interested to help.

With the start of the long-lasting configuration of my philosophical thoughts about the nature (many years ago in 80s decade), I used and processed some broad concepts such as motion, time, distance, energy, matter, change, a small in number of broad concepts that were well rooted in the fecund area of physics. However, my particularly bad relation with mathematics limited the effort in observing, interpreting and understanding the physical phenomena and in the treatment of wordings, without any calculating sizes and application of types. My cosmological theory under the subtitle "Theory about a Complete Time and Relativity of Energy" was initially published as a philosophical book.[iii] It was a rationalistic theory, that is to say, a wording of thoughts starting from the more general concepts that applied to all things and an explanation of worldwide phenomena. For this reason, it was a unified theory about time, space, matter and intellect, as the subtitle hinds. Within the goals of the philosophical effort was not only to answer some scientific questions, to explain the preservation of nature and the relation of matter with the creation of things. Within the goals it was equally important for the answers to arise logically through simple thoughts with an obligatory priority, and the views to be as sure as if the result came from mathematical calculations. For this reason, thoughts continued with words and common meanings known to all people and with easy remarks that could be made by every person, wherever they live. It is the well-known method (of earlier philosophers) where many phenomena were interpreted by primal things or attributes or all phenomena were reduced to a unique existence (monistic interpretation, monism). It has the advantage of causative thoughts and quick exploration, because it avoids many traps of our experience. The experience an inexhaustible variety of things is displayed and the world is appeared as being divided with extreme differences and inequalities and its unity as coincidental.

1.7. The complete Universe as a dynamic free space with wave effects

The confirmation came many years later,[iv] when the phenomena needed to be described and calculated for the association of "empty" space with the structural elements were recognized. For many years the phenomenon of motion without relocation was lurking in common expressions of a global energy and abstruse philosophical thoughts. Motion without bodies was lurking and not the movement of individual bodies that move freely until they impinge against something: This motion in physics is called "wave". **Waves** are generated when the balance of a quantity is disrupted and this quantity resists and returns to its original state. Energy can be transmitted via the waves and not via the parts of the quantity that is disrupted. **A common quantity of energy appears as free space, while the structural elements of this quantity are maintained as its fluctuations**. Amounts of energy are transferred rapidly (in most fast paces) to the disturbed "empty" space so that the physical space can return to a balanced situation and we detect these energy fluctuations as particles, fields and remote forces. This effect explains the unstoppable movement in the microscopic structure of things, but also, how stable things can be eventually formed by so many movements and high speeds. This explains how energy changes with " measure ", since the movement with pace is a “numbered” movement and the periodical phenomena are measured by the frequency and not speed. This beautiful, understandable and mathematically expressible explanation for the dynamic connection between free space and matter through wave phenomena gives a definitive answer to the question about the beginning of the material nature. Several hundred events and phenomena (known and unknown) are linked with this rational explanation reveling of how these different phenomena (and so much different, in many cases) are interconnected or produced and in which quantities and in which sizes the changes are inflicted. It is not the solution of a single problem nor the answer to a single question and a calculation which may be proved wrong. Queries about change and balance disappear and free space is transformed into a common amount of energy (by which the particles are formed) only when we explain that the complete cosmos in a maximum time is present as a free space. It sounds unbelievable because we are used to the image of the separate bodies in the large dimensions and the relative movements of the external bodies in the free space (but caution, it is not our delusion). But there is no simpler explanation for a multitude of natural phenomena and for the uniform application of laws throughout nature, since all the visible world of the separate bodies is rooted in the same amount of energy to which we are accustomed and which we call "free space". This common amount of energy is revealed in the sensory organs of man by the property of length, distance, angle and

very recently in history we have detected gravitational force and electromagnetic phenomena.

Probably for the first time a theory explains the presence of the physical space and how it appears like an empty container. Courage or imagination was not needed for such an explanation. The explanation came out rationally by itself through general thoughts about the fundamental natural phenomena. If this explanation were correct and how useful it was for cosmological research, was not immediately perceived. The correctness and significance of this explanation appeared many years later when the structural elements were connected to the space as waves of a shared quantity. Only then the cosmological theory acquired the interest that was missing for a physicist, and theoretical consequences that could be investigated by mathematical calculations followed. The presentation of this cosmological theory could begin precisely from this thought of the physical space as a quantity with a dynamic energy and not from the definition of the Universe as a complete set or from the paradoxical concept of a "finished time". But then it would not have been possible to see how human thought rationally achieved such a close relation between universal space and matter. Thus, the close relation of these two summarized phenomena would have remained unexplained and a random thought. Physical space would have remained an unexplained natural phenomenon and the simplest one such as the fundamental phenomenon of motion. This is, while the physical space is revealed rationally as a complex phenomenon with properties, behavior and with possibilities under certain universal laws only through the thought of a complete Universe in all possible ways.

The cosmological theory, which we can finally name under representative title "Theory about a Complete Time or Universe and Relativity of Energy" is in diametrical opposition to the guesswork of the “Big Bang theory”, which has dominated and has been promoted for a lot of decades. This cosmological theory begins with the simple thought about a self-existent and stabilized Universe, but with this (determinant) divergence: The Universe is stabilized **in the limits of a biggest time interval**. The Universe (in its entirety) did not begin with some Big Explosion (Big Bang), but on the contrary it has **always existed and been maintained in itself by the dynamic presence of matter, which interacts permanently with the free but finite space!** The main concept in the theory of a full Universe is contrary to the widespread and more recognized cosmological theory of the last decades and comparably to each theory, which proclaim a previous creation of the Universe. This theory began without the discoveries of physics or recourse to previous theories. I emphasize for all thinking people and especially skilled researchers and professors of physics, the opposite direction of research in this treatise that was a conscious choice in philosophy and was

named reductio ad absurdum and deductive reasoning. For the teaching and research of science, we usually remove the wholeness of reality and a lot of associated phenomena, which we temporarily ignore. We observe phenomena even when they are not fundamental or necessary for the existence of all other things and we rather observe them accidentally and they are related closely to the field of research. An example is when we observe the movement of a water droplet on a smooth surface with a certain slope. Here in this treatise, we have removed the accidental, the occasional, the instantaneous phenomena and a multitude of specific things with their details, in order to distinguish and describe the phenomena, which are fundamental and necessary for the existence of all other things. In a few words, it is a rationalistic theory that directs the research by beginning with fundamental phenomena and utilizes physics selectively. So this cosmological theory accomplishes to describe and explain a lot of different phenomena in a unified way, such as the free space, time and rhythm, motion, matter, energy, inertia and furthermore, it explains the appearance of Life (with a synchronization of structural elements) with unprecedented logic. It explains the biological phenomena as an expression (externalization) in the direct and simultaneous presence of the Common Total via the most abstract reality, which are the material carriers (or particles) in the microscopic dimensions (that is, through the complete Universe that exists as a free space with fluctuations in its balanced energy). Really, it is a rational theory that has high expectations because simplifies research! With usual vocabulary and through general principles (which are called philosophical analyses) has succeeded to tackle scientific questions creatively, which are posed in physics through accidental observations and discoveries and it gave solutions to eternal questions.

1.8. The concept of a complete Universe introduces laws. Certain limits to natural magnitudes are introduced

The mathematical investigation would not begin and could not advance, if **the instructive thoughts** of the previous physical explanation with the broad concepts were not in advance. Some directive thoughts and first conclusions, referring to:

• The limits of distance and time,

• and the close relation between the global or curved space and the limits of time and length.

• The close relation of the free space to the existence of a common energy quantity.

• The close relation between mass to the fast change in the energy of the free space.

• The close relation of matter to the extreme fast and circular change in a common substance.

• The close relation of gravity to the dynamic and centralized energy of the free space.

• The close relation between matter and the fluctuation in the energy of free space,

• and the relative/indirect beginning of the Universe by the structural elements (that it contains, ie the matter).

• The reduction in energy and in a maximum speed with the presence of matter.

• The close relation between the law of the conservation of energy with the stability of the Complete Universe and also to the discontinuity and the tendency of energy restoration to the equilibrium

In the philosophical book "The Theology of Science" all the observations above were detected and supported along with other bold reasonings, with rational thinking and as conclusions of the general postulate: *"The Universe (as the totality of all material things) is self-existent and always the same in the limits of a biggest total time (within a maximum period Tuni, in other words). The Universe per Maximum Time Period is always the same. This is in contrast to its parts, which are always incomplete. The existence of all things is continually completed and all things change permanently without exception…"*

Summarizing, we repeat and emphasize that the rational theory for a "Complete Time and Universe" introduces in general and theoretically some **limits in the time and length** and a necessary relation and **coexistence between a minimal limit and a maximal limit.** Also this theory introduces a

relation for the preservation of limits despite the change of the sizes of phenomena. In addition to the fundamental phenomena of time and length, in physics these limits are determined regarding at least the quantity of mass, energy, speed, momentum, rate of change, in the gravitational force, and other physical forces. The limits on the fundamental sizes are introduced with the easiest mathematics and immediately the wave processes that retrieve and preserve nature are revealed.

A physicist and writer of popular science, *Gills Cohen-Tannoudji*, in his brief book "Les constantes universelles" which was published in 1993, without saying anything more about the precious information that are hidden in the physical constants, he observed: "*The new interpretation of the gravitational constant combined with the constants h and c creates astonishing prospects: the existence of Planck's time and length implies that space-time itself has also a quantum structure. Imagine what astonishing consequences the existence of a limit to the divisibility of space, but mainly in the divisibility of time will have!* " p123

The limit to the divisibility of time is the amazing conclusion that results from the consideration of the (full) Universe as constant (and simultaneous) inside the limits of a total time. This amazing conclusion can result somehow with little imagination and beginning with a simple supposition as easily as a lot of other conclusions and consequences without experiments, costless and without loss of time! This observation about the limit in the divisibility of time - which resulted as a conclusion and not accidentally- and the effort to draw theoretical consequences was realized early (1990) and this philosophical theory, which was developed, was named somehow contradictorily "Theory of a Complete Time and Relativity of Energy". More briefly and comprehensibly we can call it also "Theory of a Simultaneous and full Universe".

"*The worldwide moment is not constituted by endless or infinite number of smaller moments, otherwise the Universe would not always be itself in the limits of one (utmost wide) moment. The limits of the sub-moments should not be smaller than a certain minimal limit (otherwise the sub-moments would be infinite in number)" p153*

"*Knowing that the time is the things together with their changes (inextricably) and that the Universe exists as complete inside the limits of a greater moment, we find the existence of a maximal and a minimal duration in the interaction… The constant way by which the common substance (or the Universe) is always realized in its minimal moment, this, is called in empirical physics matter or mass* " *p164*

1.9. Minimum time intervals and structural elements

The climax of this awesome conclusion about the limits in the divisibility of the time (which derived from general principles in a philosophical book) is **the most close relation of matter (structural elements) with the minimal time, in which the Universe begins to be realized (permanently) by the free space**. Hence the close relation of matter with periodic fluctuations and paces ensues. The theory of a Completed Time and the philosophical thought with the abstract significations cannot be left unnoticed so contemptuously, while famous and successful scientists only suspect a limit of the divisibility of time and wonder about the curious role of universal physical constants. And this is particularly after certain first proportions between physical phenomena have been found, which can be denoted by known formulas and equations of physics. Those who hasten to claim that the concept of "a Complete Universe in the limits of a maximum time" and "a limit in the division of time" are occasional philosophical thoughts will be exposed. Let us not forget that the familiar concept of "time" is decisive for the science of physics and is connected with all quantities and physical forces. The limit of the divisibility of time is one of the most important conclusions in the philosophical theory about a Complete Time and Universe. The consequences of this limit rather have neither been sought after successfully nor been comprehended by nobody until now. In modern research many phenomena and relations have been observed in order to comprehend better the structure of the Universe and matter. Researchers have approached the solution to the conundrum, but the knowledge is fragmentary. The thinking according to a multitude of details and a lot of accidental observations is confusing. The most important observations for certain essential relations between the observed phenomena have been lost or interpreted by other unexplained phenomena. The imagination of a few leading scientists in their effort to explain some paradoxical phenomena is creative but leaves out more queries.

The theory of a complete and stabilized Universe does not lead the research away from our experience and the earthly world. On the contrary, it gives prospect to the human reason, because it does not transfer the problem of the creation of nature into something previous or wholly different. We can search for the marks in the phenomena around us, which strengthen this concept. The marks and the observations strengthen the concept of a Universe with limits in the changes. A Universe which does not develop unlimited in time, which is not extended infinitely in a flat space, which does not contain infinite quantity of energy, **is in its entirety and in a maximum period always and forever the same and participates per-**

manently for the maintenance and the synchronization of its smaller material elements. Or do the marks strengthen the view of a Universe infinite in the time and in space, which evolves permanently and is different during the passing of time, a Universe which contains an infinite number of things, in infinite distances and in general with infinite quantities? Experience and science can give the answer also in the two cases, even if the theoretical thought of one person is unable to. It is easy to express some flippant words such as " an other theory yet ", " philosophy " and " silliness ", but we avoid thinking with such phrases and we repeat like parrots some theories that cause more queries than answers.

The first contact of the philosophical interpretation (for a complete Universe inside a maximum time) with the mathematical notation is the introduction of the minimal and maximum limits in physical quantities and the addition of indicator **min** and **max** to the symbols of a lot of quantities respectively. In general, a decisive observation (also consequence) of the physical interpretation about a complete and stabilized Universe that facilitated rational thinking is the existence of periodical phenomena, common attributes and same laws in all nature, since all the things are considered as most rapid oscillations with a constant quantity of energy (which appeared as a "free space"). The periodical phenomena would be impossible and accidental in nature, if motion and change in nature were not regulated by **constant** minimal and maximum limits (which are summarized by certain constants h,c,G).

1.10. Movement and structure of matter

In order to understand without resorting to allegorical and incomprehensible expressions:

• what happens in the structure of matter,

• how behave the microscopic quantities in the subatomic space

• how is connected the motion of microscopic materials with the motion of bigger things

• why the gravitational attraction does not assemble the totality of matter (without gap)

It should be recognized that matter in the microscopic level is neither a substance nor some distinguished thing. Matter (an abbreviated expression for the smallest elements of things) is not, but it is realized and changes permanently. "*The so-called matter cannot be divided endlessly or without ceasing to have the same quality and this is explained because the matter is not substance but a way of existence in the common substance. Otherwise, the matter could be not divided or it would be divided endlessly without being transformed* " as I had written. (p158-159).

Consequently we wonder and try to understand: From what does matter derive? By what is it permanently realized? Is matter connected with something and is it realized unceasingly? And what does it make the structure of matter to change with circular and repeated motions? By "chopping" matter we do not "chop" compact and immutable quantities. We "chop" quantities of motion and micro-quantities that interact with one another. In more microscopic space we reach the beginning of these microscopic motions and in minimal quantities and finally in their "connection" with an other reality**,** which is constant and motionless in comparison to these motions. Within such a constant and motionless (relatively) reality these microscopic and regulated motions in structure of matter are realized and exist.

The motion in the interior of microscopic matter and the stability in its structure cannot be explained by the energy and the motion of the outer (and accidental) things or actions. Therefore, the energy with that the structure of matter is maintained, it is not drawn outside of the matter and we know well, that matter exists in enormous distances of space and over time. This observation alone leads to the conclusion that matter, near us or away from us, is connected with something common, with a common reality and even so, that matter exists with the same microscopic structure. This shared reality is nothing else than the " free " space. How could the structure of an atom be maintained and the same structure be repeated in an endless quantity of matter if the changes in the interior of the atom were only exterior movements (such as those mechanical motions which we ob-

serve in free space)? If we think more carefully we will understand, that even if we had only a Newtonian view for the world, then only a supernatural God could regulate, synchronize and maintain the microscopic motions, so that they constitute fundamental quantities of length and time for the bigger things! If God of *Leibnitz's* philosophy is not a satisfactory explanation for us, then with we can conclude using childish thinking, that something is happening in the most microscopic dimensions for all matter everywhere in the Universe, which is not an exterior connection of some particles. That something, cannot be something else than a wave change in an invisible carrier of energy (we perceive as free space) given the knowledge that we have for the phenomenon of motion from all our experiences up until today. That something we perceive as free and global space. Only in the wave change (and fluctuation in energy) can we observe a huge number of mathematical relations, rhythmic and regular phenomena so that a multitude of particular phenomena can be interpreted, which we observe indirectly in the most microscopic dimensions of nature.

What highlights spectacularly the microscopic nature is the motion and creation, that is realized by wave phenomena. A smaller thing meets the huge world not only externally... That is to say, each thing is not connected only with the exterior and separate parts of nature, the obvious phenomena such as displacement, collision and inertia. All things, independent of their geometric dimensions are connected permanently with a common quantity of energy in smaller lengths (with fast rates). All things are considered as shaping by most rapid oscillations of energy in a constant quantity that is found in balanced situation. For this reason, the mathematical proportions and the formulas which are essential for the description of big material bodies (such as these that have been symbolized with constants h,c,G), are essential for the calculations in microscopic dimensions, as we will see. This is, because the minimal limits in the energy changes coexist with maximal limits and are preserved such as the average and it is near such values that the fluctuations constitute the structural elements. **The research in smaller dimensions is a research of the limits of the Universe**.

With a reasonable analysis of certain broad concepts and with the help of the imaginary representation can we observe certain constant phenomena and general relations that are found in the microscopic space of matter. Of course, in order to extract information on microscopic space, tools of an advanced technology are needed, which were manufactured for the first time in the 20th century. We are supposed to be informed and we possess the elementary knowledge needed for the comprehension of this treatise. This is mainly, so that our initial report about the "matter" with general terms and without the precious scientific knowledge (which is divided into separate teaching fields in many volumes of books) is not considered as our igno-

rance here. We follow here a different and opposite route (from the general to the specific characteristics) a method that is considered to be deceptive and irrelevant to experience by researchers. While it is our choice if we despise experience and research has not been tested thus rationally with the same expectations, with the same patience and with the same care. We would not have dared talk about the structure of matter by engaging in theoretical thoughts and logical analyses if the general concepts had not been previously shaped with observations from our common experience:

1) An aspect of one self-existent and complete Universe (in a maximal time period).

2) An aspect of the close relation of such a Complete Universe with the presence of global (free) space,

3) and with limits in time and length (hence also with limits in motion).

4) On the relation of the above theoretical observations to the curvature of free space (limit of longest distance and possibility of removal and approach simultaneously) and

5) with the presence of matter in the role of carrier and as initial wave change for the existence of more complex (or indirect) material things.

6) On the close relation between the particles with phenomena of periodical change and with known wave phenomena.

These are the fundamental (initial and directive) theoretical thoughts that constitute the core of the rational cosmological theory, which is named by the paradoxical title " Theory on a Complete Time and Relativity of Energy ".

In the field of physics and chemistry are the behavior of matter and the attributes concerning its structure described and explained in detail. Here we talk more generally and we refer to the common phenomenon, which we observe in all the particular cases. This common phenomenon is the **motion and the transfer of energy**

with displacement (body move) or via waves.

A main theoretical distinction ensues, which is needed in physics: The presence of the Universe is realized by two forms of motion, that are not described with the same terminology and are not expressed by the same laws. On the one hand the Universe, the motion and the transfer of energy are realized into space with the material things (bodies) as each person has always perceived, which was described in the “mechanistic” physics. On the other hand the “ immobility ” of the finite space (as a stabilized quantity of dynamic energy) exists, where each change causes a somehow hindered (or inhibited;) motion, which has a tendency for reset in to the situation of stagnation (or in rest, if you prefer) of the free space and this is the wave motion.

The wave motion does not " obey " to the Newtonian logic of motion, because this motion is generated by the resistance against the change and not by the lack of resistance.

The physical laws, which regulate the existence and the structure of material elements are not messages that come from their outside, from far away and insubstantially. These laws begin from the common " contact ", which all structural elements have with the one and the same " empty " space, with the one and common complete reality, with the same " shared" quantity of energy, from the their common (invisible) substance, the fluctuations of which are the structural elements.

The total quantity of energy is the same for all things and all the structural elements take shape by the same fluctuations of energy of the one and same dynamic space. The nature is founded on the antithesis between matter and free space. This visible antithesis is the invisible antithesis in the change of energy and in the total energy that is always the same quantity. If this theoretical segregation of matter by a dynamic space is therefore inexplicable, provocative and divisive, then it is also inexplicable and divisive that the energy is altered, but its total quantity is maintained constant.

This theoretical segregation of motion (into mechanical and wave) is more than useful, since it is essential for the comprehension and the explanation of many phenomena. The material carriers (the particles) with their internal energy are neither cut off from the free space neither they are simply found into space. The microscopic structure of matter testifies for the wave motion of the free space and the close relation of the free space to the phenomenon of inertia, the creation of particles ($\mathbf{M}_{max} = \mathbf{f}_{max}\ \mathbf{h}\ /\mathbf{c}^2$) as well as to the electromagnetic phenomena.

As we will repeat and explain, the mass in the microcosm is the result of motion and the structure of matter is maintained by periodical and synchronous motions and wave phenomena. This possibility that the thing is separated from its motion does not exist in the structure of matter, because, the thing is formed in there by some rapid motion and does not exist as a separate and independent thing. When we speak, therefore, about the source of mass and the microscopic structure of matter, we should think instantly, that the speed and the energy of the quantities, which are in motion, are not some distinguished attributes of certain compact microscopic bodies. The microscopic quantities of matter are relative situations of immobility, accumulation and exchange of energy and synchronization, because they are cre-

ated by extreme fast rate in motion and also by wave phenomena, that the concealed presence of the free space “encourages”. Also the forces, which appear in the microscopic structure of matter, do not emanate from the microscopic movement of some particles. They are created by the property of **the constant space to assemble and disassemble its energy** with extreme highest frequency and by phenomena of coordination, that increase or decrease the energy and by stationary waves. Basically, a wave in the isotropic energy of free space can either be radially disassembled (expansion) or be radially assembled (contraction). In this way, the wave is weakened if "transmitted" radially or on the contrary, it is strengthened if it is assembled. Electromagnetic radiation belongs to the first case, while the gravitational radiation belongs to the second case. The view of gravity as a phenomenon of wave motion in the opposite direction can be of decisive importance for the investigation on the maintenance of the structure of matter.

1.11. Some first mistakes that appear rationally in physics

This distinction of the “motion” (into mechanical and wave) and the comprehension of the close relation between space and matter leads us also to the physical explanation of gravitational attraction and the clarification of some paradoxical terms, such as “deformity or curved space-time”, “alteration of the geometry of space-time” and “gravitational force”. Still, our view of the dark space as a finite quantity of energy, which is presented as some particles in the points of decrease or its flow, helps in order to describe the (wave) behavior of the free space and its close relation to the located matter (as a body), with terms of the classic physics and without to “ devise ” new phenomena. This close relation between free space and matter is easily revealed when we think of the concept about a complete whole within the concept of cosmos. The explanation of the phenomenon of gravitational attraction and its close relation with waves of the space which are concentrated reveals like a chain reaction some similarities and differences that these waves have with the electromagnetic phenomena and with the nuclear energy and how the matter is conserved (by tiny lightnings, rapid fluctuations). The electromagnetic phenomena, the force where is limited to the core of atom, the gravitational field, and the generation of structural elements have something which is common: they are connected with motion that is wave and phenomena that are generated by fluctuations.

The description of the “erotic” relation between space and matter needs caution. The free space should neither be considered as an absolute immobility nor as a chaotic motion. Visible bodies (with increased mass and volume) should not be blocked by other bodies in order to be moved. The bod-

ies with their mass resist the movement of others. However, they can move and change the movement of other bodies. They can move if "obstacles" (with their mass) do not exist. This is the mechanical movement, as we are used to see it and we will mean this possibility of movement, when we refer to "empty or vacuous, or clear" space. Let someone not hurry to challenge this by saying that space is not empty. We do not leave the possibility of moving the bodies inexplicable or as an illusion by saying thoughtlessly that space is never empty. The natural space is relatively empty for localized bodies with their known inertia, especially when they are larger in size. The presence of the free space is relative and plays a double role. The characteristic " a carrier of the energy ", which we attribute to the free space, needs to be clarified in order to understand, how some energy can exist in this unnoticed and bodiless way. Really, an unsuspected and more invisible phenomenon than the free space did not exist -near the border of illusion-, if we think of its global significance. The scientific explanation of the phenomenon of the existence of free space and extension will be revealed something worse than a hidebound mathematical approach to nature by traditional physics. Certain unjustifiable errors and the omissions of the world scientific community over a lot of decades will be revealed to us (for example, the easy rejection of " ether "[v] and a common system for motion and time with frivolous criteria, while all people talk about the universal speed of c). The ignorance of the (wave) way according to which the light appears caused misinterpretation of its relation to the material things and it was considered as a motion in space, such as the motion of material bodies. While the light is clearly a wave motion of the same free space… and fluctuation of an existing energy (according to the fundamental equation **h** = E_{max} / f_{max}). Moreover, the easy observation of **the conservation of matter via internal (subatomic) processes, which are realized according to the same laws in all the extent of the free space,** and the fact that they are closely related to wave (electromagnetic) phenomena such as are the light and heat are concealed in the dark in mainstream physics. Thus, the permanent relation, which exists between the phenomenon of visible mass and the invisible wave changes remained in the dark, which include partly the known electromagnetic phenomena.

According to the theory of special relativity are all movements relative, but the speed of light is the absolute limit. The history is well known. After measurements with experimental devices* was a medium of light transmission (ether) - with properties such as some researchers had imagined - not detected. The assumption of the existence of an ether was entirely rejected. This was one of the biggest errors in the history of physics, because after this:

• The concept of an absolutely free space has been founded in the thought of physicists all over the world and for a lot of decades.

• The suspicions of the properties of free space were cleared off and their systematic research was halted. They chose to consider the free space like a rubbery material.

• The research for the beginning of nature was focused on the structure of matter and was limited to the search for elementary particles.

• The observation of wave phenomena was downgraded in the research for the structure of matter and it caused difficulties as a contrasting phenomenon that cannot coexist with the motion of (separated) particles.

• Every other stable limit or reference system was removed of the research, while the things were considered as effects, which are depended only on their exterior conditions without having a common point of connection. All motions were considered as being determined only in relation to each other and externally to the free space.

• The speed of light was identified with the speed of bodies and particles (as photons).

* Famous is the experiment Michelson-Morley in the late 19th century

I formulated a long time ago the unique explanation of the creation of the Universe, which we should accept. This is the only explanation that does not lead the research and reasoning to an impasse. On the contrary, our thoughts approach questions of physics and explain a lot of observations, that are described by Science and happened to precede. This unique explanation, that **the Universe was always complete and stabilized inside the limits of a maximum time interval**. Along with this explanation we infer the fundamental conclusion, that the totality of material things influences simultaneously as such each individual thing and predetermines the properties and the quantity of their structural elements.

This is realized according to rational thoughts and without conflict between thoughts and observations of our experience.

This is realized by 100% “safe” vocabulary (along with few general notions that do not express non-existent phenomena, but universal phenomena) and by alternative formulations of descriptions.

This is realized by possessing knowledge of possible solutions that has been attempted during the history of Philosophy.

After an initial investigation for the answers which would be given by this new cosmological theory to the questions of modern physics and astrophysics by utilizing the terms that these Natural Sciences require, I achieved

eventually to find unexpectedly fast a simple mathematical correlation. I found a most simple mathematical correlation that reveals clearly the new cosmological explanation in terms of modern physics and as a scientific theory for physical phenomena and not only as a philosophical theory. It is a relation that could cause interest and present the fundamental concept of my theory to the intellect of a professor in order to understand it, which it had not been comprehensible by any other logical means until then:

>>> The educated people will await a concise answer:

What would be most logical, most intelligent and reliable for an astrophysicist than reverse the highest frequency $\mathbf{f_{max}}$ of the Universe (the end of electromagnetic spectrum), define a minimal time $\mathbf{1/f_{max} = T_{min}}$ and then search what existed in this minimal time interval? Will we insist on searching for what existed in the first seconds of the famous Big Bang?

OR will we seek what's going on with the fluctuations of a stable quantity of energy (of the free space) near the end of the electromagnetic spectrum and how the structure of the matter is kept constant without the Universe being missing? Particles somehow create constant structure of matter and the astronomic world or on the contrary the particles are created, while a complete world exists in advance?

A minimum time t_{min}, in which the Universe began to be created or a frequency f_{max}, in which the balanced energy of free space has electromagnetic fluctuations and the wave effects keep small sums of energy in stagnant situations as particles?

Only by the close relation between the structure of matter and wave change at the balanced energy of the full Universe can a multitude of phenomena be interpreted. Thus, many relations and phenomena can be revealed, that they have not yet been observed and many other of known phenomena can be confirmed without conflict with experience and without extravagant vocabulary.

► Exchanges of energy and also interactions with matter at frequencies above 10^{20} Hz in microscopic dimensions and at the speed of light (approximately) are realized all around us. Up to now we have ignored this reality, we have simplified it in our perception and replaced it with the concept of a "free" space and we have perceived its presence mostly from the electromagnetic phenomena and gravity. **An invisible reality participates permanently in the material developments** with quantities of energy, that are ex-

changed and altered above 10^{20} Hz and this reality has been ignored in science. This reality participates permanently and simultaneously for the entire material world, from one point to another… In physics these quantities of energy (h·f), which are exchanged and altered in very brief time intervals (t=1/f), have been called "particles". Do you still speak about the total creation of the Universe and also about the fad of Big Bang? Does mass increase infinitely at the maximum speed of c or are the fluctuations of free space realized, which, when they decelerate (in slower rates), cause in that case the formation of electromagnetic waves, while, when they decelerate more, they cause the formation of particles having inertia?

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Who has heard or read since almost a century the following query: Since there is no absolute time and a same pace for all things or a common frame of reference, then how do the structural elements achieve to be formed as the same matter throughout space and have a brilliant perspective in time? How do they achieve the same rate changes and fluctuations in energy? No-one of the competent researchers hasn't thought of the simplest thing even as a hypothesis, that the same structural elements, which we detect over a very large part of the Universe, are themselves “clocks of nature”. By “Clocks”, we mean that they are formed and maintained by energy oscillations, by rate changes and rate energy exchanges, which we observe as particles (electrons etc.). Is the speed of light not a global limit for motions in the perceivable world? Is the intergalactic space, in which we observe a large part of the world - a very larger than own milky way - not a common reference system for an array of many other galaxies and astronomical bodies? If everything is done relatively, if everything is in reference to something else, then should we observe a world with random structure, where the similarities are coincidences, while different laws other materials and extreme unevenness should exist in every region of the world? We don't observe such an incoherent astronomical world, where the things are together by accident and are dictated by random physical laws. All things form a whole, participate in it in common terms and are coordinated in such a way that the whole can become united, common to all its parts and creative.

Many non-specialists and famous professors repeat with robotic thought, that there is not an absolute time. If that is the case, I ask defiantly to explain to us, how the structure of matter appears with the same rate changes and exchanges of hf energy for a big part of the world (if not for the entire world). If time is (only) relative to the "moving system", then we should

find matter with different structure and zigzag movements in every cubic meter of space. We should find matter with different properties of the particles, with random energy levels around the nucleus, with different absorption or emission of energy, with different particle shapes and ultimately astronomical bodies, in which different laws of physics would be applied. The light, which reaches us from the depths of the Universe and from every direction, ought to show a different structure of matter and we could not calculate the distances of galaxies and their sizes. Even the *Hubble's law* could not be applied because of much disparity and relativity in the motion and the position of astronomical bodies. But all researchers admit that our knowledge of our familiar surroundings can also be applied to bodies far away from us. All admit a common time for the beginning of the cosmos. Everybody talks about a wider astronomical space which expands for each observer. Almost all researchers and technicians rely on the fact that the speed of light (or nearly it) is a maximum (undoubtedly decisive) global limit. While they talk about the same matter, about universal laws and global phenomena (gravity, e/m interaction, quantum properties, component particles, electrical charge, etc.), they claim unsuspectingly and contradictorily that there is no absolute time and motion. An amateur researcher responds to all these talented researchers and teachers: Not only there are certain absolute and global limits, but these limits are regulated accurately by nature, so that a vast world is self-sustaining and evolves with the prospect of the complex phenomenon of life. But the amazing accuracy with which the motion is imposed on all things and with perspective of balance has the most amazing explanation: The Universe is with all possible ways and always the same and participates in the material world through the microscopic structure of the free space! How can the accuracy in physical developments be lost if all the energy changes are adjusted so that the global Whole remains the same, with same total amount of energy and simply with wave phenomena in an unchanged amount, which we detect as free space?[vi]

Research is facilitated by an easy finding that could have been formulated and highlighted at least 100 years ago. We all realize that an immeasurable deviation in a value or an amount continuing for a long time, then the deviation will increase noticeably. We all realize that the insignificant increase of one cent in the value of a product will accumulate and will become a significant amount of money if we calculate the sum for a large number of pieces of this product. For thousands of pieces one cent will be multiplied and become thousands of cents. How important is a minimum deviation and how much it is multiplied is well known by mathematicians, product manufacturers and economists. As for nature research, everyone thinks and observes that things are formed by particles, which are not immobile. Everyone observes and repeats how everything in nature moves and consists of

tiny quantities. Therefore, the following question arises: How is nature preserved and how does the cosmos exist with its laws, as we observe it in unbelievably long distances, in many large dimensions of things and despite the vast amount of particles? The most insignificant deviation in matter formation, the lesser deviation in the velocities and radius with which the structural elements are formed, each deviation in the charge of the electron or proton, etc. would be subversive and destructive for nature in the large dimensions. After the increase of distance the consequences would also be subversive and nature would appear totally different and with other laws – if it did not collapse. The most insignificant deviation and an error in the properties of particles multiplied several million times over as time passes or after the formation of astronomical bodies would be devastating and nature could not continue to function according to the same laws.

If such an insignificant divergence does not happen and if the quantities of structural elements are formed from the beginning just as much as needed in order to allow nature and the cosmos to have its laws, this astounding precision will reveal that all these quantities of matter are regulated by something that is common, shared and exists everywhere. Finally, the question is more aptly worded as follows: What is it that exists everywhere and is linked to the quantities of matter to all its extent and with all these movements? It can not be something that exists on a planet or in a galaxy or exclusively here in my home. Well, what can this be according to the experience and the knowledge that we have as humans, which is not only in our imagination and which we can investigate? The first and only observation of the unmistakable answer to this question cannot be anything but "space". Only this phenomenon appears undoubtedly to be everywhere in the world and is connected microscopically with the structural elements. The first observation and finding is on a phenomenon called "free space," in the sense of a container in which the individual things of nature are contained, but also in the sense of a quantity that is somewhat invisibly connected (in microscopic dimensions) to things. By beginning with this finding can we maybe investigate and conclude that the "free space" is something more. We could conclude, for instance, that it has other properties and is not as free as it may seem. However, the space as free, the space as a world container, the space as empty, in the sense that it does not impede the motion of the bodies, when forces are applied between them, the space with this original meaning and according to the common experience is the initial finding so that research can go the right direction (with correct theory). Thus the explanation of the various natural phenomena is simplified.

1.12. WATCH THE SECRET OF NATURE

(which did not need 100 years global research in order to be revealed!): Almost all physicists of the world fell into the trap of some earlier researchers, who thought that such bodies, as these which were studied by *Newton* and *Galileo, are required* for motion. At that time, however, the electromagnetic phenomena were not well known. Physicists – in contrast to even illiterate people - thought that nature consists only of material bodies and their mechanical motions. For more than 100 years they have been trying to explain the creation of the cosmos by particles and explosions, but they have not explained the most important thing: How the particles are organized, how the laws of nature are introduced and where they come from, given that each particle would have its own course and all together would be a powder and nothing more without law. Look how the light is transmitted and conveys accurately a wealth of information to all directions. Is this rapid and regulated dissemination achieved by the accumulation of the particles? No. The whole free space "trembles" and "boils" and "foams". There was no simpler working principle for nature and simpler solution for the mind of a physicist: When a steady amount is disturbed (eg stagnant water), then synchronized disturbances occur, energy is transmitted from waves and the amount "tries"to return to the original state of equilibrium. Particles as long as radiations and forces from distance (e.g., fields) are produced with this wave motion. And when one hears what other effects may accompany the wave motions and how easily mathematical relations are created, which govern these wave motions, then one will wonder once more: How can those, who have more and better knowledge, think like idiots in critical moments and important issues? Blind trust and habit affect logic, seriously!

We are not talking about (mechanical) movements, such as those of the material bodies, which *Galileo and Newton* put into motion and observed. We are talking about wave motions, ie fluctuations, vibrations, oscillations, namely motions that reciprocate, rotate, repeat themselves, much like standing waves, which are thus realized periodically with (very fast) pace, with opposite phases or in synchronization and are measured by frequency and by amounts of energy, that are computed in mathematics. And all these are realized in the fastest speed of nature and in the shorter distances. These are not bodies, which fly to the moon and come back, but they are the ones that move **in shorter distances and with the speed of light**!

Fluctuations in faster rates. Anyone can perceive, that the speed of light is an extremely fast speed and that none of the things, which move

around us, run so fast. Most authors of popular science books, if not all the authors, repeat easily and emphasize the higher speed of light with beautiful comparisons and similes. However, we would not easily find another motion to be highlighted, which is also related to the high speed of light, but this is not the usual continuous motion of material bodies that travel unhindered into space. This is the phenomenon of fluctuation or oscillation, the rotation and alternation, which changes at an incredibly fast rate. Who has heard or read since almost a century about this phenomenon as a source for the microcosm? The static images that follow one another in display at a rate only 50 times per sec cause the perception of a continuous movement. The cone of an usual loudspeaker may vibrate and creak at rates up to 20,000 times per sec. We have noticed and produced fluctuations that reach rates faster than those of visible light and exceed 10 followed by 15 zeros alternations per sec. Such fluctuation rates are the same impressively fast, if not more, as the speed, which we imagine in a rectilinear motion, is. Perhaps they would clarify, that we talk about fields and so they think that the mystery disappears. But, it would rather be a greater and unsolved mystery, if these rapid fluctuations or the rates of this alternative movement were reached by material things, such as the things we see around us or we use. We cannot ignore the frequency of repetition neither for the description of the structural elements nor for the psychological problems and the difficulties of life. The phenomenon of rhythm, time period and generally of repetition is essential for the preservation of the cosmos. This phenomenon is associated with the most complex phenomena, which often cause the query for their strict accuracy for their symmetry, the proportions of their forms and for their balance to arise. This phenomenon hides behind feelings of beauty, but it ensures the evolution of matter, the creation of life and the habit biologically and psychologically. The repetition can be very fast, very frequent, with rapid changes, with fast alternations or uniformly variable pace and thus the existence of a thing or group of things can be maintained, the same phenomena can be reproduced and we can be affected very often and in the same ways. Without this fundamental phenomenon of rhythmic motion would the prospect of stability in the nature be a rare and random phenomenon. However, this has been downgraded historically for decades by the researchers of the structure of matter with incredible stupidity.

We say that any measurable physical change, which is realized at a constant rate or repeated in equal time intervals, namely periodically, changes according to a frequency. The periodic change may occur in position, speed, variation of a quantity (eg intensity of current), direction, in the appearance of a same result, such as an electric or light pulse and many other special occasions. The periodic change can occur in different ways and be realized by different things like a pendulum, the orbit of a planet, the rotation of a

wheel, the direction of an electric current. But in all periodic changes, even if they are more complicated, we observe a start time, a time interval and a finishing time of a quantity and the repetition of intermediate values or phenomena. If we just measure the time (t) of a number of iterations (N), we can calculate the frequency (f) with this measurement by dividing the number of repetitions by the total time (f = N / t). In periodical phenomena and phenomena which are repeated at a constant rate, we can find a plurality of mathematical relations, which are known from the simple shape of the circle (trigonometric), but the equality pi = 3.14159... in a perfect circle is more apparent.

The light: A small portion of the electromagnetic radiation is felt by the eye close to the 1e14 Hz with a wavelength of about 400 nm for the violet color to 700 nm for red (about a hundred millionth of a meter). The speed of light c in the vacuum has been measured 2.997924e8 m/s or 299792 km/s. Compare the number of this speed to that speed, which we perceive as a fast speed in our daily life. In the time of about 1.5 sec the light reaches the moon. The thought of the speed of light, when we realize its extent, can unite physics with philosophy! How can something be about 300 million meters away in 1 sec, when we struggle by using all the technical means to move a few kilometers per hour? Movement at maximum speed and coincidentally (almost) without mass. Nevertheless the bodies with mass, which surround us, do not move at such high speeds (as we all see). That is the opposite conclusion of physics, according to which, the mass increases in proportion to speed and becomes infinite if the body has speed equal to the one of light. But in the real world the bodies consist of molecules and are in a situation of dynamic equilibrium between them. Can the material bodies move in such a high speed without being dismantled by the forces of their acceleration? And if "yes", is it possible to have such a high speed as the one of light and in how much time can they reach that speed? The answer is yours.

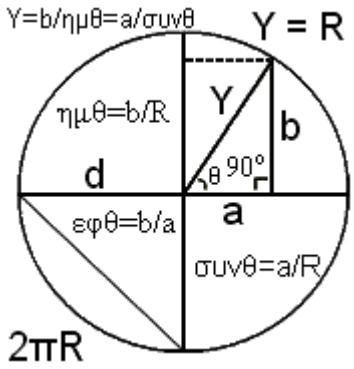
Nevertheless it is not only the amazing high speed of light, which ignites the philosophical thinking to investigate the phenomenon beyond the scientific methods. Even more challenging and very important for the progress of physics is the easy observation of the UNIFORM presence of light in all directions of an empty space. The light is extremely rapid and dimensionless! Is it the magical movement of countless photons or the fluctuation of the free space? The light can also carry information with countless details to all points, directly or by reflection and with minimal losses! The fact that we see a thing from a different perspective (from another side) as being almost the same is not at all obvious. Could one thing ever do all these, which

moves through space according to the known manner of change of position? Is it the movement of light or the fluctuation of free space? It is not a departure and an arrival, such as that which we perceive in the material world. The light is transmitted rapidly, that is, in minimum time, because there is an invisible vehicle - carrier for the transmission of light, which extends everywhere simultaneously. This, which is transmitted, it is energy through a simultaneous and common carrier, that is disrupted. It is a disorder, that increases or reduces the rate, at which the free space returns to a stable energy state. We should not talk or even write in order to explain the free space as a mediator with balanced amount of energy. This issue it should have been closed at least one hundred years ago. Only another reason can explain the misleading information and the downgrade of this issue and not an old experiment, as it has been recorded and reproduced in the historical flashbacks.

Please note another finding which you do not easily read in the well-known books on cosmological research. An ascertainment associated with the finding of precision and fineness of visual information: A lot of telecommunication devices can emit from a limited space of a few square meters. The e / m signals can be emitted at the same time in a number of radio frequencies and with high power. All of these e / m fields and emitted signals coexist and with the help of them the fields of many other electrical and electronic devices can be produced. In the same environment lights can focus and flash, as well as many devices can function that generate noise and other radiations. From a distance of several kilometers properly regulated receivers can receive the emitted signals and select them. No problem of neutralization or instability in receiving the e / m signals exists due to their simultaneous transmission from such a limited space. Still, all e / m signals can carry information, which is in the form of rapid fluctuations. One would expect that all these fields with their fluctuations and photon crowding could not be transmitted. One would expect that one e / m signal would significantly alter the transmission of the other, that many e / m fields would mix with each other and would be inseparable as noise. One would expect that they would deplete the potential of the space and that there would be only noise in the small area with the many sources of e / m fields without the technical possibility of selection, filtration and separation, such as a cloud of dust from troubled and shuffled material molecules. However, the fields and radiations retain their identity, exhibit a regulated behavior and properties determined by natural laws.

1.13. Wave phenomena, rhythms and mathematical proportions

<•> LOOK OUT FOR the "key" answer: How have they attempted until recently to give explanations for these complex phenomena (about the structure of matter) and for their absolute accuracy? By the laws of Newton's bodies and by the "push" of one body to another. Nevertheless, matter and particles are formed by the laws of wave physics and their stability is achieved through the fast pace at which small amounts of energy are repeated and synchronized! Nature is created and maintained by a motion that it is not an astronomical and a physical motion, such as the one that *Newton* was studying. It is a motion without bodies and such a motion is called **"wave"**. This motion is created not because a body does not find resistance to move, but exactly the opposite: The wave is generated because a (uniform) quantity (eg water) resists to change. This motion, then, is not a mechanical motion and in the times we live, we know that there are such intangible motions in nature: These are called "electromagnetic". For nearly four hundred years cosmological research has been misleading, because we all have been thinking of the world with images of the bodies of nature in our minds. Thus we have been thinking that the world had been mainly tangible and separated bodies (visible and moving according to Newtonian laws). So we have been trying to explain the creation of a body and the beginning of cosmos exclusively by particles and by combinations of discrete bodies. But how bodies and particles are organized and regulated by laws, has still been the greatest mystery of nature. The solution is only revealed when we start the explanation from the complete cosmos as a quantity of balanced energy of which, we detect the fluctuations (oscillations and paces with the near-light speed). We detect these fluctuations as particles and as forces inescapably with mediation of our biological body. Thus the solution is revealing and not if we start the explanation of the a world as a set of separated bodies and particles with inexplicable forces. Otherwise the mystery remains and the solution is hidden.



All ratios that disclosed in geometry of the circle between the periphery and the radius, between the angle of a radius with the other radius, the lengths of the arcs and the strings and the ratios between the sides of the triangles, which are formed by the radius and strings etc., are in periodic and rhythmic phenomena. Rhythmic motions and energy exchanges are realized sev-

eral trillion millions of times per second in microscopic distances. Do the trained researchers of a lab expect to observe them like (mechanical) movements of visible bodies? Do they expect to compute accurately and in real-time, while the distance of observation is a multiple length of the distances into which these rhythmic interactions occur?

The principle for the formation of waves, the preservation of microscopic phenomena and their strangeness will appear more clearly with few numbers. The length of 1m needs time of 1m / 2.997924e8 m/s = 0.333564e-8 sec with the maximum speed of light. A length of 1cm is traversed in about 3e-11sec (in 0.00000000003 sec). It is not necessary to compute separately these numbers with many zeros. Here it is needed only to compare and imagine if it helps. Suppose that the observations of microscopic phenomena are in this (relatively large) distance of 1 centimeter. The advanced technology of the 20th century is already needed in order to make inquiries and accurate measurements at such distance. The outer electrons of an atom are linked at several shorter distances, at which the light traveled in quite less time, approaching 1e-20 zeros before the decimal point. Question to good elementary school students and high school students: Can we observe changes in such small dimensions if light takes longer to reach the detectors or directly our eyes? With how much delay?

The problem becomes even more difficult and more interesting, when we consider that light - by which we are informed - is not a continuous flow of particles or a continuous beam but it is an alternating and rhythmic phenomenon (of two fields). The range of the frequency of light is close to the frequency (in cycles per sec) of 1e14 Hz and conversely, the period of the alternation of fields is about 1e-14 sec. So if changes are made in an alternating and rhythmic manner in so short lengths, then these changes should be slower than the pace of light in order to be observed properly. Only in that case light "is prepared" to react to all the short moments, when microscopic changes occur instantaneously. Otherwise, if the paces of the microscopic changes are faster than the one of light, then light will not react at all the times with the microscopic phenomena and will not reveal them properly as a whole. The observation and information will encounter difficulties and our technology will be primitive if we consider that the origin of wave phenomena, by which particles are produced by the "empty" space, is in more microscopic lengths and in greater rates than the 14 zeros of light.

Assuming that we explain the creation of things by tiny bodies (particles) then the particles and their strange properties remain inexplicable. It is not obvious and comprehensible that we speak of matter and particles, as we think by habit. It is not obvious that particles are present in large quantities and have certain characteristics. It is not obvious and easy, that stable com-

binations are achieved between them. If one throws a handful of salt in the vacuum without forces, then one should not expect that the molecules will ever meet and "will collaborate" – while being in motion – in order to produce a stable result. These forces cannot be explained only by the collision of one particle with another. The cosmos is maintained with consistency and synchronization by imposing certain forces. Some people are satisfied to explain the forces by the "introduction" of a god. If this explanation is not satisfactory, then only one thing will remain: All particles of the cosmos are tiny oscillations of a common quantity of energy. The oscillations are made quickly, almost with the speed of light and in shorter distances. We talk about the rates of change that their integer number is confirmed to be over 21 digits (10^{21}), while the sounds we hear have rates up to four digits, because the atoms and molecules can vibrate at these low rates without dissolving. Where are rates with more than 21 digits realized? Do not expect that they will be realized in something tangible. But the particles of the tangible world are produced “explosively” and kept rhythmically by this invisible mediator / carrier.



An invisible reality of electromagnetic energy (h*f) is the source for the creation of all particles. The consideration of the free space as an amount of energy which is kept being compensated in a maximum pace (and not because of the absolute immobility), gives the significant thought that the motion at maximum speed is a permanent fact. The absence of light is not the absence of change in the energy of free space. Light is one of the regions of the electromagnetic spectrum, as we perceive in some cases, when the balanced energy of "black" space is disturbed. In Newton's era and until the time when only few physicists imagined the " big bang " as the creation of all things, the common experience that the cosmos is composed of matter in the known conditions (gas, liquid, solid and plasma) had been confirmed. They believed, that everything can be explained by the movement of the bodies and by small parts of them. Until recently, everyone has been talking about the eternal change of things and about the perpetual move. But no one can explain the stability, the similarity, the creativity, the continuity and the repeatability that the cosmos displays, albeit intermittently and temporarily. Nobody has informed the people, that when a change and movement is realized in recurring manner (eg circular, alternating), and especially, when it is realized in the highest speeds or in short distances, then the change coexists with balance, is stable and the unlikely effect of synchronization in multiple motions can be achieved. And this happens in the foundations of nature, into the structure of matter! That is, rhythm, fluctuation, period with incredible speed in short distances: Everyone can understand this phenomenon, the di-

versity of rhythmic phenomena, study and understand the physical world better. The cosmos as whole and its laws can be explained by these general phenomena of motion. Not by the "flavors" and "colors" of some particles, which are everywhere in all material bodies of cosmos in an inexplicable manner... As if they were cells that reproduce.

The alternations, the oscillations, the fluctuations and generally the periodic motions can be repeated in frequencies beyond imagination. In wave phenomena the fastest paces are reached in shorter distances and lengths. The periodic moves in shorter distances can appear either as monotonous repetitions or as stationary situations and amazing combinations. In periodical phenomena the moves do not lack balance. In contrast to this, the repetitions and the rhythms exist as precondition and requirement for balance and synchronization. The interpretation of the structure of the cosmos and matter by small balls and " remote controlled " laws can not explain thousands of phenomena that spring from microscopic dimensions. But most importantly, it cannot be explained why many same particles move ceaselessly, how they are formed, where their properties (such as charge, spin, distance forces, etc.) they come from and how they all together manage to form stable things and not an infinite dust with random forms... We reiterate our surprise for the huge clusters of galaxies, the distant space distances and star explosions. But it is the same, if not more impressive, that everything requires small amounts of mass, at extremely short distances and without gigantic explosions. The laws of the world are hiding in its tiniest lengths and into invisible phenomena. Just imagine that the DNA would be formed slowly and with pellets that come and go! But, as it seems, nature has wisdom while some researchers have convenient silliness. The free space with its fields and with the speed of light is involved in the structural elements. Material things (bodies) are as such and exist not only because they were made by some of their external ones. Material things exist and are realized (by dynamic processes) together with the energy of the free space that participates in the microscopic structure of their matter. While the "empty" space is the entire Universe, which does not interact externally with our matter, this Universe seems to us to be absent. It is an "empty space" because we do not interact with it as we do with the bodies of Newtonian mechanics. In no science can the phenomenon of space and the role of lengths, distances and angles be denied.

We modern people can understand from the revolution of digital technology better how important the speed and the repeated change in nature's foundations is, how nature is smart and creative, and how it appears in mathematical proportions. For many centuries, no efficient construction had evolved to perform fast and difficult calculations. In order to build a computer with the technical capabilities as we know it today, it was necessary

that the electronic technology had been developed. Only after the manufacture of the electronic valves in the 20th century began the successful efforts and of course these first fabrications did not resemble the later computers with their tiny components. The language in which calculations are performed quickly and results are stored could not be the flow of a liquid or moving mechanical parts. Operations with large numbers and the making of many synchronized calculations need speed and agility with minimum inertia. Therefore, a large number of pieces would be needed to move and to be adjusted like pieces of jigsaw, while their movements had to be performed quickly by hand or automatically by the force of (slow) springs or the (slow) movement of some fluid. These difficulties (namely the number of mechanical parts and the speed of movements and alternations) were theoretically overcome by the application of electricity.

The electric current could change quickly and could be used as a language consisting of moments (pulses) when electricity flows and moments when the flow is interrupted. This is similar to the *Morse* code, which was used for telecommunications. The sounds of this code were generated by the touch of a button. The electric current passed instantly and the sound was brief as well. This was all accomplished by a brief press of a key. By pressing the key for a longer period of time the current flowed for longer and the sound was also prolonged. This was the principle of operation. Morse devised a combination of short and prolonged sounds for each letter of the alphabet, for numbers, punctuation, and other signs of expression. The language of computers is made of such electrical pulses. That is, moments when a minimum amount of current passes and moments when this flow is interrupted. These moments of closing - opening (in circuit with the electric flow) are represented by numbers 1 and 0. The language of digital technology consists of sequences of 0 and 1. Each digit of such a sequence is called a bit and 8 bits make a byte. By the codification of the 8 bits can we represent 256 (= 2^8) different characters as a result of 256 different combinations of 0 and 1. So, the one, who built an electrical circuit, which allowed the electricity to pass and not to pass quickly, made a leap for the invention of computers without knowing it! The next and inevitable leap was to prepare a complete language with zeros and aces (software, as this was named later), which would correspond to commands and to the language we use to talk and write, just as it was more simply done with the *Morse* code.

The construction of the electronic valves allowed for the first time fluctuations in electricity to be made at rates of thousands of times per second. Many electronic valves could send and receive electrical pulses amongst them and one valve puts the other in operation or shuts down for a certain amount of time. Storing these combinations of electrical pulses was another difficult problem for the computer development. In a few decades and espe-

cially since the construction of the transistors, it had been possible to fluctuate the electric current several billions times per second. The function that the electric current becomes a short and controlled pulse was ensured by the low volume and weight, low voltages and less heat loss of the transistor. Thousands of transistors together could quickly open and close as switches and exchange electric pulses. What was needed for the development of computers was the coding of the pulses, as we have explained above in a simplified manner. It was necessary to combine the pulse of the current (turning on and off in high frequencies) with a number of many pulses for each letter of the language or for a whole word. For many centuries, it hardly any step could be made for the reason we mentioned in a simplified manner: It was necessary to combine a large number of "signs" in a variety of ways, at the highest speed and in small space. This complex and fast operation could not be done with gears and springs. And nature with the variety of its structural elements and the fastest rhythms in their microscopic structure seems to know it ... better than man.

Who has ever heard a researcher speak of the wave phenomena in order to inform the people about the Universe? Nature "works" with much knowledge of physics, which have been taught in primary education and it is not needed to invent strange phenomena. The wave and periodical phenomena and how these are inseparable in the structure of matter: This should be an issue for a long time in each educational production, in each presentation, in each interview and not some paradoxical phenomena and the science fiction. We read in books of popular science by professors and we hear often from the researchers that matter is thought of as condensed energy. If someone wants to repeat briefly, that the particles are concentrated or diluted energy, we will not complain. In this way we do not learn anything though. We do not understand how and why the energy is concentrated or vice versa. Also, why is it concentrated so that the structure of matter is formed or maintained? By which laws? The answers to these questions cause a "big explosion" in physics and reveal the Big Deception, which is ironically called " Big Bang " by *Fred Hoyle*. Most strange phenomena will be explained and will be easily understood if we understand that the particles and their properties are created in certain time intervals, where some quantities of energy are transferred into matter as waves. That is, in moments of interaction and when an interaction is maintained and repeated. These quantities are generated by disturbances that spread and intermingle according to the laws of wave phenomena and at paces higher than those of the light (f>1e15 Hz). The moment, in which the particles are formed, functions as a "brake" to the maximum speed c, in which waves are concentrated or decentralized and when amounts of energy accumulate or discharge particularly rapidly. With this deceleration more energy can accumulate or conversely. Apart from the

pace of fluctuations, the outcome is further determined by the other wave phenomena. The trapping of energy quantities and the fast exchange between them creates also the conditions for the absorption of waves, amplification etc. The mass and the particles are quantities of energy h*f with reduced speed and this observation appears in a few simple formulas (known since a century) like the following:

$$E = \frac{h\,c}{\lambda} \qquad M = \frac{h}{c\,\lambda}$$

Look what changes in the above formulas without knowing physics. We know that the energy of the e/m waves travels at the speed of light c. The speed c is in the numerator. In the relation of mass the speed c is in the denominator. Energy quantities moving at the speed of light are in first formula, while particles which are localized in space and inertia are in the other formula.

$$\frac{E}{c^2} = \frac{p}{V} = \frac{F}{a} = M$$ As it is shown on the left, the characteristic of motion does not appear in the formulas that give the mass M. There are hundreds of such signs and coincidences, that reveal the structure of matter and how it is formed by the free space. Most of the physical phenomena, which are correlated so that matter can be formed by the energy of free space, are well known.

Eventually, we did not need to investigate all the individual things in order to think of a beginning for the creation of the cosmos. No need to we ignore most of phenomena and choose one or two phenomena as fundamental (ie attraction and repulsion). Eventually, there was no need to look back in time and find a single cause and a beginning for what followed. The cosmos as a complete set (super-set) is the only cause that explains the existence of the physical laws. This can be conceived so simply without choosing individual elements, without imagining humanoid gods, without the despair that is brought forth by the thought of an infinite progression in the past. All these difficulties disappear and only one remains: How did the Universe achieve to regulate the individual developments and how do the laws apply to all phenomena... so that the totality of all things seems incomplete and always unfinished! How does the Universe achieve to preserve its energy entirely, while the energy is transformed, reduced and is always subjected to change? The answer can not be given without understanding how the "empty" space internally is associated with the structural elements and with wave phenomena.

1.14. Some characteristics of the wave change

In our general interpretation (for a complete and stabilized Universe), **some characteristics of the wave change** are considered to be crucial for the emergence of many natural phenomena. Everyone can perceive how crucial they are without describing them in mathematical terms. These features with ordinary vocabulary are as follows:

1) Wave motion is not like the unobstructed move of bodies within the free space.

2) We notice disturbance in something that was balanced.

3) Resistance to disturbance causes sharp stimulation and change of position (somehow a shock).

4) A new shift phase follows and a relay process are repeated.

5) If the disturbed medium/carrier contains separate quantities, then these quantities are affected and oscillated at a rate.

6) The balance of the carrier is re-established unless it is somewhat impeded, as when the cause of the disruption remains.

7) The properties of the wave carrier determine the velocity of waves and at which rate its waves can be produced.

8) The cohesion of the disturbed carrier facilitates the synchronization of many disturbances.

9) Synchronized fluctuations may be stagnant or alternate and may be repeat in the same way.

10) The rate of wavy change and its repetition implies mathematical proportions.

11) Some contrasts are created and repeated in proportion to the beginning and the end of the repeated fluctuation.

12) Many waves can be amplified or weakened by one another.

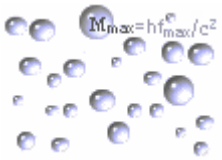
13) Waves can be generated (and follow one another) with a different angle, even rate.

14) Small deviations in the rates or intensity of the waves can convey these deviations to the things that take their energy.

1.15. The synoptic answer

CYCLICAL TIME - COMPLETE UNIVERSE - DYNAMIC FREE SPACE

THIS IS THE SYNOPTIC ANSWER ABOUT THE CREATION OF THE UNIVERSE



" There are not the external material things which achieve a balanced total (of things) and the maintenance of physical laws with their movement, approach, removal, union and segregation. On the contrary, the complete Total preexists...

The material world is complete, direct and simultaneous (with the all possible ways) in its entirety of time and exists relatively as a finite space and constant quantity of energy for all what can happen indirectly by the structural elements, which exist as fluctuations of this constant quantity. Thus, the (complete) Universe exerts permanently a (nuclear) force on the structural elements by which it is realized and recreated indirectly and relatively as being external and incomplete…

The physical laws, which regulate the existence and the structure of material elements are not insubstantial messages that come from their outside, from far away. These laws begin from the common " contact " that the all structural elements have with the one and the same space, the one and common complete reality, the same " communal " quantity of energy and finally from their common (invisible) substance, of which the structural elements exist as such rapid fluctuations.

The total quantity of energy ($E=hf$)[1] is fixed for the all things and all the structural elements take shape by the same fluctuations of energy in one and the same dynamic space. Nature is founded on the contrast of matter to the free space. This visible contrast is the invisible contrast in the change of energy and in the total energy, that is always the same and fixed quantity. If, therefore, this theoretical segregation of matter against the dynamic space is inexplicable, provocative and divisive, then it is similarly inexplicable and divisive that the energy is altered, but its total quantity remains constant. The free space neither expands nor shrinks. The free space is a “communal” and balanced quantity of energy with fluctuations, that generate phenomena of centralization and decentralization to the isotropic and wave transmission

1 We talk about energy in terms of physics rather than astrology

of its energy. Relatively, the total energy is the free space and compensates with the fastest way (almost c) for the deficiencies of itself, that constitute the material world. But the flow with waves so as to compensate for the deficiencies, again creates new deficiencies very fast and it preserves the material elements. (Balance and rate in change and stationary waves). The law of conservation of energy (in its total) is at the same time a law of the same quantity of energy that is absent, that is to say, for the conservation of material world! The energy decreases and flows constantly to compensate its losses not only with a limit in quantity, but also with a limit of a unit of time. The change and transmission of energy cannot be faster than a minimal time interval (Law of the Conservation of Power)". As compared to balance and stability, which would not have a meaning without motion and change, also the conservation of energy would not have a meaning without the decrease of energy.

Is there a theory that explains the application of forces from distance, with the same laws throughout the universe and throughout time rationally, scientifically and with reference to observable phenomena? Matter -either nearby or far away- is connected to something communal, with a common reality, in such a way that matter always maintains the same structure. The formation and the structure of the material elements does not depend on the objects and the different conditions of the environment and it is not so much unstable despite the external forces. What else can be found everywhere in the cosmos that regulates the structure of matter, is always connected with it and contributes to the uniformity of its structure and its laws? What else we can find, which is not imaginary and is permanently associated with anything other than the so-called "free" space? What else can be found everywhere in the Universe, which regulates the structure of matter by its real presence and not by theoretical laws? No theory, which describes the creation of things by primary material elements or particles, can give a serious, rational and empirically grounded interpretation of the presence of the same forces and limits everywhere in the Universe.

2.0. THE ABSTRACT KNOWLEDGE AND THE UNIVERSE

(A little epistemology is required for cosmological research!)

Universe, Cosmos, “multi-verse”. The unity and multiplicity of things

An initial observation: The Greek word " Σύμπαν = Universe " is a compound word and it simply means the totality of everything, that is to say, all this, which exists. This definition does not prohibit us from accompanying the word " Universe " with an adjective like the words " complete " , " full " or from saying with emphasis " the totality of the Universe ". The meaning of the word " Universe " is found in something unique, that distinguishes it from each particular thing. The word " Universe " or the phrase " the totality of all that exists " are not so explicit, as we believe. All humans will not think of precisely the same when they hear these phrases. It isn't immediately obvious what we mean by the words " things " and if we denote with the word " totality " also the multitude of exterior things as a sum or moreover our dreams, our thoughts, the motions of the things etc. By the initial and " wide" definition of the “Universe” we hinder the precision of its definition and we let ourselves be open to the possibility to think somehow otherwise, when we determine more precisely the most general notions, such as " existence " and " thing ". Moreover, many philosophers and the modern researchers have written paradoxical theories about nature, the world and the universe and irrational and contradictory thoughts. To avoid misinterpretations, we have to stress or clarify the meanings that are obvious and rational to a lot of people.

One of the oldest and most popular biases in the human history takes shape, when we hear the simple word " Universe ", namely the entire world, everything, the totality of all things. The truth of our smallness by the criterion of our geometric dimensions leads our thought to a generalized opinion of our smallness regarding all our other attributes and abilities. The generalized opinion of our overall smallness in contrast to an infinite Universe enchains our mind and discourages the exploratory thought as it happens with our opinion about God. Few people in history dared to think of the wider world and how nature works: the Philosophers. This bias has continued to be an obstacle to the historical growth of the entire Science. Due to this bias human thought has been fragmented in separate and closest phenomena, which we can observe, without the conscience of their unity and of their deeper interconnection. That is, without knowledge for the common laws that are imposed on the different phenomena. Furthermore, the usefulness of

abstract thinking for the detection of the dependence of all the phenomena and for the formulation of general laws was degraded compared to the observation of the separate things that offered infinite opportunities. The notion " concrete thing " was identified with the " visible " and the " solid ", while the " abstract notion " is considered to be " invisible " and " fictional ", namely they are in diametrical opposition.

It should cause a big impression, that in science we can even be told about the Universe in its entirety, while removing almost all the things that it contains. We say "Universe" , that is to say everything, all the things that exist and that no-one will either ever measure or see and know. We seek to know the "Universe", namely something which appears to be like infinity, inexhaustible and complicated. If we knew all the things, which the Universe contains, then we would be " gods ". It happens paradoxically that we speak more easily about the Universe and it is more difficult to understand the human society, which is included by the Universe. Because of the fact that the Universe is a totality, but a unique and united wholeness, we can refer to its entirety of things without speaking about anything particularly. On the contrary, it is required… that we know the least number of discrete things and not the most and also to remove them from our thought! Is this knowledge without experience? Yes and No! Yes, it is without experience, because we remove useless details and particularities of innumerable things. We remove traits and things that are randomly formed or that we happen to perceive. We remove the experience of things, which do not offer in a nutshell the knowledge that we need in order to explain the nature as a whole. We remove things that had not existed before a certain time point, but a whole cosmos had existed before them. This experience with all its details may be valuable for our action and for our survival in our environment, but it is a misleading experience for the cosmological research. We can think of the universe, not because we despise experience itself, but because we choose the valuable experience and we observe the essential phenomena, without which the universe would not exist. Conversely, those, who think of the universe as if it were a warehouse with a lot of things, contradict themselves and do not understand well what they say. Because they say, that it is difficult to talk about the universe, but they easily believe or imagine, that the universe is only an infinite number and variety of bodies. They do not think and imagine that the most important difference of the cosmos as a whole is not the variety and the unimaginable number of bodies, but the laws and the way with which the laws are imposed on individual things. Thousands of impressive pictures of space cannot show the invisible relations of phenomena and the laws that regulate their existence. They do not reveal and they neither explain the laws that regulate the motion and the structure, which we observe in big and in microscopic dimensions of world,

nor do they explain the role of matter. It is needed that we think rationally, calculate and read… The photos from space are very nice and fantastic, but they offer nothing more to the minds of most people who do not conduct research of the astronomical world. They simply stimulate their thoughts so as to wonder whether and how far the boundaries of the universe are and to compare the things of their common experience with astronomical sizes. In other words, the photographs and the edited images from space ignite the thought of the most realistic people who are indifferent to philosophy in such a way that they occasionally ask the same questions, as some philosophers do. These same philosophical questions can be articulated even by observing common things and simply by rational thinking. But those who live by having all their thoughts and soul focused on human relationships need such images in order to realize even instantaneously their great ignorance and their excessive certainty - a certainty of their profit, of the events of the distant past as well as of their predictions.

When we talk about the totality of things and try to give an overall explanation, we do not need to refer to separate and complex things, which are next to us and nowhere else. That is, it will not help us much and it will not be the fastest way, if we talk about the plants, the specifications of cars, the geophysical map of the Earth, the city we live, every star which is added on the map of the astronomical space and the specific relationships, which are described in the scientific books in all over the world. The evolution of human knowledge of the things around us has revealed some phenomena and elements, which are more prevalent and are encountered more often in nature. These are contained in a larger number of things and at longer periods, such as for example, in the composition of chemical substances as well as the electromagnetic fields. The discovery of similarities and common elements in all things is not surprising for the philosophers and for the theoretical thinking. For instance, the existence of the structural elements of nature is not a random phenomenon either in nature or in rational thought. This (the similarities and common elements) has been expected instead since ancient times for many researchers, theorists and thinkers. This is why, we have found since the earlier times many attempts for describing the universe including the unique and most famed examples of ancient Greek philosophy.

2.1. Observing... the observer and the abstract concepts

Some thoughts about the cosmos start with a turning of thought into itself and not from observing the sky! This was an advantage of philosophy unknown to most people and which no scientist should ignore or degrade it.

Some questions are asked about knowledge (what is it and when we have it) and about a destination of life with this intellectual turning. Incidentally, these same questions will be revealed by anyone by virtue of this inner / intellectual inversion. In particular, the question regarding whether the senses show the things and world just as they are is an inseparable issue from the research of nature. Rational thoughts are initiated with regard to this issue by a few abstract concepts, which result to general views of nature as a single wholeness of things with common laws regardless of the individual differences and changes that appear due to the senses. That is, rational thinking reveals more quickly that nature has similarities and analogies, common features, common phenomena, specific laws, universal forms and conditions for balance. This is although nature as perceived by the senses appears to be relative and different to each biological body and different when the same biological body moves. There are different biological organs in function and number and how nature looks depends on the organs with which the biological body is equipped. Therefore, do not depreciate and deride rational thought. The **relativity in the appearance of the world by the senses** is one of first revelations.

Since the description of the totality of things and the general explanations refer to common elements and common phenomena, it is thus rational to use some abstract concepts and expressions such as: time and length, act and effect, change, motion and rhythm, totality, component and many other notions, which are necessary in order to refer briefly and overall to all related things. The relation of these general concepts with concepts, which describe phenomena in physics or other sciences, is not random and this coincidence is not a puzzle. We can speak of a kind of experience which we do not have yet and this possibility emanates from experience by the mediation of some general notions. **Some notions can emanate from a minimal number of perceptions (or observations), but these notions correspond to a much bigger number of observations** (to things that we haven't seen). For example, when we say, that humans have two feet, this is a truth not only for those whom we have perceived - this is our real experience – but it is a truth also for innumerable other humans in present, for many that are absent and for a lot of people that we have not seen. Then, if I conclude that a man who has only one leg cannot run faster, this will be true for almost every human being. This is knowledge beyond personal observation and experience because things bear similarities and analogies with one another. I can also conclude rationally that a man with one leg can run faster than the one who has two legs but does not rum at all (for example a paraplegic). But this is not the rule. A multitude of accidental and fragmentary conclusions of experience can be revealed faster, easily and not randomly. Also, a multitude of separate explanations (special cases) have a common prerequisite and the

same explanation when the same result is repeated. We detect some traits that are usually together (eg body and expanse) through the theoretical analysis of some concepts. By linking some general concepts (eg quantities and sizes) we create again concepts that can also reflect a combination of phenomena in the world. By observing some relations and resemblances in the nearest and the most common things of our experience, we also confirm that some phenomena are repeated or they are more than we have initially found. By the analysis of a few words and meanings, which can be found in widespread physical phenomena (common experience, for example light, time, motion) and by the rationale of the everyday experience and how the phenomena relate to each other, we can give answers and achieve well-aimed approaches to many scientific questions. In some cases, if we reject the correct meanings or if we say something nonsensical, then we will need to say absurdities and our thought will “break” with some foolish impasses (reductio ad absurdum). Many of the scientific observations and discoveries, which were made accidentally, could have resulted rationally and by another time priority. They could have resulted as a reasonable consequence, by rules of logical thinking and correct expression even if our thought had begun from different observations and by observing the usual phenomena in our environment. Furthermore, it would have been possible to avoid some mistakes that have spread to society and science for a long time and some failed interpretations!

It is no coincidence, that humans can think and formulate opinions on things beyond experience, on the most distant things, on the greatest and the smallest, on invisible things and for the universe overall. Philosophers were not so deluded and stubborn, as it might seem from their inconsistencies, errors and differences. It is rather common in science to make assertions on a smaller number of things than it could be done or to discover some relations amongst the things, while we have anticipated that the things are not connected or we have believed that these relations exist only in local phenomena. *Jayant Narlikar* wrote simply by observing (in his book "The lightness of Gravity", 1999) "We started talking about gravity on the occasion of the fall of an apple and look how far we have come!". When we hear some thoughts on creation or the purpose of nature, we realize that we try to exceed our spiritual power. In our thought comes immediately the image of an immense world, with infinite forms, developments and details and a comparison with the geometric dimensions of the human body. However, research on these issues has begun since pre-Christian times and with the least possible knowledge. But look! Many thoughts and opinions did not cause laughter, but admiration and so the great and amazing story of Philosophy began. The ones, which are in conflict with the common experience of all people are the most amazing philosophical thoughts. Such a thought is that

the senses and experience mislead us. While everyone expects that we have to travel all over the universe to find out what the essence of things is and while everyone is sure that the world is as it appears before our human eyes, many philosophers thought subversively: The world is not as it appears before our eyes. The world is not even stable and we cannot say that it is, since it is constantly realized. Finally, it is confirmed that the thoughts on the world as a whole or on some of its laws are easier and the answers are less compared to many (local) things that we think we know well. The human soul and society are more complicated issues. This is, because we think about phenomena that do not follow the rules of logic and the laws of nature but rather the imagination and feelings. A lot of things are found exclusively in a region of the world or some unique events happened at a certain moment and did not leave a mark. If we think about such (unique and non-repetitive) phenomena then it is more difficult to know and confirm them. As for cosmology, we do not try to learn all the possible forms of things, to measure all the celestial bodies and we do not need all the knowledge to make a complex construction. We primarily seek laws, fundamental phenomena and some mathematical relations that regulate the structure of the world and matter and their boundaries. And look again, astronomers observe with the latest technology, that the same structural elements are located at distances that we will never approach. And think, that the structural elements are essential and important to all things, and therefore what we learn about the matter of our own body is knowledge of the matter of many other bodies that lie in the depths of the Universe.

One of the greatest (most misleading) biases in science and more generally in the humanity is the opinion, that the reference to the particular things and the attempt to describe the things with clarity provides us with more knowledge. This clarity not only does not provide us with more knowledge but it simultaneously increases our ignorance and it presupposes an error: We ignore things, which we consider (arbitrarily) not to be connected. That is to say, concrete description = piecemeal and fragmented description and ignorance at will. In our daily lives and in science, we ignore things and relations with compromise in order to achieve simplification and for reasons of priority, while we foresee what is related more immediately and what indirectly. We refer to "concrete" things without knowing well what precisely we need to ignore, while we teach all details of things into a virtual environment of our imagination. This is, because we are thus (choosing things in mind and out of their environment) facilitated and delighted, since we need to begin from somewhere in order to conduct research or to live (as we expect). By the time our thought refers to concrete things, we have in this same moment ignored, the wholeness -theoretically- of reality and its possibilities, someone could easily say, and we make this abstraction usually

without conscience. If the world had a small number of things and an approachable limit, then we would be explore it fast. If it were easy to acquire enough knowledge, then knowledge would probably have an end. We would not even need to talk or write so much! If we still have difficulty studying a particular thing, this difficulty should incite a suspicion of how much this thing is definitely a thing and how "united" it is with its environment.

2.2. How information is formed from senses

One of the first observations on cosmological issues is the observation of the very notions of words, and the inference laws (which fortunately apply to the outside world). It is surprising to conclude via a survey of how we get information with our sensory organs about the world and about what we mean "knowledge", that everyone can see that the world appears to be deficient, incomplete and misleading. By detecting relations, which the separate things have with each other and with the inference laws, a more complex -and different than the perceived- world is quickly revealed. Indicatively, such a logical and cognitive problem, which leads to answers to cosmological questions is the following: Everything can be defined (numerically) as only one or as many parts together. Depending on the angle we observe, how far we observe it, and by what mediates (other things)the observation, one thing is many things together and at the same time different things (with different sides and views). Anyone expressing an opinion about one thing has decided and has chosen to define it as one thing or as many things together. This choice often goes unnoticed. Moreover, what we define as one thing and express in an abbreviated manner, is very often not just one thing, because many parts meet and touch each other or the parts bear a similarity (such as a same color or have solidity). Then there are many disagreements, because one refers to the thing in such a way that one chooses to see and think about it (selectively). By these last remarks for the observer, we do not want to explain the phenomena as hallucinations, as many thinkers can easily claim. We want instead to **facilitate research by removing a number of unnecessary observations**. The right explanation for the creation of things has to explain how the senses show the world with such relative traits and not to avoid this relativity by virtue of the easy thought, that the traits of the world are random and are introduced as illusions by the biology of the observer. Physicists, allow us to add a few lines with more observations on the principle of knowledge. They will easily understand how useful these observations are for nature research.

Undoubtedly a little epistemology is necessary for cosmological research. One of the advantages of philosophy and the hidden possibilities of nature is that some thoughts on nature can start with a turning of thinking into itself and not with observing the sky! That is, it starts with certain questions on knowledge (what is it and when we have it) and the destination of life. In particular, the question on whether the senses disclose the things and nature such as they are themselves: This question goes directly to abstract thoughts and general views about a nature as a single wholeness of things which has global laws, regardless of the individual differences and changes that the senses exhibit. Cosmology begins with rational thought and observation of mental processes. If cosmological research does not start so rationally and with the detection of some research prerequisites, then research will be random and a collection of observations starting from wrong definitions of phenomena.

1) Knowledge begins with choice and will. What will we look at? Where are we going to look for? Where will the attention come from? So in every research and in every science morality and intent are somehow involved, that is, the purpose of the research and the choice of the research area for some reasons (if not purposes) and by some motivations.

2) The principle of knowledge is in close relation to its biological and spiritual creator (the person). So the world appears and becomes known it, relatively, selectively and discriminatory.

3) Knowledge of things is formed by biological and mental processes and is spiritual. Knowledge is not things, but it shows things. The formation of knowledge includes features from the biology and the language (of the mental subject).

4) Here, be careful, do not make the mistake of asking how the external actions from the natural world influence the biological senses and are converted into information about the natural world. Each biological body has already in itself constant information about itself and about its condition. External actions cause changes on a biological body that already had information (and not is created from zero). Since the information, which this biological body has already for itself, changes, so certain characteristics of the natural world are detected. Since the biological body (with its whole matter) is inseparably linked (internally and externally) to a natural environment. So the right question is, how is it achieved that a physical body has information about itself and therefore how is it achieved to be alive and to define it as "biological"? You will not find life without some information about itself.

5) Information and thoughts are linked to show things right. In humans some selected observations and concepts are externalized into a sequence by applying rules of logic and grammar. However, the order of observations and the rules which are applied have the formation of knowledge and the proper representation of things as effect. This success of knowledge through the application of rules in thought and in expression reveals that i specific rules and laws are in force in the real world. These are at least these laws, which allow the things to appear and become sensible and known. In human thinking there are laws and rules for the connection of concepts and for the proper representation of things that are contemporaneously knowledge of the cosmos. These are rules such as the relation of a large quantity to a small quantity and the number of things, rules for things moving or immobile (nouns and verbs in natural language), for a beginning and for an end (times of verbs), for many characteristics of only one thing (adjectives in natural language), ways of moving or connection (adverbs in natural language), for identity and for otherness of things, etc.

2.3. Biological specifications also determine which reality is revealed

In our (human) biological life a reality is revealed which is not exactly the same for every life. Which reality is revealed? It does not depend only on our conscious choices and our thoughts. Biological specifications determine also which reality is revealed: Which sensory organs and how many such sensory organs are, how they work, ie what effects they detect and receive (irritations) and in which feelings they are transformed. Also, at which point in time, in which area of space, in which geographical position, exactly where and in which position in relation to some other things the biological body is (relative to the time of local things) etc. In general, how the biological body is made, in which environment and how it is connected with the environment, so it is specified which reality is revealed and if it is imprinted. Our physical movements also determine what we see, what we hear, what we generally perceive and which reality is formed as our experience. The events which we observe and in which we participate are inseparable from our (inner) life. However, the same things and facts can be perceived by many others as a "package" along with different images, with another view and meaning and perhaps in a different time order. In the end, a different experience will "reconstitute" another reality especially if the individual memorizes information easily. Of course, reality is never only what we perceive and it is never the whole. Always a part of reality is revealed (to every biological body) with a unique “texture”, which is determined by the unique (energy) structure of the biological body and its choices. Without any refer-

ence point is reality an infinite number of events that happen simultaneously. The facts are distinguished when a point of reference is determined, where they cause stimuli or effects. This point can be a planet, a galaxy, a stone or a biological body, etc. Everything that affects them comes from a reality or as a part of a reality. Anything, which does not affect it, is a potential reality for those things that do not receive these actions and effects.

2.4. Sensory organs utilize natural phenomena that are repeated most often

Nevertheless, a biological body has the ability to receive influences through its sensory organs and thus to receive information and store it – partly or entirely. It is a complex "receiver" of reference, which can be affected in more ways than a stone. The stone is affected by its closest environment, which can be soil, air, rain water, gravitational force, pressure by a nearby stone, heat, soil vibrations, friction. This is the "reality" to an inanimate stone. However, a biological body has sensors that are influenced by sound waves, it has sensors that form information by its contact with its environment (eg changes in heat and pressure) and it has, above all, sensors influenced by a segment (or more) of the electromagnetic spectrum. A (minimal) effect of things, which exist farther away into the environment, becomes possible with eyesight. Thus we can easily understand by a brief and general description about what is the condition for the appearance of the reality, that something else is important for the dependence and relevance of the empirical reality: In order for the biological body to have sensations that reveal a reality beyond the nearest things (that affect it on its body) its sensory organs have adapted in such a way that an advantage of the **effects, which are permanent or more repeated and common, can be taken**. That is, they use natural laws and physical phenomena (such as electromagnetism, heat, density, inertia, sound waves, etc.) that do not miss from other things and are common features of a reality. Thus, it is explained that many people observe the same characteristics of nature and a person still perceives the characteristics of a common reality and not different characteristics according to any specific time point. And as it has been revealed by the application of mathematics that one law of reality or one of its characteristics is its change by quantitative measure and analogy relations. We almost say, that the principle of sensation reveals irrespectively of the variable content in the sensory organs, that **if we want to find rather a common reality than an infinite multitude of things, we need to explore the common and permanent characteristics of the cosmos** and thus to explain proceeding, how many different things exist in so many ways and deviations.

2.5. The environment acts and influences the biological body, which already has information

The simplest form of life is in contact with an environment that is not limited to the outer limits of its biological form, as we perceive easily. The contact of the biological body is at the same time informative. That is, every form of life detects the contact of its body with the environment, because it has information on the condition of its body. How the biological body has contact with the environment and how it is affected neither depends solely on the environment nor does it solely depend on the biological body (how it is formed, how many and with what organs etc.). Everyone -even without being a philosopher- can ask and think of this question: Is the environmental detection an effect determined solely by the effects on the biological body, no matter what that body is? No. If so, then the biological body would be set in motion exclusively by the effects of the environment without its own involvement and action (ie deterministically like a tennis ball).

Is environmental detection an effect that depends exclusively on the biological body? No. If so, then the biological body would be mobilized only by its own action and it would not take in account the environment (ie it would be crazy, preposterous and self-destructive) at all. Everyone -even without being a philosopher- can think that the information, by which the environment is detected by a biological body, is formed with the contribution of both "worlds": The subject and object, as some earlier philosophers would say. The environment acts and influences the biological body, which already has information on its condition, and the body detects the effects and responds accordingly. For example, the biological body detects an increase or decrease in temperature in its environment and changes the direction of its motion or speed and seeks a tolerable environment that will not threaten its biological balance. It detects an abnormality on the surface that it touches, a protrusion or a dent and it accordingly adjusts the body and its movement. The biological body has been created and evolved in an environment and by the matter this environment offers. So in general, the biological body is created with environmental specifications and has acquired the necessary equipment for self-preservation within it. Some of its supplies are also the sensory organs with which it collects information. Temporarily we leave aside the knowledge and thoughts that the human brain introduces. This is, because when the time comes to add the thought and the knowledge of a man to the information of the senses, then we will need to write many books!

On the other hand, it would be, of course, impossible to have some information and experience without our existence (physical or biological and psychological). Therefore, information and experience are never independent of the quality and the potential of our own existence. Information through the senses is not independent of ourselves as a whole. We can be assured of this in general without having to refer specifically to some of the biological parts of ourselves or to some biological functions. Reality shows a biological body that behaves entirely with the participation of all its organs. Here we do not have to say more about the brain, the nervous system, the sensory organs. For the same reason, we can rationally conclude that another person, who is not with the same interconnection of matter, with the same possibilities and same relations within its environment, does not perceive the same things and at the same time. We anticipate this difference with the information of the senses and in the perception for every biological body, which is different as a complex body, even a little. **The sensation of external things and the information of sensory organs is always a result of the relationship between things and the biological body**. This relation of ours to things (position, moment, direction, distance, angle, weight, resistance, biological and mental state, etc) changes in various ways and always shows a part of the reality, never the whole.

2.6. The senses make abstraction and generalization (but they do not deceive us)

So our perception (our bio-information, if you prefer) is a piecemeal knowledge of reality, ineluctably. The fact that the information of the senses is not directly the same thing, and that it does not show us the things just the way they are (that is, regardless of ourselves) does not imply that things do not exist and that we suffer from hallucinations. On the contrary, it implies that the things are not completely different than our own biological body and it further implies that things do not exist without relationships, without parts and without interactions or without some common elements. The abstraction of information, synopsis and distortion in knowledge begin automatically (unconsciously) along with the sensations to show the environment of the biological body and not the whole cosmos or the whole of the actions that take place outside the biological body. It is not only information removal and selective reception of information (as is done consciously with human thinking) is realized by the senses. Observe still that senses make generalization (as it is realized with general concepts of words)! That is, many things appear the same or with the same trait, while they have many and important differences. For example, we see two things

of the same shape or same color. However, things may be different in their materials, structure, properties, usefulness, etc beyond the same shape or color. Color appears automatically (carelessly and biologically) as a general and abstract notion of the senses, whether we think or not. That is, the senses automatically make abstraction and generalization of information, as when we think and form words. This is an observation "bomb" and it requires from us to identify the senses as intellectual functions and not to contradistinguish between them. The knowledge of things begins with the senses but deception and selective information (partiality and predilection) begin also together with it.

Of course, as we have already started to say more generally, the senses do not display a fake world, since they respond to the effects of the environment and need the laws of nature. The senses were not formed without natural laws and they do not mislead the biological body. They are physiological functions of the biological body, which is inseparable from nature and its laws. The senses use natural phenomena and their organs are developed together with the biological bodies, which are adapted and utilize the natural phenomena in order to survive in their environment. For example anything reacting to our body movements seems to be real for us and this physical resistance is mathematically related to the inertia of the physical bodies. The biological organs do not show the wholeness of reality and just as it is, but this does not mean that they display a fake world. Sensory information is formed according to the principle of matching. A microphone converts the sound into electrical pulses. Then the inverse process is completed for listening: The electrical pulses are converted into vibrations of the speaker. Electrical pulses are not the vibrations of the speaker. But the electrical pulses encode and carry the ratios for the vibration of the speaker, as when the electrical pulses were created with the vibrations on the microphone. So the senses are not things, but they transform stimuli and proportions of the stimuli and thus transfer information. Sensations transform stimuli via natural processes that are caused by natural phenomena and external actions. We see, hear and touch things because we are made of the same materials and there are similarities between the physical bodies. Such a body permanently accompanies our own inner presence. In short, although the sensations and the appearance of things are misleading and incomplete, they begin, however, from natural processes and from the laws of nature and not from different laws for each biological body, as the case would be if the world did not have laws, shared phenomena and similarities. That's why there is consistency according to natural laws and correspondence with some natural processes of how things appear.

One of the first findings of the study on the objective world (on a nature

which has multiple forms and relationships independently of our own spirit) is included within the very word "world" or "cosmos". If natural phenomena were not regulated and there were no order and global laws, then there would be no world and humans. There would be molecules that move and meet at random without any progression and without producing anything stable. The fact that an unbelievably large amount of molecules constitutes the human body is an awesome and unlikely achievement that requires laws, balance conditions, successful combinations and regulatory actions. Things are simpler when we want to understand. If we do not want to understand, then we can doubt everything. Yes, it is revealed that change is thus not only as we mean it unilaterally as instability, overturning, imbalance and this is realized by solely understanding that nature exists and saying the phrases "cosmos or nature or universe". The change is realized by laws, by a measured quantity and can be repetitive, synchronized and rhythmic. It is not the change of a chaos without laws. It is a change that requires some order and is somehow regulated. Change is not always like the sparks of fire. The change in structure of matter maintains the atoms. The change in the biological body preserves the body. The change in the Earth's orbit maintains Earth and life. Forget the blind repetition of the one-sided observation that everything is changing. Everything changes, but how... they change, with what pace they change and how they are balanced and synchronized, we would ask if we were more careful.

2.7. Information and observations are not limited to the senses

The close relation of thought to matter and the essential difference between humans and other animals are among the most misunderstood issues in the philosophy and even in science. A stimulation and in general the influence on a biological body only by the external things impel to a life as the one of the other animals. That is, they impel to a life, which is determined momently with every change in sensory data in an accidental and exterior way and the behavior is regulated more simply, without continuity and not creatively (but solely for survival). However man has the direct/-inner ability to maintain and process the information of the senses in his/her interior without time and area restrictions. The observation of humans is not limited to the senses. Most sensory data is lost in case there are no corresponding things that appear and without the same ways of effect of the environment. Human thought allows for the preservation and correlation of information, the "abstraction" of time and distance like something detached from instantaneous information of the senses. Humans have this intellectual and biological advantage to hold identifying signs of things (namely info-

rmative statements about their identity) and then to think about these signs and externalize them by a language. Humans can contemplate about what is found in their memory without it being in front of their eyes, contemplate about the exterior things without they being simultaneously presented to their senses, distinguish the information due to their attention, maintain an experience and so they can influence themselves immediately - mentally, by memories and fantasy. Thus, humans participate also in the specification and in the quality of their experience and their life in an interior - mental way and influence even their biology.

Humans are not influenced as a dead thing or only by the senses like the other animals and exlusively for survival within their natural enviroment. Humans are influenced by themselves by virtue of the maintained experience, the thought and the knowledge of exterior things and society, without the things being presented to their sensory organs, without they existing or really influencing them. Humans are distinguished both internally and externally from all other animals by this constant possibility to maintain and process data. It would be impossible for any living organism to think and acquire this interior/spiritual advantage, if its biological specifications did not offer the possibility to maintain and process information independently of the exterior things. The facts that an animal has one or more bodily members, it moves standing on two feet or diagonally, its organism is maintained by a different operation, it has feathers or many heads are phenomena of adaptation for survival, that do not ensure the spiritual advantage of the humans. Almost all activities of humans and their psychology are created and influenced permanently by their thinking until the other side: to behave and act as being more influenced by the interior (mentally) rather than by what is really perceived in the nearby environment. Unfortunately, the interesting question on how credibly we know the world and things becomes more complicated when we introduce thinking and the processing of intelligence into the initial knowledge / information of the senses. We will not get away from the purpose of this book.[vii]

2.8. Reliability and Truth

All opinions -even the ones opposed to our own- are expressed by people. But we all treat words, meanings, and synthesize meanings in sentences that are supposed to describe or explain something in the real world. Which view is the right one? Often all different views are correct, and sometimes they are all wrong. When do we understand whether they are right or wrong? We do not have many brief ways to appreciate the correctness: We

need to open our eyes, look out into the world and investigate if what we say really exists or happens. If they are not visible to the eyes, then we have to trace the results of what we say that exists or happens. If we do not turn to the visible world to think, then we can not say with a 100% certainty that what we describe and explain exists or happens. We have to distinguish somehow our imagination from the correct representation of things in our thought and from correct information. How do we make this distinction? Those who think carelessly and speak and write without observing their words and meanings should rather think of the answer by themselves.

People easily talk about the words that they identify with things, they talk without rules of correct expression of the meanings and for things exclusively in their imagination. Humans can imagine or not remember correctly or have hallucinations or deliberately say things differently. A rule for the assessment of credibility is to be able to observe in the world what we have in our thought or that we were told. If many other people can observe it, then this ability is a positive sign and the doubt diminishes. Much of the information, which we are told, is not easy to verify or it is not verified. We do not need to show our knowledge and compete for who knows best. We do not need to have the full knowledge to understand if others have knowledge of what they say or if they say something because they read it or imagined it. It is easy to say a lot that reveals the unreliability of what we hear or read. **Our assurance is not due to our own excessive assumption that we have knowledge**. Our certainty is due to the fact that others speak and write without themselves having seen, without having noticed and they talk about the things that are not common or constant. It is extremely easy to observe if what others say or write:

· We can see it in the world with our own observation.

· Concerns their imaginary world, while the laws of the sensible world neither are applied nor do they cooperate with their imaginary world.

· Are references to something that someone said, saw or heard, and no one else can hear or see.

· If what others write is consistent according to the rules of logic or is a loose sequence of words and if the queries generated can be answered.

· If the world of senses is seriously considered or deemed to be a world of hallucinations.

· If they show us results and causes, but most of the involved things and much information are missing from our thought.

There are criteria / marks with which we estimate that we probably have

knowledge or that we probably hear jokes, lies and fantasies.

1) There is common experience from the sensible world. (Sensory organs have this usefulness, we are informed. Without these biological abilities we could not have any information either about our body or about our environment).

2) The experience by the scientific research and testing is reproduced and taught. (Observations that have been recorded and confirmed many times and by different efforts and are often exploited for technology).

3) In order to talk and write, we apply some rules (mainly grammar and syntax rules). Without these rules, it would probably take a psychological investigation to understand us.

4) The words and symbols by which the information is transferred must reflect the elements of the world and observations made in things.

5) We apply rules of logic in order not to say absurdities and explanations that negate what we initially accepted. We have heard about the principle of conservation of energy. Have you heard about the "principle of conservation of reason"? What we say should not invalidate our original thought and meaning of words. Information can be organized in a way that facilitates research and learning. These intellectual abilities are summarized in the words "logic" and "rational thought". Consider the opposite, that we will not think logically... We will say something and we will immediately cancel it and we will say the exact opposite. In terms of quantities we will say "equality" instead "inequality" and vice versa. We will notice some differences in two things, but we will conclude that they are exactly the same thing. We will observe common traits and we will conclude that they are completely different things.

6) In nature, as it seems, things have their order, their identity, their differences, their processes and their equilibrium because laws are applied. For example, some procedures lead to a result and some procedures impede the same result or prepare the opposite result. Separate bodies always have a difference in their identity and are therefore separate. This observation would not be worthy of inquiry if natural laws did not conform to rules of reason. The differences of things and their developments seem to be regulated so that things have an identity and the actions have their results (while maintaining its natural laws).

7) Finally, when we hear about a thing or an event or a situation that we cannot observe (because it is far in time or space and especially when something is not repeated), then we need to hold doubts. Do not equate the clues with the evidence.

8) In order to avoid an erroneous estimation in cases of time pressure and other limitations for verification, we can estimate with probabilities whether what is said to has 100% reliability or less. Lack of reliability is not always a complete disproof and total denial. If necessary, we bear in mind what we have learned and control its reliability at another time.

Everyone can say anything they want, but not all people are credulous. Many would like of us to be so gullible and tolerant regarding every thought. If we show our research thinking, they will not like it. This is, because they are dreaming or because they want to protect their interests or because they want to deceive us or because they have never thought there are criteria / filters of truth and because they abuse the ability to communicate. Many people are gullible and possible victims of the fraudsters because they have not learned that there are some signs of truth. We cannot equate all viewpoints, as if all were confirmed equally easily and within the common world. We cannot hear all the views and answers with the same chance that they are right. Some views are more obvious, more likely, simpler, more understandable, shorter, more easily verified and are backed up by observations made by everyone. For example, few people would bet that tomorrow the sun will not rise. Some other views are not so obvious. They need calculations, they are not short and simple, their vocabulary is not understandable, they need a trained intellect, they are not confirmed by observations in the world, they are mixed with imagination and some opinions are mostly predictions or testimonials of few people. The inquiring thought prevents the hurried certainty. We, who choose the filters for the truth, have marks of credibility and reject easily many thoughts and doubt a lot of information, are not overly confident and omniscient. We understand that self-control of thinking and its confinement to the most obvious, the most widespread and the most certain things is not a pleasant choice.

2.9. Thinking from the general point of view unto the particular and individual case

Eventually, some first thoughts and remarks on how we are in psychological and intellectual contact with the physical world reveal immediately certain weaknesses that limit our knowledge of the world and create doubts with regard to the true correspondence of knowledge to things. These first thoughts and remarks can be made by any person (thinking being) and for this reason many important thoughts have already been made since the earliest years. In the time of the *European Enlightenment* these easy philosophical thoughts about human thinking and the weaknesses of knowledge were

not appreciated or were ignored by younger and pioneering researchers after many centuries of contempt for nature research and passive replication of religious beliefs. Researchers of physical and chemical phenomena have focused on the individual things and the perspective that this particular knowledge provides for the action and for work. The observations on the weaknesses of thought and the views of the principle of knowledge reveal thus immediately and before the research of nature that knowledge begins fragmentarily, by random choice and imagination and that thus non-existent relations of things are introduced or necessary relations are removed. Thus, the observation of phenomena begins with imagination and with reckless deduction even in scientific research and it falls into traps when it is ignorant of observations (of how our knowledge is formed).

One of the traps, which has been disclosed in all areas of human research and is nowadays well known, is the role of the whole for the existence of its parts and for the regulation of the relations amongst them, especially when they are dynamically connected. Also, the relations amongst the parts, the possible ways to interact, the ways in which things are done and connected, and their qualities are always a big part of the reality - the greater - that is not visible and obvious to the senses. Only with the intellect can we discover it, focus our attention on it and study it better.[viii] Everything around us could have its own name, even the same fruits of a tree. We necessarily use generic concepts that show (briefly) many things that look alike. The ambiguity does not invalidate the fact that general concepts and words have a percentage of information. Perhaps we would like more information and to talk more specifically about each thing individually. But this is not always necessary. We talk more specifically about one thing and give more information when needed. Also some phenomena are obscure by nature itself. For example, our soul ... If we start talking more specifically about our soul, then we will maybe write a novel or a book of psychology. Quantum physics has not yet given the philosophers' timeless message that the "specific" is not so clearly defined, stable, comprehensible, unambiguous and determined sufficiently, as science minds imagine by trusting too much their senses and degrading the distortion that the ignorance causes to our thinking. "*We overestimate the material causes and we imagine that from now on we have found the solution of the enigma, because we are lulled by the delusion that we know the matter better than the "metaphysical" spirit, but matter is as unknown to us as much as the spirit,*" wrote psychologist *C.G. Jung (1875-1961)*.

Every educated person, who was a studious pupil in their school years, must have read that the observation and the research of exclusively individual things leaves the role of the whole for the existence, connection and for the regulation between its parts and their relations in the dark. Every educat-

ed person must have read and understood, that certain relations are lost by the analysis of a dynamic total to its components or to simpler parts, which are essential and exist only when the parts constitute a total (for example, a human body). It is understood, that the whole and form are not always a sum of parts, but something more, particularly if the connection between parts is realized dynamically and not statically. Also, every educated person must have known and each scientist surely knows, that we find in a lot of separate observations on the individual things and in a multitude of phenomena, what they have common or what is repeated in time in the same conditions (as a law). From the enormous volume of data in our observations, from experiments and via long-lasting verification we reach a brief view-estimation, that refers to a multitude of cases. In school, such concise and fundamental thoughts are marked as SOS signal, since they are fundamental to the application to a multitude of special cases. If somebody reaches from a straight line the initial idea -in which many observations of separate phenomena are indicated and summarized -, then they will have an advantage. This “theorist” has won time and is able to explain the impasses and errors of the other researchers and goes a step beyond. A lot of separate (in our descriptions) phenomena lead to abbreviations, general findings and a big number of pages with a lot of analyses, which can be summarized and said with a minimal number of words. A lot of particular phenomena and things need some fundamental laws (that regulate the totality of things).

An example of absurdity regarding the notions of "nothing" and "zero". In order to draw conclusions with the rules of logic, a prerequisite is to know the general definition of the words we use. Many concepts have been formed by the observation of things and we express them in words (eg the tree, the dog, the stone) and we know a little bit that these words show something in the real world. Many other concepts are formed within the human intellect, but it is not as obvious whether they signify something in the real world. For example, we form the word "monster" from the imaginary image of a monster with limbs of different animals and then we mean our own fantasy with this word. However, a concept / idea may not signify something in the physical world, but this concept can be realized. A brilliant case is the concept of number and many concepts of mathematics. Another case may be the concept of a "tool". We have not seen it, however, we can build it and then replicate it (eg a knife). It has not existed until that moment and then we find it in all the countries of the world. So far, we summarize known spiritual processes to think particularly about the words "nothing or none or zero". We humans choose what they mean and where these general concepts apply. In everyday life, when we say "nothing" or "not at all" we mean the lack of a thing or a situation or an event. We mean absence and non-existence. That is, these words have been defined in general for those

cases where we want to declare a lack and absence. Some examples: "Did he apologize? No, he did not at all! Does the pot still have oil? No, it has nothing. Did our friend make the decision? Not yet, nothing! It is not forbidden by our thinking to leave a little of the notion that there is something in the concept of "nothing" and not to mean the complete lack with the concept of "nothing". We will find again an application of the word in the natural world. In order to avoid misunderstanding and to be able to understand, it is important to clarify from the outset how we use this concept. If the word "nothing" is defined as a complete lack, then we contradict ourselves when we extract something from this concept with the rules of logic. If, however, we choose so contradictorily this notion of "nothing", then with the same irrational thinking we can think of the reverse: The "something" and what exists is not necessarily something and it does probably not exist relatively and it is "nothing". (Hegel dared to make such a dialectical use of concepts and he was great! "You are ... and at the same time you are not what others are," Hegel would have told you). Conclusion: If we use the notion of "nothing" together with the meaning of "something", then **also the concept of "something" can be used with the notion of "nothing"**. So decide whether you want to apply the rules of logic to thinking or not. This is, because the acceptation of the contradiction in thought results in the identity of opposing concepts and the meaning does not change by the choice of one or the other word.

2.10. We describe fundamental and necessary phenomena for all things

As we said, cosmology begins without the observation of the sky and its stars and the shortest path of research goes through the thoughts of who the observer of the world is. Then it quickly becomes obvious that the things have a relative existence and their characteristics relatively to each other. These characteristics are removed from the research and thus the research is facilitated. At the same time, the common elements which are necessary for the existence of the world are revealed and certain properties and phenomena which are not missing from the constitution of things. Some of the first observations (phenomena) regarding the cosmological questions are observations 1) on the very meanings of words, 2) on the principle of the senses (which informs us about the world) and 3) on some rules of connection of the meanings (the inference laws which apply fortunately to the outside world). **The problems of cosmology are not exclusive to the field of physics**. Undoubtedly problems with logic of concepts, rules of thought, some problems with the expression of thoughts and choices of thoughts and observations for research are included. The appropriate observations and

some experiments on nature itself give us unexpectedly easily information on the (common) natural phenomena that are involved in all individual things or regulate and adjust them. The first concepts and observations, on which cosmology is founded as a science and which direct the research refer to essential attributes of things and prerequisites of their existence. Knowledge about nature as a whole is not knowledge of any particular thing. This means that knowledge about nature as a whole is neither expressed in narrow terms nor by names of specific things. This is, because if we explain how nature is and how it started evolving by using some rare or complex phenomena, then this explanation will create new questions about what these phenomena are and why they are necessary for the whole nature. Knowledge of the necessary phenomena of nature and its laws is generalized and abstract knowledge. But this rational and abstract thinking does not preclude knowledge from commencing observations on separate things. For cosmological issues we can start from general principles to individual things, from general and fundamental notions to specific and occasional things. Deductive reasoning, which is utilized by philosophers, and not inductive reasoning, which is utilized in scientific research, is the preferred way to conduct our research.

In order not to expand this thought (for rational research) further, read an example to think that the way from the general trait to the individual one does not necessarily start from the imagination, but by observing experience. Suppose an alien craft landed near a village and its passengers saw some people going and coming. Immediately, they could make the hasty conclusion: They were on a planet where such creatures live in a standing position, with two legs, two hands, two eyes, two ears ... Before each research and other land trips their conclusion would be correct! From their first observations, they would be able to think that they would meet other similar people who would not be the same as those they saw but they would look like them (they would have some basic traits). Later, from observation and experience, they would confirm that their hasty conclusion would have been correct, although they might have imagined something more (wrongly)... In the case of the study of the universe (the world as a whole) what we first need is an explanation of its structure and not the good knowledge of each astronomical body that is included in it. The answers to the questions about the meaning of life and about the beginning of the cosmos are not the most difficult. To give these answers in summary, it does not require good knowledge of any individual thing, good knowledge and expertise of the characteristics of an insect or of a galaxy, the exhaustive knowledge of a part of the world or the most complicated calculations. It needs observation and thought about the laws of the world, about certain common qualities of things and a few measurements about physical sizes.

All the world touches our body and permeates us. We would not have to go far in order to explore the laws of the world and the essence of its potentials. Our experience shows us that resemblances and common elements amongst the things in the entirety of space and time exist, which also need an explanation. This means, that we can collect information through the observation of nearest things about the most distant things and about not visible things.

I emphasize addressing all thinking people and especially skilled researchers and professors of physics, that a contrast exists between our own research method and the one of traditional scientific research: This is the opposite direction regarding the investigation and the eduction of inferences, that was a conscious choice in philosophy and was named logical method of abductive inference (abductive reasoning), and deductive thought through the use of general terms (deductive reasoning). For the development and teaching of the physical science and also for research we usually remove the wholeness of reality and a lot of associated phenomena, which we temporarily ignore. Usually, this is done without knowledge of the interdependence of phenomena, in order to begin the research with a few undisputed observations. We describe those phenomena, which are usually randomly observed and are related closely to the academic field of research. So we think even when the phenomena which we observe are not fundamental and necessary for the existence of all other things and for their total. This is for example, when we observe the heat and glow in two metal bodies rubbed together. Here in this treatise, we have removed the unique, the unrepeatable, the accidental, the occasional and some instantaneous phenomena and a multitude of specific things with their details, in order to distinguish and describe the phenomena, which are fundamental and necessary to the realization and existence of all other things, in comparative moments, places and circumstances... For example, when we think of a maximum speed in nature, we can think properly and observe some mathematical relations without having to start with observations on all the motions that take place next to us. This abstract thinking is not contrary to research when the generalization is made with the prospect of a later application of certain relations (as laws) to specific things and in more particular cases. A cosmology instilled by such rational thought is a rational cosmology and it would be more fitting to be expressed by the phrase “cosmonomy”.

2.11. Certain initial and ancillary thoughts for a proper understanding of the concepts

Rational cosmology with observations of our everyday experience:

Thoughts that are necessarily produced through general concepts and by reductio ad absurdum. Explanation for all phenomena of the cosmos as complete and self-sufficient. Precedence of the global, timeless and always previous phenomena in contrast to individual, local and occasional things. The common phenomena by which all the individual and temporal phenomena are regulated and created. Knowledge about common reality, which is not a separate thing, but it is imposed by laws and rules.

Individual and occasional phenomena, that is to say: locally limited, with different forms and combinations, which have a short duration of existence or are unstable and instantaneous, with many variations and deviations, in simpler or more complex ways, random or caused by other things, with actions and reactions, with approaches, compounds and mergers or by removal, decoupling and disintegration. Is there something identical or stable to the individual and occasional phenomena? What stays the same and fixed is not an individual thing.

2.12. Cosmology or Cosmonomy:

For modern researchers, cosmology is a branch of astronomy along with astrophysics, which describes and interprets the origin, structure and destination of the world as a whole (as a totality of all things in time and space), on the basis of astronomical observations and by the application of known physical laws. This is the contemporary concept of cosmology. Those who speak about cosmology as a particular science emphasize two research fields that contributed to its development and its mathematical formulation in the early 20th century. One field of research began with the formulation and study of relativity theories. The second began from the study of the structure of matter and the introduction of the term "quantum" to describe certain electromagnetic phenomena. Physics, as it has been developed since then, is called modern physics, while physics as it had been developed until then, is named classical. Of course, it was crucial for the development of cosmology as well as for research in general to observe the sky with the most modern telescopes and using the latest technologies.

The theories for the description and interpretation of the world as a whole, and all the thoughts that were formulated over a period of many centuries which preceded them, were called "philosophical." These were degraded as "prehistoric" nature research and they were considered to be a mythology of few whimsical people. If we tolerate some of the earlier philosophical theories or thoughts on the term "cosmology", then cosmology can be considered to be a direction or a branch of philosophy. It is a philosophi-

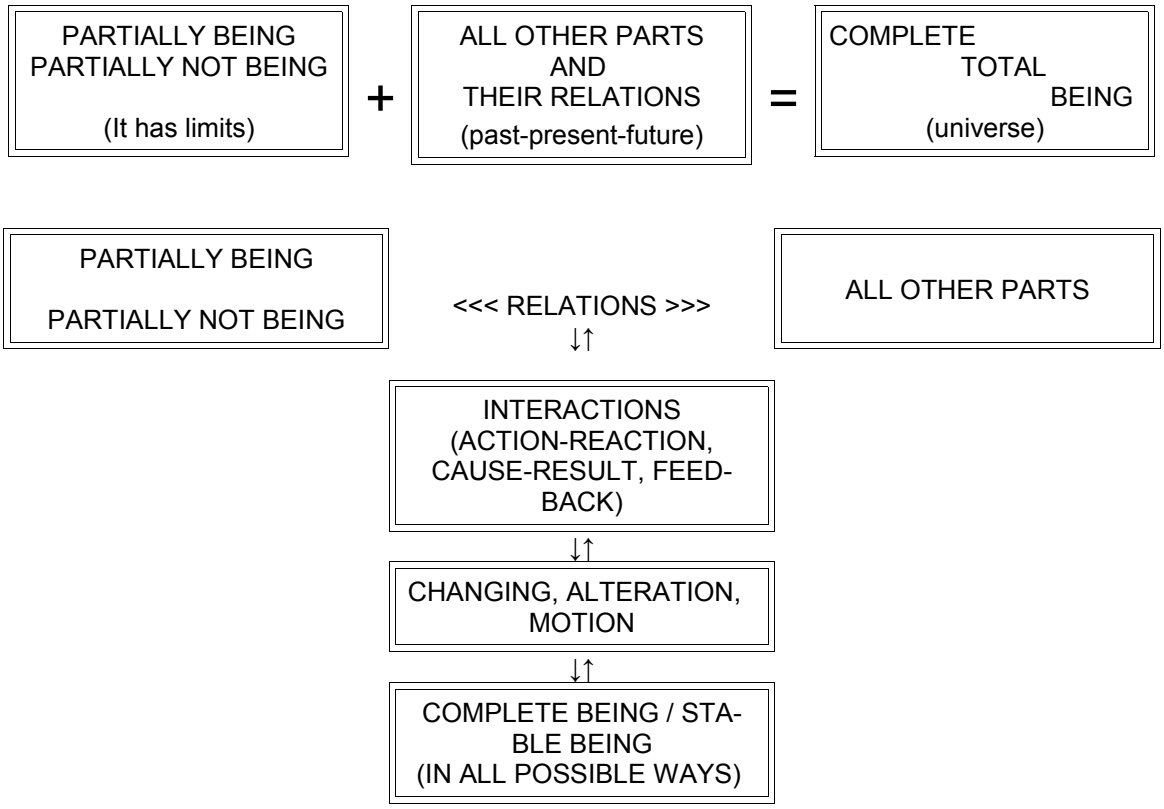
cal branch in which a theory and an interpretation are formulated with regard to the origin, laws, and destination of the world as a whole, through the observation of local phenomena and rational thoughts that are regulated by rules of logic. In philosophy, certain common traits are attributed to things, a substance of things is appointed and explanations are generalized, while interpretations are even attempted in the forms of speech. In philosophy the relations between life and material nature and a possible relation of a god (in the sense of a spiritual being with a global role) are indispensably studied. This is a wider and historical concept of cosmology. In this broader perspective cosmology does not develop within the narrow margins of a scientific theory and exclusively on the basis of only a few laboratory observations. Also the object of study of cosmology is not just the calculation of some quantities. What exactly cosmological research involve and what is the sequence of thoughts for its advancement is also an issue which, in order to be completely and reliably answered, should perhaps be answered after the research will have been completed. When the credibility of the senses itself is questioned, then it is unrealistic if we have the view that we are clearly aware of what we are looking for and which solutions are needed. A lot of past observations of the physical world and many of the logical thoughts along with their queries, as they have been recorded in the history of philosophy, are also included in cosmology.

Cosmology has been developed with observations of local phenomena from recent research that are to be found and to be detected everywhere in the world such as the gravitational field, e / m phenomena, the structure of matter and microscopic processes, the inertia of bodies, heat, electricity and kinetic energy, acceleration and mass, the principle of conservation of energy, and the relation of energy with the particles and the heat. So locally there have been astronomical observations of similarities in star processes and their structure, the large number of galaxies and their distribution, and the well-known matter has been detected in depth of space and time. These few observations -out of the entire physics and of the infinite problems of mathematical calculations- and few locked measurements are necessary for the development of cosmology and for a unified interpretation of the world. Easy generalization was not just a hasty and frivolous rationale of some philosophers. Nature itself provokes and encourages us to think more broadly about the world and creatively and rationally for research. Everyone should recognize the creative role of abstract thinking and appreciate rational thinking for the cosmological research, particularly on the principle of knowledge not only as a method of reasoning but also as source of rules that are also applied by nature to its processes.

2.13. The common features and properties (attributes) of all things

The Theory of a full and stabilized Universe has been unfolded by this first and logical concept for the totality of things:

A SIMPLIFIED CHART OF THE ORIGIN OF THE COSMOS



<<< THE FUNDAMENTAL PHENOMENA >>>

MODES OF INTERACTIONS	DIRECT - INDIRECT	SYNCHRONIZED MOVE AND RHYTHM MOMENTARY AND STABLE RELATIONS WEAKER AND STRONGER INTERACTION COMMON MODES / SHARED ELEMENTS
	FAST - SLOW	
	RHYTHMIC - IRREGULAR	
	SYNCHRONIZED - ASYNCHRO-NIZED	
	DIRECTED – INVERSE	
	PERPETUAL - MOMENTARY	
	CONTINUAL - RECURRENT	
	BIPARTITE - MULTIPARTY	
	WITH RESISTANCE - UNHINDERED	

COMPLETE BEING → STABILIZED (TOTAL) BEING → IN MAXIMUM TIME
PARTIAL/INCOMPLETE BEING → FLUCTUANT BEING → IN LESS INTERVALS
SMALL AMOUNTS OF BEING → STRUCTURAL ELEMENTS → MIN. MOMENTS

Reality as a common totality and as a part. The thoughts, which follow intend to show the consequence of rational thought and how surprising conclusions emerge in such simple words. Eventually, is there one common to all (objective) reality, and are there many ways to interpret it, or are there many different realities? This is one of the first cosmological questions that every human can think of. The question is reawakened in particular by reflections on how reality is shown to different observers and to the sensations of every biological body. By observing some difference of reality as it appears from person to person and to every form of life, it is easy to deny that there is a common to all reality. A reality, which appears different and multiple has at the same time the signs that it is one and the same for all. It is therefore easy for anyone to support the one view or the other. We will give the right answer when we agree that reality is common and one for all but at the same time it is made up of many parts that are somewhat connected to each other.

If the parts are not the same, then the phenomenon occurs, which is worth pondering on, that each one of the parts is affected differently in comparison to the other. That is, their matter does not produce the same results from their environment. But parts of the world are neither (exactly) the same, nor are they completely different. That is why their matter may not produce the same results from their environment, but some results are created the same. Before we come to introduce the notion of an "observer", the inanimate bodies are already influenced differently by their external influences. Therefore, if bodies acquire biological functions and evolve into living bodies, then their different influences are experienced and detected respectively with some differences. The common and (objective) reality in itself, without reference to anything is with an unbelievable number of separate bodies, is in all the ways these bodies are connected and transformed. No individual thing is the whole reality. The common reality in itself, without reference to anything, is a common reality only if it is understood as a complete totality in reference to itself. But, apparently, the unified and common reality has this characteristic, that it is not only in reference to its total self. Its "self", that is to say, the unified and common reality, is at the same time fragmented, shared and over many time intervals. Individual things are not the global common and unique reality. But locally the individual things can also be common things in their environment. Their environment also is a deficient reality, with a limited number of interconnected things. Many individual things combined with each other are also not the whole of reality. Given that the common reality exists at the same time as fragmented, shared and not at a single time, therefore the overall and common reality does not exist in reference to its parts or it does not exist as a whole and it is not detected entire-

ly.

If the parts of the common reality are some molecules, then these molecules are affected by their environment as molecules and little results are generated on them. If the parts of the common reality are biological bodies, then the bodies are affected by their environment as biological and results are produced on them that give information. To solve this cosmological puzzle (of a same reality and at the same time different), we should understand that the common and unique reality exists at the same time with two permanent features: 1) The common and unique reality is as it is in reference to the whole of itself and 2) at the same time it is not in reference to its total self. How does this happen? Why does the world confuse our thinking? In case 2, because the common and unique reality is not in reference to its total self, therefore, two conclusions follow: The common and unique reality is absent in reference to "nothing" and its most fragmented parts. Each separate and different thing has another connection with its environment and with the common and unique reality. It receives the effects as it can according to its structure and how it is and with its own interconnection with the environment.

The common and unique reality is as it is in reference to its total self and 2) at the same time it is not in reference to its total self and **at the same time, the common reality is missing ... and exist as incomplete**, piecemeal and as a part. The double presence of one and the same reality (or dual process, let's say) is a fundamental feature of reality. The reality which is common to all at the same time is not common, it exists and it does not exist. The reality is complete as a whole, however it is not complete as a part. It is complete and with all the effects on the whole of itself, and it does not exist as a whole and with all the results for its parts. The common reality to the different parts is not with all the same results and therefore it is not exactly the same reality (in relation to the different parts). Following these rational observations, we can conclude for the biological bodies that if they are different then they do not detect the same common reality. Experience agrees with this rational conclusion.

But here we make another important observation (which is easy to follow from the observation of relativity and the multiplicity of things): How can things not be exactly the same, but also not entirely (100%) different? How can things be the same, but always have a difference? (Such as the fruits of a tree or a large number of people). If we analyze it rationally, we will find that things always have a common element and they are never completely different as parts of two completely (100%) different worlds. It is true that the individual things always have a common element and this observation is linked to the other observation that the individual things always detect

something common from one and the same reality. The explanation must be sought in this observation: If the individual things always have a common element, then they have some same influence. The complete reality (toward itself), which is common to all through rational thinking, seems to be as if it were at the same time linked to every separated and different thing. And paradoxically, by the research of the physical world and by the common experience, we detect a division of the world that fits with the previous rational thought: The world appears to be incomplete with the image of a universal space, and this space is connected to each separate body. The interpretation of a complete and stabilized Universe confirms a natural process that is incredible to the eyes, but it is obvious to the rational thinking.

The observer as a person has options to think about the world as it wants and about everything the world contains. And indeed the psychology of humans affects how and what they will think, and whether one will think with a purpose or will be biased or impartial. Again, the following happens, which is worth pondering on, that if a person thinks only of themselves, then they separate themselves from the whole world and the whole world is downgraded to a stage for their own individual action. If a person only thinks of themselves, then they live with the illusion that the world is given only to them. This is how selfishness and megalomania and at the same time, the degradation of other people and the corresponding behaviors, which devalue others, appear. That is, through thoughts about human psychology and behavior, a conclusion emerges again about moral consequences when the cosmos is seen as limited in human eyes and not impartially as a global whole.

If we ask about the laws of the World, then again we will easily conclude as the first law the global equilibrium. Notice how a word that is used as if it had a known meaning often hides more information that we haven't thought about: The world to have laws, it must first be a world! The World must be preserved and be united as a whole so as to has laws, that is, some fixed functions or processes by which the World is maintained and changed. Because if the Universe were different per cubic meter, if it were not a Total and if in every fraction of a second the world is transformed into another world, then also its laws: they would have moments of disappearance, they would change in every fraction of time and they would not be same laws for the whole World. From these reasonings it follows that the first law is the law of universal equilibrium (so that the Universe exists and is one and evolves without disappearing). A world without laws is probably not a world (and certainly not organized as a single whole). Laws without a World is a human fantasy and would be inapplicable.

3.0. The foundations of the visible world rest upon the free space

Observation of the sky and astronomical phenomena are closely related to the study of the limits of the cosmos, its structure and how it was created or is maintained. Research of the sky seems so closely connected to it and necessary that it is difficult for someone to think that we can talk about the universe without observing astronomical phenomena or without knowledge of astronomy. Undoubtedly knowledge from astronomical research contributes to the progress of cosmology and it is necessary for the propagation and confirmation of interpretations. Many pages of information from the Astronomical Research could be added to issues related to the structure of matter, the limits of the cosmos and its laws. It is not in the purpose of this book to repeat known information or to recite the history of this science. To shorten the book, we also avoided a retrospection of previous views and discoveries that are related to cosmology as a separate research area.

In the '80s it was made clear to the mind of a young man via the most primary and simplest thoughts in the world, that time corresponds to changes in the things and that time does not have a meaning without the things. Then the " big explosion " in thought quickly took place, that gave birth to the philosophical theory, which he later named "Theory of a Finished Time or Complete Universe and Relativity of Energy": The Universe should have been completed and stabilized inside the limits of a longest time interval. It is a complete Universe with all the possible ways! The Universe was not created after an external connection to structural elements or to a quantity, but contrarily: The structural elements is this same Universe at the beginning of its creation as it is realized in the minimal (shortest) time moments. **The beginning of the Universe is not out of the Universe**!

The immediate and complete Universe exists already in a total time (maximum time period T_{uni}) but it exists relatively as a finite free space and as a constant quantity of energy for all this, which can happen indirectly with the material carriers, which exist as fluctuations of this constant quantity. The total energy of the Universe (E_{uni}) exists simultaneously relatively to all the individual material things, it is a fixed quantity and it is thus presented as equivalent and isotropic in the form of a finite free space. The free space is the total energy of the Universe in equilibrium and when this equilibrium is disturbed, then fluctuations are induced until it returns to the equilibrium state. Forget particles like balls and as separate things. This thought of tiny balls misled the investigation of the creation of the nature and prevents all people from understanding what happens in the microcosm. It would be better to imagine the particles as tiny vortexes in a uniform quantity. The free space "flows" at the speed of light to cover those points where

the energy is reduced. This centralized flow of free space is detected as gravitational field and as motion of material bodies. But the existence of the flow means that energy is detached somewhere beyond and so it is reduced again and this process is repeated at the fastest rate of the nature. Thus, apart from the energy concentration which we detect as a gravitational field, we observe the continuous flow of energy compensating for the new reduction, such as the motion of particles (provided, that the particles are not hindered by other forces and resistances).

Time, the Universe and the free space do not exist without matter, namely the Universe does not exist only immediately, without quality or structure and without indirect interactions. Similarly, a total time without smaller moments does not exist. Reversely, structural (material) elements, which compose externally the Universe (them alone, out of a previous totality and without a central, single and synchronous regulation) do not exist. Thus, using the terminology of physics, the Universe is the total energy, while this does not imply that energy is not absent. Precisely this relative lack of energy defines its meaning, makes the energy identical to time, namely to the flow and the change and shows its force. The total energy of the Universe is not present in its wholeness in only one moment. On the contrary, the total energy exists as a (dynamic) finite space and counterbalances its deficiencies, which consist the world of material bodies. But the flow to counterbalance again creates lacks of energy almost at the speed of the light. (Related phenomena are: balance in motion, stationary waves, synchronism and rhythmic changes).

A smaller thing touches the astronomical world not only externally· that is to say, it is not connected only to the exterior and separate parts of nature. It is not connected only to the obvious phenomena such as the shift, the transfer, the collision and inertia. All things are independently of their dimensions connected directly to a common quantity in smaller (microscopic) lengths. By this common quantity they are maintained as fluctuations of same energy and quantities of energy are exchanged (at faster paces and synchronized) there permanently in depth. A gigantic body neither is farther away than is a particle relatively to the full Universe nor is different in substance. Both are results of stabilized exchange of energy that can be realized in a short time or in a slower time interval and with continuity. The empty space has always the role of a balanced quantity and a carrier for the transfer of kinetic energy. That is the reason why motion is never absent from the particles and nature.

In modern physics the coexistence of the " two sides of reality " constitutes an unsolved problem, a mystery: This is nature as presented in the most microscopic dimensions compared to it as presented in bigger dimen-

sions. The field of physics which describes the world in its most microscopic dimensions seems to be unbridgeable with regard to the physics which describes the world in our visible dimensions. In the microscopic world the existence of the particles (except for the fact that each one converges with another one accidentally and behave as a body), is a result of the most rapid oscillation of a common quantity. Their existence is not only a result of their external and distant connection to other particles (and by the application of many forces). They move at higher speeds and they react in smaller time intervals. They touch always the same boring particles like themselves in order to establish some brief relations in the briefest time margins and they are somehow trapped in the smallest area of nature. Mainly however, their existence and motion depend decisively on the fast rhythm, according to which a constant quantity is altered and on motions, which are not realized in the absence of obstacles, as it happens in our visible and Newtonian world. On the contrary, they have motions that are generated by the resistance of a constant quantity (that is, of free space) and affected by wave disturbances. In other words, the wave motion changes spectacularly the setting in the microscopic world and causes phenomena, that we do not observe in nature of big bodies (or we observe them accidentally and not essentially for the structure of nature). If we understand that the stability of material carriers is achieved by periodic changes occurring at extremely high rates and with energy exchange (which occurs in an extremely short time) then we will not imagine the particles as bodies that can act continuously (with their mass). So we will explain that the energy of these tiny carriers does not change from the large size of the bodies that come in contact with them but when these particles interact more often. What is the meaning of the "bigger" thing and more amount of matter at the moment when their point of interaction (such as a collision) will be a minimal point in a single moment? It is not at all strange that the intensity of a field is not enough to influence their own energy (something that could not be explained before the photoelectric phenomenon was discovered). If the stability of the atom was interpreted by quantum description of its energy, this interpretation from modern research presupposes the general phenomenon of equilibrium of a shared energy quantity and the wave phenomena created by its perturbation. If one begins to interpret the structure of matter from this most general concept, then will not be surprised by a lot of microscopic phenomena that are paradoxical. We conclude again that the energy balance in the structural elements is not achieved only by the occasional interactions between them. What we call structure and form in one thing starts with a regulation of energy changes. Since the energy quantity of space is the same and simultaneous to all material carriers, therefore any change in this quantity begins to be as fast, with the same energy fluctuations at the same time intervals and rates and with the respective lengths for the entire material world, regardless of the relative

motion of the bodies externally to the others. **The re-creation of nature is realized in a "wave way" and phenomena in microscopic lengths and almost at the speed of light**. How does the quantum physics of the microcosm harmonize with the Newtonian Physics of the macrocosm? In short, since space is a shared amount of energy and since the structural elements are oscillations of this shared quantity, hence the large-scale quantity (large dimensions) is inseparably linked to small quantities (of the structural elements in the microscopic dimensions). Can someone else answer so briefly and simply and without recourse to paradoxical phenomena?

The re-creation of nature by wave phenomena is a reliable conclusion for us, which is not inferred by observing the structure of matter within a research center. The Universe was always complete and was never created. Not only it is not absent, but on the contrary, a world, which is absent, is immediately useful to the existence of light, heat, radio-waves and a certain structure of matter, through which we exist into space and time as separate entities! The empty (free) space is the Universe that they seek before the moment of the "Big Bang"! It is a phenomenon which is permanently connected with the presence of every material thing and which we had not considered to be energetic and real because of our experience. The free space participates in the structure of matter with the wave phenomena that are caused by its balanced energy. This rational interpretation of the presence of the free space in the theory for a Complete and common Universe turns once and for all expectations upside down in Science, philosophy and the thought of human about the world.

The knowledge of the structure of matter has been overestimated, while the role of the whole for the presence of matter has been underestimated. The research on microscopic dimensions is a research on the limits of the Universe, because the microscopic motions are realized in the total energy and this energy appears as a free space of large dimensions. That is to say, the cosmos as a full and stable wholeness is required for the existence of matter (and particularly mass) and thus matter is created, composed and maintained by wave phenomena of a shared quantity. Wave and rhythmic phenomena like wildfire at fast speeds approaching the speed of light, at the fastest rates of nature and (coincidentally) in the most microscopic lengths. Thus, a lot of these wave phenomena are detected via sensors in laboratories or generate results, that are called "particles" and their attributes. Each of the atoms of matter has one, the same and common nucleus: the space. And all actions from distance amongst bodies (intangible forces) are generated by wave fluctuation of free space. This is unification and simplification of research!

3.1. In summary, what is the Theory of the Completed (cyclical) Time?

It is an unified theory of time, free space and matter developed by the analysis of concepts on the basis of the most abstract definition for the Universe and with only one hypothesis that was not accidental: The wholeness of all things is not only what we perceive (in our own way) here and now, but the wholeness is all things of all times. That is, when we say "Universe" we have to include its past and future. This is, because in the meaning of the Universe we include the changes together (indiscriminately) with the material things, thus we identify things with time. Time is a thing along with its changes. It is impossible to have one thing without time or vice versa, because time is ultimately this same thing as it changes and interacts with other things and time counts as things change.

3.2. What is the assumption?

We assume (not by chance) that the Universe does not change without limits in order to become something different (with unlimited possibilities), but after a long time it begins to become again as it was. That is, we assume that the Universe is always the same (with stabilized quality) within the limits of a Total Moment (in the entire Time). Since the Universe with its changes is always the same (if we think of it in all of the moments), so we add the adjectival definition of "finished" or "complete" Time. We assume, therefore, that the Universe is a single wider Totality within the constant limits of a wider present. The Universe is all the so-called material things along with all their possible changes! Relations and interactions amongst things at separate moments of time are these same things at all of their moments together (at the same time). Interactions are not realized without things and things are not realized without interactions.

3.3. The initial difficulty of understanding

of a "Universe full in the entirety of time" or of the expression "all things within the limits of a maximum total time".

I have noticed the difficulty of understanding the very abstract definition of the Universe as a full totality of all things within the time limits of a maximum total time. Of course, the difficulty arises, because the word "Uni-

verse" allows everyone to imagine and think of a multitude of things with their great differences and the distances that separate them. When referring to all things, we assume by the usage of the word "Universe" that there is a variety of things with great differences amongst them, each one of which is distinct from the other. We can not imagine how they are interconnected so as to constitute a fixed totality, which we call the "Universe", and how to measure these time intervals according to our life spans. We see instead an inexhaustible number of separate things, which are never the same and change as time passes and so their wholeness becomes different. Therefore, in order to prevent the misinterpretations and queries caused by the observations from our daily experience, when I referred to all things (in the beginning of my philosophical effort), I had removed a large number of the observations by saying supplementary: "things as they exist, independently of how we perceive them, that is, without the features and properties with which the things appear to have to us in reference to the ways we are here and now and to our biological functions". In other words, things as they exist regardless of our dimensions, of where we are, of what chemical matter we are made of and of how our sensory organs are affected. We say this without implying that we have hallucinations and we perceive non-existent features of things.

The movements of individual things are as important as matter of tangible things. If we subtract the flow of time and the motion, then we also have to subtract the distance. Things approach, touch and push each other, or move away and dissolve and thus combine in various ways. They exist as separate or after a union and evolve with the flow of time and movement. Things around us without any distance or without change would not exist and would certainly be different. But the manners in which things change are just such that they can balance, have some stability and be maintained and have their own characteristics. Otherwise everything would be “dust in the wind” as a famous song says. River remains a river for a long time. It does not disappear from minute to minute, its direction does not change from minute to minute, it does not transform into oil, gasoline or lava. This phenomenon of duration, continuation and prolongation is generally a stability, although not perfect, but it is a necessary stability. The existence of the whole world, of nature and of our life is due to such stability and not to imbalance.

When we say that things move, change and interact, we refer to these things again at another time, their transformation and the creation of new things or the destruction of past ones by their motion and change. We refer to various ways according to which things are done. We refer to how (the way), how much and when they act on each other making new forms and differentiating the previous ones. By isolating a moment, at which we per-

ceive things and by imagining things for a short time interval or in slow paces, we consider them as separate, detached and incomplete. So, we do not understand the missing things, the changes that will be actualized, the connections and the disconnections that will be made, the new things that will arise and how some previous ones will disappear.

We will succeed in understanding better and rationally what things are if we stop seeing things as if they have a static form, as if they were being distinct and separate within the space. We will succeed in this if we imagine things as moving, approaching, moving away, uniting and separating, modifying, transmitting and receiving energy, inducing changes through their contact or through others or at a distance and all these motions at a fast pace of the centuries. As philosopher *Hegel* would say, the things are as they are, but at the same time things "are not" and are ceaselessly somehow realized. Their "being" is changing. So rationally, when we consider the fact that they are parts of only one totality and they inevitably relate to each other with all the possible ways - sooner or later, directly or more indirectly - and thus they are a wider whole as a common feature of things, then we can finally consider all them together to be only one thing, as a totality within a full time.

At different time points, the Universe is different. A lot of things are missing, a lot of movements and actions are missing and existing things are linked together in "half-finished" ways. This can be compared to seeing a movie in parts without the sequence of all pictures and with lost frames. We could not understand how they relate to the same plot and the same movie and what is the ending, while we would have perceived incoherent information if we had not seen this movie before. We can say that the Universe is not unified and exists as a multitude of things (or shattered) at short intervals, because in short intervals neither all the possible things nor all the possible ways of connecting to each other can exist. But the universe in itself is wholly present (towards itself) and could not perceive itself as shredded and scattered. The recurrence of the same things, in the same ways and the same developments after the longest period is a repetition only in relation to separate things. But this recurrence is not realized at a different time (apart from the maximum interval of time). All the differences of things and the inexhaustible variety of things do not derive from differences in their substance, as they fragmentary appear to the eyes.

<•> Stabilized Universe – Maximum time interval – Cyclical time

Therefore, if we say that **all possible things are parts** of one and the same whole, this whole we call it "Universe". Within which time interval is possible that all the possible things exist in all possible ways? This time in-

terval is not infinite (since a stabilized Universe has not got infinite possibilities). That is, everything has happened and the Universe is realized with all its possibilities within the limits of a maximum time interval -no matter how long this time interval is. It may be inconceivably large (compared to the life span of humans), but we consider it to be limited. The pointers of a mechanical clock do not seem to move. It takes time to see their rotation, which results from the shorter periodic movements of its gears. Their rotary motion is constantly completed and the indicators constantly return to where they have been. After a long time, the movement of the indicators appears to have increased their deflection, but this deviation is relative and transitory. Eventually, the indicators of a mechanical clock are every 24 hours always in the same positions. In other words, the Universe is finished within the maximum time and everything has been done. We never stop measuring time, but we count the repetition of the same time interval, as if the time restarts for the same thing. That is why we call it "circular time" and I once called it "finished time" so easily. The period is a cyclical time and when the period is repeated, then we talk about frequency.

The shortest definition of the Universe as a totality of things along with the things of the past and of the future is probably not original. The Universe had been understood and defined as complete and timeless even before the mathematical formulation of the theory of relativity and even in ancient times. *Plato* conceived the amazing and smart idea that the world of senses is the moving image of the motionless eternity. *Parmenides* and his students were among the first philosophers to reasonably question the existence of time. Still, many philosophers could not understand the meaning of an empty space amongst things, since they considered things to be connected together as a whole. Also known is the thought of *Leibniz* about the universe as a set of all possible worlds in the mind of God, the best of which is this one in that we humans live. We have much to say and think of the philosophical efforts of the past in a separate book. In the philosophical theory for a “Completed Time” the definition of the Universe as a wholeness of all things along with what has been in the past and what will be in the future was supplemented by the following logical thought:

"At a maximum total time", "always the same Universe within the limits of a total time".

It is stressed and implied in the general definition that we defended here, that there is nothing else that is entirely separate from or disconnected and unrelated to the structure of the Universe. Anything else which cannot be defined as a "part" of the Universe is excluded and no other reality is accepted that would be entirely independent of the consequences as imposed by the common Total on its parts. By definition here, everything which exists is

"subordinated" to consequences and constraints resulting only from an assumption that it is part of a common total. The existence of separate substances or original constituents, which create the common Total (made of zero) are immediately excluded. But the most decisive feature of this definition is, as it will be proved, that it introduces the concept of cyclical time or period and the limit of a maximum and stabilized quantity as a basic principle for the existence of all things. In addition, a connecting relation and a necessary coexistence of the maximum limit with a minimum limit is introduced and this abstract principle contains the relation as a core idea, which is searched for in modern physics in terms of a relation between the theory of general relativity and quantum physics.

3.4. Things are not interconnected in all possible ways and exist as separate

In the most general terms we can say theoretically: We are parts of a common Total interconnected with other parts and not at the same moment as all the rest. So as the part can exist as separate (external and limited) among others, it must not be and not interact in all possible ways. Things exist as incomplete and separate because they are not interconnected in all possible ways. This is unlike the self-contained Universe (their Common Total), which exists directly and in advance of those things. We do not question the flow of time and the reality of change. On the contrary, we conclude that it is a necessary property of the parts of the completed Universe. The unfolding of this seemingly irrational and contradictory view of a simultaneous universe (in the maximum time) leads to incredibly logical consequences, as I have argued with some surprise. Everything is subjected to consequences and constraints, which result from the premise that everything is a part of a common whole. One of the first, logical and decisive consequences resulting from this excessive definition of the simultaneous Universe is the forced definition of the concept with regard to change and time. The view of a Universe 100% completed at a same maximum time interval imposes time and change for each part (so that the whole can consist of parts). But it also implies the periodic change and not just the change, because the common Total of things must always remain the same and therefore regulated.

What we now need to do is to immediately explain how the Universe does not appear to be all at a same time, and how we exist in such a nature where "everything changes". To explain how the Universe does not appear to be all at once and how we exist in such a world, the essential relation

which always exists between the structure of matter, the common space and the whole Universe, has to be revealed. These last philosophical thoughts become more concrete by the revelation of this close relation. The relation, which everything always has with each other in spite of their differences, is revealed in particular by this relation: Amongst the structural elements (which "create" things in longer time intervals and they do this as fast ways of acting) and the simultaneous energy of the uncreated Universe, which exists as a finite space for developments over time through matter. Things are constantly connected to a common space and exchange energy with it.

It would be rather impossible to understand how the Universe as a fixed Total imposes limits and laws on a vast number of things and their creation with regard to the manner they are interconnected (if that imposition was not shorter and immediate). We would create thoughts that have been made over the centuries by well-known philosophers, such as the theory of *Leibniz* of the foreseen harmony of the Units. It is somewhat incredible and dark to think that this vast amount of matter in the depths of space and in the endless course of time is "synchronized" and self-regulated by the mere explanation that it is imposed by the stability of their Total or by a God. Our explanation would stop in abstract laws without being able to find the source of these invisible laws in the things around us. In order to understand how the multitude of things ultimately exists and acts in a way that such a Universe is preserved, which would function as a machine (by having its own laws), we have to fully understand each one of its "parts". However, things are more understandable than we think we have understood (and even more so for us philosophers, who tend to generalize very easily and believe that we have come close to the right interpretation of the cosmos). There is a common phenomenon which is inextricably linked to the presence of every material thing and of which we have not thought as active because of our experience. The explanation of the presence of free space, as it results from the theory for a Complete and Common Time Universe (as a finite amount of dynamic energy), reveals how the multitude of things is regulated by the same laws.

3.5. There is only one difficulty that we could never solve, while avoiding a lot of other questions:

To explain how the Universe does not appear to us as complete and with all its things at the same time. The beginning of the cosmos is realized by the participation of the whole. The beginning is within the Universe and it is relative, that is, it begins through the structure of matter, which is almost nothing. The opposite of the whole cosmos is matter (quantities which move and change very quickly, do not forget). The Universe has always existed, it has been always structured, it has always had its laws and by these laws it is preserved and recreated perpetually. The whole cosmos is present with all the possible combinations and nothing is missing: it is simultaneous. Nevertheless, we do not perceive the entire Universe at the same time, but we can see that the whole Universe is missing almost! When we say that the Universe is complete, we immediately think that it must be solid like a solid body. We think that we cannot move and nothing could move. We do not perceive a complete Universe, but sufficient free space for many more things. But what makes you think that the complete Universe should be compact and solid, and not the other way, namely that the Universe is absent? The complete Universe exists as a free space for matter. We should not imagine the Complete Universe as if it were a solid body and an obstacle to movement. We do not observe it via the resistance of the bodies, as we would expect, but we detect it as absent and we call it "empty" space.[ix] Could fishes realize that water is an obstacle to their movement? They can move with the resistance of water. The amount of water is their "empty space". And the birds would not fly without the resistance of the invisible air. In other words, the free space proves mathematically that the Universe is complete and simultaneous and proves also the principle of the conservation of the total amount of energy! Space is something with which all tangible bodies are dynamically connected and it is truly incredible phenomenon. But it is not an unreasonable or inexplicable phenomenon. On the contrary, what are the particles and how are the gravitational forces be applied everywhere in astronomical space, these natural phenomena can not be convincingly explained with thoughts about some other particles.

One of the first reasonable questions arising from the definition of a stabilized Universe within the limits of a maximum time is: what is the meaning of the time limit, what is the meaning of the beginning and the end in a universe that is always the same and complete? If the Universe is stabilized in the totality of all moments then it has neither beginning nor end in time and is timeless. What is meant by a total and constant moment, that is, a time interval with boundaries, for something that did not begin to exist and,

on the contrary, is stabilized like the Universe? If the Universe is complete at the end of a maximum period of time, why does it again begin to be created and where does it begin again? These logical questions arise when we consider the stability of the Universe as a state of immobility and lack of activity. Consider, however, that if the Universe was evolving and without any time limit, then the answer to the question on what the Universe had been at an earlier point in time would not only be difficult, but it would be impossible to give an answer in advance and this answer would be inadequate. While the question arising from the thought of a Universe always the same within the limits of a maximum time may seem difficult, it gives us however the optimism that our human logic can provide a pure scientific answer and that we do not lose our time! With this optimistic logic our thinking can look for an explanation of how the Universe is kept stable, without being interrupted in its entirety.

So as the cosmos can be present as a whole (and have the characteristics of reality) without being static and immobile, it must have its beginning and its end in time without ever be missing itself. The only logical solution to this contradiction is a Universe that has not got a beginning (and an end to its existence) directly in its entirety. The beginning and end of the time period of the existence of the Universe is not an overall beginning of its entire existence, except for its parts, which exist at shorter intervals. The contradiction is overcome and an answer is formulated more correctly when we think that the completed Universe is constantly created from itself through matter and that the intermediate phases of its evolution are never missing. In other words, the Universe is fully present without missing the intermediate intervals in which it is still realized and without missing its shorter times. According to this logical interpretation creation ceases to be a metaphysical phenomenon. Furthermore, the creation does not start with external actions exclusively or with laws, which are coincidentally introduced by some things. The creation of things ceases to be a phenomenon exclusively determined by the environment and by random materials. Such a stabilized Universe must exist at the same time in many sub-moments or phases of itself (as many astronomical worlds) and not in a random structure and in a continuous evolution, in a rectilinear time. The moment at which the Universe begins to be realized is not before Universe is finished. The Universe constantly begins to be realized at a minimum moment tmin by itself and it is constantly completed (and it is done as it has always been, in all possible ways) after a maximum time Tmax. Because this beginning and the end are the fixed boundaries of the present, where the whole Universe is (simultaneously towards itself), therefore the maximum time Tmax and the minimum time Tmin are always the same for all the individual things. At the shortest time we detect its structural elements, while at its maximum time we detect

the free space.

In philosophical terms, the only solution, according to which nature can create new things influencing each other and allowing nature to evolve in such a way that it has a past and future without missing a sufficient cause for each individual thing is this one: Individual things are instant parts of a self-existent whole, which has always been the same. No individual thing can be the self-existent or sufficient cause for another thing. The individual things are external and indirect (in relation to each other), while the whole is directly present. The permanent relation of things to their common totality arises from the presence of matter, from which all things begin to exist (and thus it does not allow them to become completely different and independent, despite the differences that are created in the individual conditions and by whatever evolution). **The presence of matter is directly related to the presence of the entire Universe** and imposes the permanent and direct relation of things with the wholeness of the Universe and not only with the environment and the external conditions. The presence of matter and the common space sets common boundaries for the existence and change of all things.

4.0. About the paradoxical phrase " finished time or complete time"

The designation "Theory of Completed Time and Relativity of Energy" was published for the first time as a subtitle of the version of the philosophical book "The Theology of Science" (that was published in Jan/2000). Most obviously, this subtitle could have been "Theory for a Complete Universe with Dynamic Free Space", while it can somewhat more provocatively be called "Theory for a simultaneous and 100% Complete Universe". By listening to the phrase "finished time or complete time" someone can immediately scoff. "Time" remind us of motion, therefore it reminds us of the passing of moments and its division into past, present and future. Logically, we can not understand a completed time. The specification "complete" or "finished" cancels the concept of time. If the time were complete, then no moment would pass, there would be no "before", "now" or "after", the time would not pass and therefore the time would not exist. If the time is finished, then a moment must be final. When the author chose this phrase to entitle his cosmological theory, he had not thought before, that these two concepts of "time" and "finished" were irreconcilable and contradictory. But he had not needed to think so carefully. This is because he had previously found an explanation in his thought for this apparent contrast, as it is shown by the shortened phrase. The author neither chose this phrase so to say by imagination, nor because he was foolish and for this reason he did not stop using it.

We could talk about a "timeless" Universe, as some thinkers have concluded or about an "unchanged" Universe. But if we chose the designations “timeless” and "unchanged cosmos", in which the logical connection of the concepts is revealed more clearly, we would fail. If the time is removed, then we will fall like blind in trap of *Elea philosophers,* which is clearly contrary to experience. Then we would have to explain how we measure time in our lives and further for every motion, as was well observed already by *Aristotle*. In the end, we would be forced to hide the truth deeper and we would explain motion as our own delusion. The phrase "timeless Universe" leaves the problem unsolved, and so we can speak only about relative motions depending on a point of reference. We can talk about measuring time as a relative phenomenon and limited to one place. This is similar to when we talk about "right" and "left". We measure time according to the day and night of our planet in order to adapt to life in the physical environment, but also to be able to reach easily an agreement with other people in relation to the definition of the "when". However, for the measurement of time can we choose a different rhythm according to our own interest. For example, the short period of a known radiation can be measured for the measurement of time for microscopic changes, which last a fraction of a second, rather than

the day and night. Also we can easily see, that things have not the same pace for their existence. From another view, the moment when something happens to someone, then this something does not happen to all others. Anyway, the "now" of one thing is not the same "now" of other things that are far away.

We can think convincingly about the relativity of time. Experience does not contradict with our view and everyone can confirmed it by his own experience. However, some questions of common experience are again raised that remain unanswered. Some questions are raised on the creative coexistence of many different things, on the synchronization of the motions of many celestial bodies which continue to be synchronized in such a cosmos. These phenomena of coexistence and synchronization are not so obvious, as we are used to. While so many movements by so many things and at different paces exist, a world still exists, has developments and consecution and is discerned from our dreams. Several things move and can achieve their combination as a whole or a result which is repeated. That is, they are synchronized, after a combination is achieved and a cooperation within shared time. The timing of the motions of celestial bodies also causes questions. The synchronization phenomena and the creative coexistence of many, different and moving things, the periodic repetition of many phenomena, the continued existence and the possibility for cooperation need a convincing explanation. These phenomena can neither be explained by the rejection of time, nor by chance. **Motions which are regulated and synchronized are not random motions**. If motions were random and comparative to external things, we would discuss it provided that the setting and the timing or synchronization were not in nature and were rare and localized phenomena in a cosmic chaos. Even the stones know the saying "everything flows". But a whirligig begins to lose its balance when the rotational speed is reduced. Everything moves and changes, but then, why are there elliptical, circular and spiral motions? The astronomical space could have celestial bodies of all possible geometric shapes. Their moves could theoretically be realized with all the angles that a line may have in a notebook. The fact that something changes does not imply that it changes in an one-sided manner, since by "change"we usually mean the instability and the break of continuity and the destabilization. Also, many terrible forces can be balanced and a picture of stagnation appears. In this case, the resultant of all forces is zero, as we say for a such situation in physics. The structural elements are preserved by their internal motions and thus the cosmos has reallity. Reality has the main feature of stability and continuity.

We cannot leave unnoticed and as a random phenomenon, that it is possible to measure time and the phenomenon of syncing many actions. Man has perceived this possibility since ancient times. The measurement

may apply to certain things that are retained or modified without being destroyed immediately. People can compare events in time (eg when our ancestors lived), synchronize their movements and actions (eg a group meeting, dance, collaboration) and predict events (eg eclipse of celestial bodies). Some people once thought to count time according to another uniform motion and it is not a dumb or futile thought. Surely, this comparison has not only been caused by theoretical thought, but also by the need to measure the time for the regulation of social life. And people would not have this need and would not make that thought for comparison if the stability of many phenomena and the duration of many things were random and mutable, without having any consequence, without the concept of continuity and without any measure. There is really a moment in which many moves or events happen together. Many phenomena are repeated more often or more rarely and some things have a slow progression. A motion can also be repeated the same. It is therefore possible the motion, which really coincides with time. With the repetition of the same motion, the concept of time is somewhat canceled, since evolution is interrupted instantaneously and it is repeated as a phenomenon that has more breadth or duration. Movement in nature can be realized at a steady pace and repeatedly. The concepts of rhythm and period shed light on the concept of time and then the role of time is revealed in physical processes. If we can count many time intervals for a lot of things and different intervals for many remote things (as we will think when we identify the motion with time), this lack of synchronization or timing does not invalidate the concept of time and the usefulness of a measure to apply everywhere to nature.

The author, who wrote the phrase "finished time," had realized the inability of an explanation of the above phenomena (of synchronization and co-operation). He made thoughts as a leading scientist and this with rational thinking, like here, but always with an appraisal of everyday experience, while he was paradoxically a young man and educationally unprepared. When listened and read, that time does not exist or that time is a referential and comparative phenomenon, he had a reasonable difficulty to understand. Moreover, he could not see an optimistic ending for a convincing explanation, if the cosmos was changing ceaselessly and as if an absolute time was counting for the whole cosmos. The author thought of another and more optimistic explanation without even having understood it well in the beginning of his attempt. He did not deny motion and time, as it is shown by the short phrase "time is finished". **The time is not missing from motion and motion is not missing from the things**. He wondered how easy it is to separate time from things and he somehow perceived, that time is still a misleading word. Unless... time was motion itself either some observers measure it or not.

4.1. A Universe, which is complete within a maximum period explains the periodic motion and time

The solution came from a simple definition of the cosmos, as a wholeness of all things. But in the whole cosmos everything and every world along with the past and their future were included. This definition was not ceased in this theoretical union of a complete set of things containing what preceded and what will follow. So that the problem of what it existed earlier and of an initial cause can be solved, the complete set of the cosmos was considered to be always the same and fixed (and also as the only sufficient cause!). So (imaginatively or rationally;) the problem of creation and of an initial cause outside the world was avoided. But a new problem was created, which was not desperate, because we would not have to think about something that has no beginning and end like numbers. The complete totality of the cosmos (together with past and its future) is always the same, while all its parts change. This is something similar to the renewal of our body cells, a process which is realized by the biological body as a whole. After all the cosmos had been stabilized in such a way that the time had been present and the notions of past and future had been preserved, so we had to give a rational explanation. If the complete totality of the cosmos is always the same, then this is realized in all the possible ways and indeed timelessly. But motion is not missing at smaller intervals; we didn't say that nature and the individual things do not change. We said that everything is realized in all the possible ways, which cannot be infinite if we want an entire and complete cosmos. Such a universal whole, the full Universe, which exists along with everything, which is realized, is the entire time as finished. This view reminds us of the *Plato's idea* that “the perceptible cosmos is a moving picture of motionless eternity”. If the full set of the cosmos is always the same, then the time in its entire totality does not flow. But time for individual things is true and is never missing, not only from their enviroment but also from their structural elements. If, therefore, time is finished for the complete Totality of the cosmos, which is always the same, it is concluded that **the Universe is complete within a maximum period**. If the Universe is complete and stabilized within a maximum time interval, then the time for the Universe is lastingly finished.[x] This last theoretical remark (for a maximum period) is the beginning of a full explanation of all physical phenomena! The initial thought of a complete and stabilized Universe not only is not overturned, but it is also surprisingly confirmed, because:

· Talking about a Universe which is complete at the same (full) time, does not necessarily mean, that the full Universe had to be here and now

with all its energy in particles and tangible bodies. It is revealed that a cosmos with all the possible things and in all possible ways of their connection is present here and now under the common quantity that we perceive like an empty space!

· All physical phenomena, are theoretically produced by this initial thought. All things and their differences are explained by motions in time intervals, by periodic changes, by relations with lengths and angles, by energy exchanges. Thus all things are revealed to have a same substance. The concept of matter with its dynamic attributes (which needed the advanced technology of the 20th century in order to be observed) is explained by wave effects.

· The study of physical phenomena is simplified. This is, because all physical phenomena are reduced to minimal fundamental ones such as motion, balance and the amount of energy. It is revealed what measurements and in which phenomena are needed for calculations of certain shorter time intervals, which are associated with a global period.

· Some contradictions and omissions in physics are revealed, while a lot of discoveries and observations of science are deduced rationally by observations on a few abstract notions (as we have just said above).

· For first time an overall explanation of the phenomenon of life begins along with physical phenomena regardless of the description of biological characteristics. This is, because this phenomenon has a close relation to the cosmos as a whole and with a simultaneous amount of energy.

· This is, because the physical phenomena are theoretically produced by a few abstract concepts and many differences of things are reduced to quantitative differences. So reversely, the concept of "knowledge" is reconsidered starting from a cosmological theory. It is revealed how the human thinking can conceptualize things and apply mathematics to nature.

If the rational explanation of the beginning of the cosmos had begun by the concept of a "timeless" or "invariant" cosmos rather than the paradoxical concept of a "finished time," then the notion of a maximum period would not have been deduced. Probably for the first time, such a general thought which refers to the entire cosmos, is straightly connected with mathematics and with a view to investigate the phenomena, so that the logical consequences of this quantitative relation can be revealed. With this general thought we have the reasonable expectation, that we can make measurements and calculations. This is, because this thought introduces a quantitative relation, such as the maximum period of time and time is something that affects all individual things. This means, that the maximum

period somehow affects all things, imposes certain relations on their movements and somehow leaves some traces to individual things, which we can look for. If we could not think of any such consequence, then this original thought would be left as a philosophical thought yet without prospect for enquiry and validation. Easily, we repeat the observation of *Heraclitus*, that everything changes. *Spinoza* described all things as ways of being in a shared substance. Many more recent philosophers have been reiterating for decades, that motion is a mode of the existence of matter. Owing to the research of microscopic phenomena, we have the image of a structure of matter in ceaseless motion. However, nobody was thinking persistently or effectively in order to find a solution to how all the different things in the nature could be formed exclusively according to such a phenomenon: the motion or change. This is the most undoubted physical phenomenon. In physics there were all observations on the motion and what mathematical relations that determine a motion. The thinkers who want to show the reality observe easily motion as a fundamental feature of it and from there and on they stop their philosophy. They do not introduce speed, acceleration, the circular and linear motion, the wave motion, the pace of change and the synchronization phenomena and balance into their thinking. **Balance is not an opposite phenomenon to the motion**. It implies instead motions and this is an observation that has escaped of many people, thinkers and researcers alike. The duration and the frequency of the repetition of an effect cannot be ignored either for describing the structural elements of the world or for the psychological problems and the difficulties of life. At last, someone had to explain by physical phenomena how the world changes and does not change (remaining something the same or common), and how things are divided, but they are all together, One. This solution was given by the world time, in which the Universe is always the same, but the explanation was not so easy. It took some time even to draw attention to the thought that the maximum time interval, that is, the Present of the Stabilized Universe, is not only a total, full and "finished" time. It is also a period.

How could the structure of the atom be maintained and repeated the same in the inexhaustible quantity of matter, if the change within of the atom were only an external movement like these movements we see in free space? How could the nature be maintained and be regulated by laws, albeit briefly, if motion were only a random effect and an effect of instability like the sparks that come from a fire? Those who conclude, that nature continuously or ceaselessly changes and nothing stays the same, leave certain phenomena unnoticed, which are not random and require an explanation. They cannot or do not want to think and to answer, why motion and change in nature is not only realized in straight and crooked lines. If everything changes, then we could conclude that all the physical movements can be realized without a

common limit on speed, but with a random approach and in random formations. The astronomical space should appear in all imaginable ways and not as uniform reminding us of circles, spheres and elliptical motions. Then, the concept of the period would be a local fortuity in nature, an occasional phenomenon. Nature would not function according to laws. However, the structural elements are here and limited in their moves and the most complex bodies are formed and maintained by these such as the biological body of a man. Can anyone imagine structural elements that change without anything being maintained stable, without balance and without having a relative immobility and properties? According to **such an one-sided view of matter as random motions, the existence of reality and a number of phenomena cannot be explained**. Research is instead facilitated and everything is interpreted in a logical order, when we consider that the structural elements are realized by moves, that are periodic, rhythmic and are characterized by energy that is compensated (fluctuations) and by very quick synchronization.

An excess to our concept about "motion"

The atoms of the stationary book oscillate around an equilibrium position. The elementary particles in the structure of the atom move. All the bodies on the planet are involved in its rotation and in its orbital motion. The planet itself changes during the passing of time. The sun and the planets move through the galaxy and galaxies move through the visible universe. We cannot enter twice the same river, as Heraclitus has already noticed impressively. There is no matter without motion.

In the above examples for the motion we tend to remove some of the characteristics of motion and thus we present the motion as an absolute and constant feature of all things in stark contrast to the immobility. The immobility appears as a random, casual and relevant phenomenon. While in physics motion is well described as a more complex phenomenon, all other features of motion are often ignored as immaterial and as if motion was independent of other properties. Similarly, we talk about the distance in space as one way that leads to infinite removal and in stark contrast to the concept of approach. The most important feature which we unsuspectingly ignore is, the mode and the time of motion, since in nature motion does not take place only in a straight and uniform manner but motion of this kind is instead the rarest. Further, it is known in physics, that the change of position and distance are not the same when the direction of the movement changes. Only in linear movement with the same direction is the distance the same with the displacement. The displacement has initial and final position regardless of the route of the moving body.

A brief reminder: To described motion we definitely need to know the location, time, distance, duration, force and speed. Speed is the quotient of the change of position to the corresponding time interval, ie $V = \Delta\chi / \Delta t$

If we consider movement to be uninterrupted change and random change, then the problem of how so many and different things coexist and how all these things constitute a whole and are in balance is not resolved. On the contrary, we are complicating the problem or we are leaving the verification of balance and the application of physical laws to chance. Nature appears to function according to an unexplained eurhythmy, order and balance despite the variety and quantity of things. But let us think that most of nature's motions are repetitive, periodic and motions that involve restoring forces. Let us think, that we refer to "movements" according to the measure of our time here on Earth and to our life spans. Let us also think, that we talk about "motions" according to the measure of the change of position here on the surface of the Earth and to one-sided observation of range from a long distance. Then, most of nature's motions disappear with such unbiased thoughts and the problem of the explanation of eurythmy is simplified. Movements will look like balance situations and they will appear as few moments in periodical changes. It is because something stays the same and does not change that we understand balance and how things have synchronized motions and successful cooperation. Considering that things coexist due to relations of balance and are synchronized as if they were motionless, then their balance and successful combination cease to look unexplained and appear as very complex phenomena.

The explanation of global equilibrium is simplified and the calculations for its confirmation are facilitated when the free space is identified as a total amount of energy with moments of divergence that appear as particles in its microscopic structure. It is because this balance and synchronization is achieved by the flow of shared energy to the cluster of astronomical bodies that every planet and every star is in the right position and continues to move in the orbits in such a way that the group is balanced. If we additionally interpret the motion of the celestial bodies as the result of a deceleration in a quantity of energy which is concentrated at the highest speed of nature, then the motion of the celestial bodies will seem extremely slow to us. The celestial bodies are quantities of energy concentrated there due to a local disruption. The motion of astronomical bodies is the result of a fast process because the energy of the space is transferred to restore its energy balance. The conservation of the bodies is due to a delay of the restoration of the energy balance. We perceive the restoration of the balance as a continuous motion of the celestial body in its orbit. They could not be synchronized

with each other by their own motion individually. If all the the astronomical bodies and their subsets have a gravitational field regulated by the same mathematical law and they are regulated without any of them being the common center for all other astronomical bodies, this global arrangement according to the same law and in such an expanse is achieved, because it is imposed by the microscopic dimensions. It is imposed by the principle of the structural elements and by the “wave way” they are maintained, that is by energy fluctuations that are compensated extremely fast. And their energy (of the structural elements) is inseparable from the communal and total energy that appears as free space. The balance and the possibility of synchronization within the vast distances of the free space are offered by the direct relation which the structural elements have to the space in its microscopic dimensions.

4.2. The contrast between free space and matter

(is the contrast between change in energy and energy that is always the same amount).

The finite space is not an amount of matter. On the contrary, we distinguish it decisively and somewhat divisively from matter. This contrast between a dynamic space and the structural elements is a fundamental observation according to the physical interpretation for a complete and always the same Universe that has a logical explanation and at the same time explains a multitude of natural phenomena. This contrast between matter and free space does not preclude their forced association and instantaneous identity. Contrarily, natural phenomena can be multiplied and transformed, without stopping being regulated by the same laws and without ever losing their affinity. Our ability to interpret the multitude of different phenomena and their variations in a unified manner and from the perspective of physics, is explained by the fact that nature is based on the contrast of free space and matter with internal and microscopical processes. **The separation of nature as a whole and as a part** is the first thought for an unexceptionable interpretation of nature. From this logical thought we concluded the theoretical separation of nature by two other concepts, which were this time the notions of space and matter. Because we have discovered that space "represents" as an amount of energy the wholeness of nature while matter is short moments of beginning in the overall presence of nature. This is a contrast that we observe in the experience corresponding to the theoretical contrast, as we could say in *Plato's* words: This is a contrast between the immobile eternity (the complete Universe) and the moving image (at shorter intervals). And this contrast with the language of classical physics is a contrast to the change in energy and to the energy that is always the same amount. So if the theoretical separation between matter and a potential space is inexplicable, provocative and divisive, then it is also inexplicable and divisive that energy changes, but the total quantity is kept constant. It would, however, be a more inexplicable phenomenon and a contrast without ever being bridged if the empty space were a lack of reality and substance, without any attributes, as we perceive it by looking at the empty distances amongst material things. Then, matter would be forever regulated regardless of the properties of the space, it would have no dynamic connection with it and we would encounter the theoretical problems that nobody could ever answer.

We should draw our attention to this important distinction, which may lead to an erroneous limitation of the notion of inertia: If we consider the free space as an energy carrier and we do not identify it with a quantity of matter and if the meaning of matter is limited to the structural elements or

microscopic carriers (particles), we do not mean by this theoretical separation that mass and inertia belong only to matter and that the dynamic space has no inertia. The wave behavior of the free space (which causes furthermore the phenomena that accompany all material bodies) is also a result of inertia. It is, however, inertia in contrast to the inertia which we observe in the unobstructed movement and the mechanical interaction of the bodies. This is the negative inertia.

We have deduced a close relation between a maximum limit with a minimum limit and a necessary coexistence of them. By the first thoughts we have deduced this relation at the maximum time interval that contains the briefest time moments. We noticed that this abstract relation contains as a core concept the relation, which is searched for in other terms in modern physics, namely a relation between the theory of general relativity and quantum physics. Also a chasm has appeared between quantum and subatomic physics and the astronomical world. These worlds seem to have different and contradicting laws. But we have deduced a close and quantitative relation between the maximum period of the complete Universe, the maximum distance of free space and structural elements and other phenomena, that we have segregated as extreme or different phenomena. **Since space is a shared amount of energy and since the structural elements are oscillations of this generic quantity, hence the big quantity (large dimensions) is inseparably linked to the small quantities (of the structural elements in the microscopic dimensions)**. Is this relation not that simple in general?

But indeed, we have also deduced a double and opposite behavior. Movements in tiny dimensions are generally wave, rhythmic and periodic. Movements are shifts like vibrations in a fluid. They have mathematical proportions and have no purely individual existence. The wave and rhythmic movements are not pure moving particles. But this is how the particles begin to be formed by the vibrations, oscillations and alternations in most fast rhythms. The world we see in space does not consist of waves, but of accumulated particles in increased volume and density and the celestial bodies formed by them. The bodies within the space are moving according to the Newtonian motion, that is, they move without obstacles. If an obstacle existed... then they would collide and react, deform or dissolve. In microscopic dimensions, the reverse occurs: The shared amount is at rest (like the water of a lake). When it's disturbed, then waves are created. Waves are created because the shared quantity cannot "move" and it returns to the original equilibrium state (as the water returns to the surface of a lake). Until the particle formation the motion derives from waves and is directed to different directions. After the particle formation, the motion is mechanical and directed to one direction at a time.

In modern research the first "class" of motion has been ignored. In subatomic dimensions the motion is clearly realized in a wave manner. In the wave motion the laws of mechanical motion (as Newton's) are not applied or have less participation! Dual behavior in the tiny world induced annoyance to researchers because they could neither imagine 100 years ago of a world that had no bodily existence nor could they believe it. They were trying to explain everything by the movements of the separate bodies or particles. While the opposite occurs: Bodies are formed and explained by the wave movements of a bodiless existence. This view reminds us of some eastern interpretations. But it is no coincidence that human thought could so easily form the meaning of a single substance and then explain the separate things with their apparent and relative differences. Since times of the *Vedas*, some people have been trying to understand how the "one" appears to be "multifold and various". More recently, *Spinoza* described things as ways in a common essence. But he did not have our own luck to live at a time when technology has revealed the "way" of existence with the concept of "wave" movement and as oscillation. *Spinoza* was unaware of our modern physics and about wave phenomena. Nevertheless, he dared to speak of things as ways of being in one substance, which for him was God/Nature and not the space. The space for Spinoza was only one of God's infinite "attributes", one of the infinite characteristics the existence of God. A little later, the *French philosophers*, chose matter as particles to explain everything. They chose matter, as they imagined it at that time with a view similar to the one of Newton or *Demokritos* if you prefer. This perception for explanation of all nature with matter has come up to our own days and apparently goes in hereditary form from teacher to student. Today, matter has nothing to do with what they imagined 100 years ago. The people have heard about the strings in modern theories and indeed, it was not a bad idea to use the notion of string. It reminds us of wave motion and related phenomena. But they focused on the mathematical description and did not give chance to the people to learn more about the wave phenomena. Also they left the existence of the strings in space without explanation and did not promote the understanding of the physical phenomena apart from fantasy. The particles are momentary and some are stable only for as long as they are combined together. They are detected as instantaneous interactions by the physical instruments and they are not maintained for a few seconds even in the most stable case. The actual particles are compounds of chemical atoms and molecules. In subatomic dimensions there are no particles (as if they were separate from motions). By discretely detecting the amounts of energy, which are absorbed, this quantum existence does not reveal necessarily some particles. Waves, vibrations, oscillations and their between-play are the phenomena that form the structural elements, as we would say to a child. These simplified descriptions should be taught already in the physics lesson in all schools.[xi]

5.0. Why mathematics can be applied with success to the things?

Why do we calculate relations of proportion in changes, sizes and quantities?

The general principle is: The Universe in the cosmological theory of a " Completed Time " is self-existent, because it is present, immutable and "compact" in the limits of a maximum total time (maximum period Tuni, in other words) and is "im-mediately" real without any mediation. The Universe per Maximum Time Period is always itself and the same as ever in its entirety in all possible ways. It is not the exterior material things which achieve a balanced totality (of things) and the maintenance of physical laws by their motion, approaching, divergence, union and segregation. On the contrary, the completed total preexists.

An unfounded thought of a complete Universe which is always the same as it has ever been within a total time (maximum period)*[2] is connected with or leads to scientific discoveries and observations, which need the experience and technology of the 20th century. How does this happen? The answer: The above unfounded thought and the thoughtless definition of the Universe introduces a decisive trait, which the scientists have not included in the development of physics for a lot of centuries until now or have blindly accepted the exact opposite: The trait of a limit and of restriction in space, time and number of things. The introduction of the limit imposes even in an arbitrary way consequences and corrections on certain equations of physics, from which it could be assumed that they could be applied in nature with infinite values in their quantity and size (which is also an unfounded thought). For example, a force could be applied in zero time. The speed could be limitless. This is, while many consequences are drawn by such a brief thought (that is, limits are imposed for the stability of the Universe) - as even an insane man could easily infer- for a scientific field, in which physicists and astronomers specialize.

The introduction of the limit was not necessary for the accuracy of the calculations. It is revealed as necessary when we calculate sizes and values that are close to the limits. The introduction of boundaries primarily in time and in length is the more general axiom that goes beyond the certainty of Einstein's axiom for the maximum speed of light in nature. When you generally claim the existence of a maximum limit in speed and this limit explains the existence of a number of phenomena (which need this limit to exist) then it is not easy to doubt it. Physical phenomena and their changes are gov-

2 There is only one difficulty, while avoiding a lot of other questions...

erned by natural laws and regulated according to certain stable relations, because natural laws (as summarized in human language) are due to the existence of unchanged limits in fundamental physical quantities. The indeterminate limit of a maximum speed is more difficult to be doubted than the sentence that tells us in particular that this maximum speed is for light. For this reason, those who have learned to think specifically and with mathematical precision should not hurry to reject the more general propositions.

So as the fact that light is not transmitted at infinite speed can be recognized, certain astronomical observations, Maxwell's equations, and difficult technological experiments have to take place. Einstein's difficult (and mathematically formulated) theory of general relativity is required in order to claim that light bends, when the rays approach stellar bodies with an extremely powerful gravitational field, and that the light behaves as if it had a minimal mass. The change in the previous untrue view which many physicists had of the light, signaled a revolution in science. But the same conclusion is rationally inferred when we think that the global space has a length limit of maximum divergence and curvature and that the radiation is its own energy disturbances. If, one logically concludes, that the global space does not expand infinitely and is not just a empty pot (as they have come close to this view in philosophy) and if we think that the free space exists as a finite amount of substance, on which wave phenomena occur, then some conclusions are drawn in general, which are the same as those of modern physics. The sciences have been developed by simple, obvious and funny propositions. How important are these brief and simple thoughts is not always revealed from the beginning, but it is revealed when they are connected with a multitude of known phenomena.

It should be understood and accepted, that the Universe has time limits of a Total and Wider Moment (a maximum period). We suppose that the Universe begins at a moment A and it finishes at a moment Z after of all developments. After one last moment Z the Universe begins again to exist as it was at the initial moment A until it reaches Z again. The time interval in which the Universe begins and is realized in all possible ways from a moment A up to a moment Z constitutes a **Maximum Total Moment**, let it be AZ. This total time AZ is finite, extremely large but a constant number, not infinite and constitutes **a maximum time limit for all** the individual things ($T_{universe}$) without exception. This number, which corresponds to the Full Time, is not divided to unlimited smaller time moments. **A minimal time moment** (let it be Ax) should exist such that the total (number) of minimal moments is not infinite.

What would the Universe be if it began to exist in the minimal possible

time moment Ax? In this minimal moment, the Universe would not have time... to become something. It would just manage to become something. In this minimal time moment something minimal and a minimal motion would exist, which would be as minimal as it could exist in a minimal possible time (that is to say, just an initial thing). The minimum possible time in which the Universe begins, constitutes another limit, **the minimal time limit** (Tmin) and this limit **is again common for all individual things** without exception. Accordingly, we have at least two decisive limits (for material interactions): A Largest Total Time in which the Universe (Tuni) exists in its entirety and a minimal possible time (Tmin), in which a minimal part of the Universe exists. All the individual things exist and are realized between these temporally limits. Material things exist and are realized according to predetermined limits (min-max) in time, distance and quantity of energy regardless of the way they are connected into space and time. They are realized and they move on the basis of a minimal time moment, multiple or submultiple moments, a maximum time and always between certain maximal limits in time and distance. The time limits of the minimal moment and the largest time of Universe and the corresponding limits in distance imposes certain mathematical relations on the interactions of the things and do not allow their uncontrolled connection, interaction and unregulated change in space and time. In short, all things are realized according to the fixed specifications of a common reality.

The completed Universe neither has an overall beginning nor can it cease to exist altogether. From the first thought we can conclude that what now constitutes the Universe is not a direct continuation of an earlier stage, and that the Universe cannot endlessly continue to exist directly in the next stages. So, when we make already these first thoughts, we expect that the universe evolves not only directly, continuously and without limits, as if it became something different which was not previously and with a unique priority. But the Universe also evolves by the coexistence with other "cosmic subsets," corresponding to long periods of its complete existence (as are galaxies, “sub-verses”) while this is ultimately without its previous stages disappearing forever. Physical processes prepare in some way the regeneration of the Universe and of all the things. But it is still too early to talk about it.

An important difference in the new physical interpretation. The beginning and the ending of a time interval AZ of the existence of the full Universe is not a total beginning or a finish for the entirety of its existence, but only of its parts, which exist in shorter time intervals. The past and the future -of the individual parts- constitute the wider “now” of 100% complete

Universe. **The Universe in the entirety of time is complete before the relative moment at which its parts begin to exist**. But on the contrary, the complete Universe is -like a free space- almost entirely absent with regard to its parts! The minimum time Ax of the Universe is not to be located before its existence and its creation is made by its microscopic dimensions, at the same time that the Universe is complete within the limits of the maximum time AZ. That is why there is no time t = 0 sec, since the Universe is at this moment already with all possible ways of connecting the things... This is a main difference of the new physical interpretation of the creation and the maintenance of nature, which has escaped from the modern scientific research and opens the gates so that a multitude of observations in the physical world can be interpreted in a unified manner. One of the first observations which impress any thinker is the numerical proportions and the measure of nature's changes. That is, ratios, quantities and sizes that can be numbered, measured and correlated such as the numbers in our thinking in the terms of mathematical logic. From the original definition of this new physical interpretation it is quickly revealed how the natural phenomena are regulated and have laws. Nature is regulated by fixed minimum and maximum limits and that is why it has periodic phenomena and laws.

The cosmological theory of Finished Time or the Completed Universe is based on a first thought that contains the concept of cyclical time and period. The consequence of this physical interpretation of a complete and stabilized Universe is generally revealed by the existence of periodic phenomena, common attributes and the same laws in all nature, since all things are considered to be rapid oscillations in a constant quantity of energy. Periodic phenomena would be impossible and random in nature if motion and change in nature were not regulated by consistent minimum and maximum limits. All individual things with all their differences, exist and occur between the time limits of a maximum total time (in which there is the entire universe) and a minimum time (in which the causes of its creation exist). The structural elements of things, the so-called matter, are rapid changes in extreme short periods of time and elementary energy exchanges (oscillations and periodic changes), or modes that are realized in a common substance as Spinoza would say more simply. That is why the limits of time (minimum and maximum time) apply to the more complex nature processes. These time limits of minimum and maximum period of the Universe impose limits, cyclical and rhythmic processes (in multiple or sub-multiple moments, fluctuations, minimum and maximum values, frequency, alternation, inversion, mean values, boundary changes at 90° and 180°, interruption, reversal, synchronization of oscillations) in order to maintain limits, restore balance, and conserve energy. Things appear to be created only as external and accidental, whereas the conditions of creation are imposed "internally" by their very

substance.

All the laws of nature are a single law, applied to different quantities and proportions: All changes occur **to maintain a constant quantity and to restore the equilibrium that is disturbed**. Necessarily the changes occur in a quantitative proportion imposed by the total quantity and by the forces restoring the equilibrium. From these proportions and limits which are imposed by a total quantity (minimum and maximum limits) the permanent and frequent features of things are created, which are generally identified as particles and chemical matter.

All properties of matter and consequently of things (distances, lengths, angles and more specifically shape, consistency, toughness, volume, elasticity, etc.) generally come from:

· The speed and rhythm according to which the structural elements interact,

· The rate of change in interactions

· The energy that physical carriers exchange or transfer (in quantity) amongst them.

· The synchronization of the changes and the number of physical carriers that are synchronized and act. (For example, the molecules of a gas under certain pressure conditions are synchronized and act in bulk).

· The increase or decrease of the number of physical carriers that act collectively (having a mediation or in one direction or with a force that groups them together).

5.1. The concept of period, circular motion, trigonometric proportions



Already since the original suggestion of the physical interpretation of a stabilized Universe the concepts of period and circular motion have been introduced as fundamental and regulative for the maintenance of the cosmos. As it is known, period, rate and generally the uniform resumption of a process has many features and mathematical relations, which are described by the geometric shape of the circle or sphere and which are observed in the cyclical motions (trigonometric functions). The static relations of the geometry of triangles, of the circle and of the spherical surface appear in the periodic changes of the energy of empty space, the rate of transfer and the exchange of energy, the periodic changes in microscopic lengths and the fluctuations of sizes and values. They appear dynamically or at a rate and pace, either momentary or as constant relations in relatively balanced conditions. These ratios simplify the investigation and the calculation of a large number of physical phenomena. We talk about the invisible phenomena which vary in higher speeds in the microscopic space and with which nature exists. A bad student at mathematics could understand into which trap we fall, when we record an endless variety of unrelated observations about the microscopic phenomena without being aware of the closer relation that these phenomena have with each other and without any explanation.

The length of the circumference of the circle relates to the length of its diameter according to a constant relation. The ratio of their lengths is a fixed number, the known number pi (π). Thus, if we divide the circumference of the circle into smaller arcs and if we form triangles inside the circle, which have sides equal to the radius and the strings of the arcs, then all the relations which exist amongst their lengths, they will always be associated with the constant ratio of the number pi. That is, there will always be ratios amongst the lengths and the angles, from the calculation of which we will find the fixed number pi. All ratios inside the circle need the shape of circle and the shape of circle needs the constant ratio of pi. This is the same as the law of conservation of energy. There is an amount of energy which changes and is shared by all things, but the quantities have ratios between them and vary according to a rate, because the original and communal amount is kept constant. The most important for the study of nature is, that all these relations which are displayed in subdivisions of the lengths and angles of the circle, are displayed in all periodic changes. In the microscopic structure of

matter and in energy changes, these mathematical proportions appear as separate phenomena and properties, while they are moments in the extremely rapid and rhythmic change of energy.

5.2. The maximum time of the Universe has a mathematical analogy with the minimum time

The maximum time (or global maximum time, t_{max}) also sets the limit (how much it is) of a minimum time t_{min}. These common and global boundaries of a minimum and maximum time (t_{min} - t_{max}) ensure that energy in nature changes according to a unit of time (that is, energy changes analogously to time E / t = power). Thus, the construction of a material nature with fixed foundations is ensured, since the foundations are energy oscillations realized by a mathematical analogy (c, h, G are closely related). We detect these energy oscillations as electromagnetic. When the energy oscillations occur at the fastest rhythms of nature, then we detect them as particles ($m = h/c \cdot \lambda$). If particles are energy oscillations (in a common amount of energy), then it is not so difficult to understand how dependable the structural elements are, which are specified under the abstracted concept of "matter".

· The maximum time of the Universe has a mathematical analogy with the length of the global free space. A maximum distance can be traveled into the Universe, since it is this distance, which can be traveled in a maximum time interval and at maximum speed (the speed of light).

· The minimum (shorter) time has a mathematical ratio with the smallest length of space. That is, a certain length is covered in the shortest time, and not longer and thus the maximum speed is determined. (Rational conclusion of a maximum speed in nature!).

· The total amount of energy (since this is the entire Universe as free space) has a mathematical analogy with the maximum time and the length of the global space. That is, the total energy is full / constant over a maximum period of time and is presented by the length dimensions of the global space and its curvature.

· The minimum time t_{min} has a mathematical ratio with a minimum amount of E_{min} energy and a minimum length of space λ_{min}. That is, a minimum quantity of energy and a fluctuation of a minimum length can correspond to a short time interval.

· The minimum time has a mathematical (reverse) ratio with the maximum frequency. That is, if the minimum period is repeated over a minimum

time t_{min}, then this iteration has the maximum rate and the frequency f is the maximum f_{max}. ($T_{min} = 1 / f_{max}$)

· The maximum frequency f_{max} has a mathematical ratio with an amount of energy that is altered or transmitted. That is, if a quantity of energy is transmitted at the highest rate, then a maximum amount of E_{max} energy is transferred or a maximum amount of energy is subtracted from somewhere ($h f_{max} = E_{max}$).

· Consequently, all of the above have mathematical ratios with the mass of the particles, since mass is related to amounts of energy ($M= h/c\lambda = E/c^2$) and amounts of energy are related to the change of time, lengths, velocities and angles. A mass $M_{max} = E_{max} /c^2$ corresponds theoretically to the maximum energy.

6.0. About the limits and unity of the universe, rationally and briefly

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Have you said that eternal truths don't exist for nature? The first universal relations constitute world axioms, certain clauses with mathematical consequences, that predetermine the undeniable foundations not only of cosmology but of every science. If we notice the worded thoughts, then we will conclude that **the concepts are linked by rules of logic and these reasonable rules apply to the world as natural laws**. Universal limits and traits of all things exist and if we ignore them, then our knowledge reveals the things more differently and with some possibilities that they don't have. If we know the common traits of things and the physical laws, then certain foolish queries disappear and even some theories that have bet on the precision of certain mathematical calculations. Some of these relations have been extracted and enumerated at a priority (they are listed here without caring for their correction or supplementation and without comments).

• *" Every part of the Universe isn't the total of all the moments (of time) and by this definition, the part exists always (perforce) at a partial moment and not at another (moment of time) ". [1]*

• *" The things are direct parts of the same reality and constitute a common Total ". [2]*

• *" Things have relations with each other, that is to say they interact with each other and they are influenced by one another ". [3]*

• *" Things interact immediately and indirectly, at different and at the same moments in a lot of different ways ". [4]*

• *" The causes and effects are themselves the things and their behavior. (...) [5] Every part of reality is a cause, which is not common for all effects, but it is simultaneously an effect, which is not common for the all the causes and interacts with the rest ". [6]*

• *" The relation or connection of the part with the total reality is not only indirect and external ". [7]*

• *" Every part of reality always differs indirectly from its totality... ". [8]*

• *" Two things without anything common (element) in their quality or in their relations with the other things, would be utterly different, utterly irrel-*

evant and without any possibility for direct or indirect influence ". [9]

• " When we say that the things depend on each other, we mean, that they are influenced permanently regarding what they are, how they are constituted, from which things they originate and the ways, in which they are the rest of the things or some other of them ". [10]

• " Where an interaction exists, there the common traits of the cause and effect always exist ". [11]

• " The effects of a cause are not the effects of another cause and we find some causes, that are irrelevant to certain effects or they have a really indirect relation, which they could not have. As we say, a lot of causality chains exist combined ". [12]

• " The same cause cannot have precisely the same consequences on different things, while different or opposite effects can be determined in direct or indirect relation with some other causes. The same cause can determine a different effect and the same effect can be determined by a different cause…". [13]

• " In reality, every part influences and modifies the other parts, however not everything (all parts) at the same moment ". [14]

• " The influences are continued with some ways that are not stably determined (immutably) causing changes in the quality, activity and interaction of the intermediate things and thus effects exist, which are not regularly determined by one and the same cause. In other words, effects are materialized or exist, for which certain of the causes have ceased to exist or to determine them and reversely: There are causes that don't constitute the alone or first cause of the existence of certain effects and however, they contribute or are useful for the existence of these effects, even when these causes do not exist ". [15]

• "The so-called indeterminism or luck is in reality the unstable determination, (a changing determination), which is explained by the indirect (and relative) contribution that the connected parts of reality have with each other ". [16]

• " Nothing, which isn't the sufficient cause of itself, can be the alone cause for the existence or quality of another (...) However, it can't be no cause or not produce an effect…". [17]

• " The alone (or sufficient) cause (...), which does not have another cause except for itself, is the perfect total of them (consequently, it is also these things together) contrary to the partly causes". [18]

• *" The same things are certain causes of themselves, because their existence is a part of one and same self-determined quality and not only an external part and for this reason, they are specified not only indirectly - externally. Their sufficient cause is neither an external fundamental cause nor an external final cause, it is their direct total, in which parts exist immediately (without any mediation)". [19]*

• *" So that interaction can exist (or difference in time), things must exist, which aren't the sufficient cause of themselves ". [20]*

• *" Everything can be considered to be a partial effect -externally to other things and independently of the moment at which it exists- for the realization of which the rest of the things have indirectly (without a beginning)contributed as certain causes". [21]*

• *" Independently of the moment in which everything begins to exist, every single thing has been influenced more indirectly by the other things and has influenced indirectly every other thing". [22]*

• *" All things constitute a constant Totality inside in limits of a moment in time, they aren't numberless, they do not interact with unlimited ways and the most indirect way with which everything influences one another isn't infinite". [23]*

• *" The most indirect ways of interaction are these, which have always been realized (without a beginning). (...) Which are these more indirect effects, which are always specified in the quality of everything? As it will be proved, these common elements are the common ways of interaction, which are named "matter" ". [24]*

• *" The effects from the most indirect interaction of the things are the things with less interactions (...) [25] They constitute the stabilized ways of influence, that we name matter". [26]*

• *"The material elements are the stabilized ways, with which the Universe has always been realized at its minimal moment and in the abstract reality, constitute the simplest qualities (of things) ". [27]*

• *" The most indirect way, via which a thing influences every other thing after a time interval and through all the other parts, must be common, constantly the same, and another more indirect way must never exist ". [28]*

• *" The reality in the entirety of Time is finished (before the relative moment at which its parts are exist as external) and for this reason, it is not only the things of the previous moments, which influence the things at the next moments, but also reversely…". [29]*

• *" The substance is the fixed and uncreated beginning of relative things and this does not mean, that the substance is what remains from the abstraction of every change and action. From such a substance the quality and complexity would be absent. Not only relations, changes and possibilities can't exist without the substance, but also the substance cannot exist as the first - common source without these last ones ".* [30]

• *" The material elements are the ways, via which the Universal Quality begins relatively indirectly to become at its minimal moment ".* [31]

• *" The carriers of indirect interaction and configuration of things, the so-called "matter", are the things with the fewest ways of interaction at the same time. They are a relative lack of quality and reality into the totality of reality and they cannot interact with many different things at the same time (or in many ways at the same time) ".* [32]

• *"If the reality were not finished (in all possible ways) or at earlier moments - before the moment at which it is still realized with respect to us- then there would be no free space".* [33]

• *"The effect of the free space on the quality of things happens in shorter time than minimum, ie directly and simultaneously on all structural carriers (of matter)".* [34]

• *"every beginning into the free space is realized relatively retrospectively by the carriers of indirect interaction and the beginning of the existence of these carriers lies outside space, that is, it is direct and occurs in distance less than the minimum, by the universe of other sub-moments, which does not relatively exist".* [35]

• *" Different complex qualities cannot be explained by just a few common and external substances for the same reason that the existence of differences in the original common (and simple) substances could not be explained ".* [36]

• *" The part as theoretical and abstract is always the same, is always a part, but its ceaseless change means that it is not precisely this same and without quality. The concept of change and time presupposes, that this part changes partly and isn't only one or simple".* [37]

• *" The things exist as limited and exist in such a way that they exist in reference to others. They exist via the mediatory existence of many other things and their connection in a environment necessarily according to the physical laws. In this sense the phrase "indirect existence or things" was used. Their indirect and separate existence presupposes a lack of direct-ness, time and substance. (...) All things are directly the same common sub-*

stance and through this they are connected immediately, simultaneously (...) If the totality of things weren't a direct cause of itself and didn't exist with a stabilized quality (like a total Time), then the so-called things would not constitute some ways of a common substance (...) and they neither could exist with a relatively constant and unified quality nor could they have some common traits ". [38]*

Some quotes from the philosophical book "The Theology of Science", ©2000, ISBN 960-385-019-5

(1) page108, (2) page114, (3) page113, (4) page124, (5) page124, (6) page130, (7) page109, (8) page109, (9) page110, (10) page111, (11) page124, (12) page124, (13) page127, (14) page127, (15) page128, (16) page131, (17) page129, (18) page129-130, (19) page130, (20) page133, (21) page128, (22) page140, (23) page139, (24) page129, (25) page141, (26) page140, (27) page158, (28) page161, (29) page157, (30) page143, (31) page141, (32) pages203-204, (33) pages169-170 and 273, (34) page171, (35) page 172, (36) page137, (37) page110, (38) page144-145

* In this passage (38) a few lines were added to the top, because it would not be at all understood. All things exist separately and have limits in nature. The limits, the particularity, the intercession, the divisibility, the multiplicity are declinations of a phenomenon, that is described more easily and briefly by the usual notion of "external things". Every trait exists together with the other and if one is removed, no other trait remains

The most abstract concepts (compare to *Aristotle's categories*), such as the concepts of part, total and relation are expressed with some vagueness (however not ambiguously) in the fundamental thoughts that are enumerated in a selected sequence (thread). The description of the cosmos as a totality and as a part imposes the concept of the relation and quantity. The union of the concept "totality" with the concept of "time" imposes the concept of change and dynamic relation between the parts. Then the relations of resemblance, identity and the difference between the part and the total ensue. These first relations have a mathematical perspective, as there are the relations of the unit with itself and the division of the unit or its multiplication in mathematics, which imply the concept of quantity and proportionality. Vagueness is exchanged for generalization. However, vagueness does not invalidate the multilateral meaning of the universal concepts, which undeniably refer to an unspecified multitude of things and phenomena and not to our fantasies. In those years, in order to obviate the rejection of some people who think that they have enough experience and all the criteria to appreciate the reliability in advance without having to listen or read, the following footnote existed with the first general thoughts: "The abstract concepts of «thing» and «part», are used here with the unspecified range of an unknown

x, which corresponds to a limit of possible solutions, of which a big number is considered known and real. By the development of the reasoning and the rational interconnection of their meaning the limits of their meaning will be clarified". The description of the structure of the cosmos and of the things as a whole needed a formulation according to universal relations. The weakness of the abstract concepts was quantitative.

7.0. The serious, logical and intelligent questions (which should be had expressed at the outset)**. Matter, space, and the Universe do not exist without each other**

7.1. Substance and structural elements

One of the most interesting philosophical questions, which include extreme and amazing contradictions, unexpected and resounding discoveries, is the question of the substance of things and their structural elements. This is a logical issue that refers to all things in general and that is why research can begin from whatever thing is next to us. People with a research spirit have raised this issue since ancient times and these (unskilled researchers) have been called "philosophers". A book is not enough to record the philosophical theories and thoughts about the question of matter and substance. With the advance of technology and the use of laboratory instruments, the scientific knowledge of the structural elements of things has surpassed every imagination and cannot be confined into the mind of one human being. However, the concept of matter in science is not just a phenomenon and it denotes many phenomena together, without understanding how they work together to form such a structure of matter. The presence and the complexity of the notion of matter has not ceased to be without explanation, while it has not ceased also to be distorted. For this purpose, new phenomena are devised and theories are formulated that raise more questions. The important feature, which had to be included in the general notion of matter a few centuries ago, if not since the time of the early philosophers, and which facilitates research, is wave motion. Philosopher *Spinoza* had almost defined matter as possessing this essential characteristic (as a way of being in a common substance),[xii] with rational and bold thinking, without unsuspecting credulousness in the visible phenomena and this at a time when matter could not still be researched in such microscopic dimensions. The revelation of the role of matter for the complex things and the guiding observations for research begin at the moment, when we form a view of a Universe, which is complete within a Maximum Period. By the simple rules of logic and since we accept the experience that things are converted/transformed, evolved, created and destroyed, it follows that:

1) The structural elements are also needed in the case of the completed Universe, since the changes and the combinations of things are achieved (in every detail) by them.

2) But the structural elements do not create things and the completed Universe by themselves (as autonomous).

3) Consequently, we must think that they are not autonomous things or indivisible fixed quantities that are assembled only after external actions,

4) but (in essence) they are periodic changes and by these changes they have their own dynamic structure. Consequently, structural elements occur in the presence of another common quantity without which, the structural elements would be entirely indefinite and asynchronous and would not have a constant structure and permanent attributes.

In the physical interpretation of a complete and always the same Universe we have made the first theoretical observation that guides us to this important observation: Changes can be realized but we observe them (through the senses) as unchanging situations. This is, because the change can occur in the shortest time intervals of nature, in a repetitive and periodic way and as stationary wave. This is a first rational thought and observation, according to which it seems less paradoxical, that the structural elements are “shortcuts” for the beginning of nature. But of course this is not enough to prevent the question: In what are these periodic changes materialized? By what are these stabilized ways with which the Universe begins to be realized? An answer can be given easily even with little imagination. But the structural elements as unchanged or elementary particles cannot interpret the dynamic nature and its multitude of phenomena even with the use of imagination, as we will see! We investigate changes that occur in microscopic dimensions, in short time intervals and at the highest velocities in the interactions, and such an explanation cancels the self-dependence of the particles. It forces us to search for the kind of laws applying to nature, which maintain, preserve and synchronize the multitude of particles, while the latter have the prospect of acquiring the same properties and specifications, which cannot be explained by accidental external conditions.

In the microcosm, the mass is the effect of motion (of wave motion) and the structure of matter is kept by motion and by the "coincidence" of many motions. Subatomic matter cannot exist or has a structure without any movement, as the philosophers of dialectical materialism have already claimed. When a long and thick object, such as a pen rotates very quickly around its imaginary axis, it looks like a thing of circular dimension. But the pen may exist as stationary and oblong. In its self-rotation it could be considered to be a different thing, which is not elongated but circular or cylindrical. Within the structure of matter there is no possibility of separating the thing from its movement. This is, because the thing is created in "depth" by some movement and it does not exist as a separate and "complete" one. If a wave of the sea, which reached the coast, were followed by a large number

of waves at a very fast pace, then this sea wave would not be able to return back to the sea due to the repeated arrivals of the other waves. A "detached" and foamy wave on the coast would be like a distinct presence taking into account the movement and energy of other waves that arrive at a very fast pace. Therefore, when referring to the source / cause of mass and to the microscopic structure of matter, we should think that the velocity and energy of the moving quantities are not separate properties of some compact microscopic particles. The microscopic quantities of matter itself are states of immobility and energy accumulation due to the very high rate of motion that causes them to exist and due the (wave) phenomena, which the hidden presence of space generates. And the forces presented and maintained in the microscopic structure of matter do not originate from the tiny movement of some minimal masses or from some external source.

We predict that subatomic forces are created by the property of the free space of concentration and decentralization of its energy,

by energy exchange with waves,

by stationary waves,

and resonance phenomena that increase or decrease the energy.

7.2. Fastest speeds and rhythms of nature

In the everyday vocabulary, "indeterminacy" extends to many other properties of particles by taking into consideration observations within thought and rules of logic. It is not limited to the position, velocity and momentum of the electrons and the inability to measure these states at the same time. The properties of the particles, as well as the particles themselves, originate from a changing state, at short moments and recurrently. **If some particles or some properties are stable, this is again achieved by phenomena of rapid and periodic change and by synchronization / resonance phenomena**. Therefore, the measurement units of sizes and quantities, which are so microscopic and dependent on the fastest speeds and the and fastest rhythms of nature, are not expected to be clearly distinct. The units of measurement in these microscopic processes do not have the same meaning, as they do when we measure quantities and sizes that exist at a distance and at paces of movement, which we have the time to measure. In the smallest dimensions of the Universe and in minimal time intervals the sizes and also the quantities cannot be "static" and do not refer to clearly separated phenomena. Researchers have realized this potency by using the most sophisticated observation organs and costly experiments. Perhaps what we say now seems to be behind the times. But do not forget, that we make these general thoughts with rational consistency through general principles that guide our research, provide solutions to problems, encourage the theoretical effort and prevent us from coming to a dead end. In the frame of our initial thoughts we observe that adapted interactions in tiny lengths necessarily require higher velocities, faster rhythms and wave processes. We understand the concepts of “faster” and “more frequent” as opposed to “low speeds” and “slower rhythms”, which we observe at the bodies around us. These microscopic motions explain easily and in a “wave way” the difficulty of observing certain physical processes. That is, we do not need to work in a research center and solve difficult equations to make such a conclusion with credibility.

7.3. Stability and same structure

The matter in its entirety and its components did not begin to exist and a reality the matter has never existed*. This finding of the Theory of the Complete Time guides us to seek a different solution of the way of creation and maintenance of the Universe. Indubitably, it leads to an impasse to wonder how the totality of the material world was created. The big error in the development in physics appears more clearly than ever and is formulated very simply by a philosophical approach: They try to explain and create theoretically the essential traits of things and the Universe from zero. They begin from a minimal reality, which is called matter or particles, they remove all the reality, which is the Universe, and then they attempt to construct the Universe from an initial matter, that is to say from the almost nothing contained in a quantity of particles, that would exist more accidentally than the molecules of the dust. While on the contrary, they would be supposed to begin from the finished whole, from a common preexisting thing, from the full Universe in the total (common) Time, in order to explain, how changes, balance and the things as separate parts are caused from the relative zero (of an empty space). They would be supposed to do this in order to explain how the exterior reality with its multiplicity and its time difference is maintained by an initial unity, the immediacy of the whole and a common substance. Or they would rather be supposed to explain how these two phenomena can coexist, namely a complete Whole and always incomplete parts (as we would say "the two sides of the same coin"). The Complete Universe has a simultaneous existence, while its parts have simultaneously a heterochronic existence. The relation between multiplicity and unity in philosophical vocabulary is now expressed in the terms of physics by the relation between an isotropic space and the rapid fluctuations, that belong to the world of material particles.

Considering that matter is everywhere in the free space and in time and always with the complete Universe, the questions, which result from this fact, are the following:

a) How is matter created and renewed, in the case that is converted into other forms of energy and

b) how is it maintained so as to remain always present in the entirety of space and the passing of time? The second question is connected immediately with the question of how matter is finally distributed “with intelligence” so that the existence and development in the (preexisting) complex material world are facilitated. These are the serious, logical and intelligent questions that should have been raised in science a lot of decades ago. Answers cannot

be given if we do not understand that the free space participates as a dynamic (and balanced) energy in the renewal of matter. These questions are more befittingly formulated when we get rid of the word "matter" and thus the notion of grains of dust and consider the structural elements of nature as lightning fast fluctuations in a common amount of energy, which are kept in a certain way stabilized.

Matter, either near us or far away from us, is connected with something common, with a common reality and in particular in such a way, that matter maintains the same structure everywhere. Matter derives from somewhere the energy, according to which it exists as an opposite phenomenon to the gravitational attraction and derives energy everywhere with a similar way (with the same laws). While we would expect to find the minimal constant quantities of a body and the end to the division of the matter in the most microscopic dimensions, on the contrary we discover a relation between stability and the fast and circular motion. How do the microscopic quantities, which move ceaselessly, acquire a more complex and constant form? Why does mass “ignore” the gravitational force and matter accomplishes to be maintained extensively by internal motions? These are queries that arise in the mind of every thinking person, when one listens to the claim that the division of matter leads to microscopic particles and these particles move incessantly at enormous speeds. Reasonably therefore, we wonder which forces “constitute” phenomena of periodical motion in form of immobility and in elliptic motion, how they do this and where is the beginning of mass.

The stability in the most rapid microscopic motions, which take place in the structure of matter (to a great extent in the free space, in the depth of time and under very different conditions) cannot be explained by the energy and motions of external (and accidental) things. If the structure of matter and generation of mass were realized by the environment, that is to say from the exterior space, then different matter with accidental structure would be supposed to exist in every cubic metre of space. The composition and the structure of an individual atom as well as the different effects and conditions would be different and would exist in an unlimited variety. However, the shaping and the structure of material elements does not depend on the objects and on the different situations in environment and matter is not so changeable by exterior forces. What other can exist everywhere in the Universe and regulate the structure of matter, be connected always with matter and behave in such a way that the structure of matter is the same everywhere and under the same laws? What other can we find, which isn't imaginary and is connected permanently with every reality, except for the so-called "empty" space? The presence of the free space is not an accidental result originating from the exterior connection of material things. The free space always preceded and enforces limits (in length, time and quantity) for the

energy and for the connection of material things. The limits can universally be enforced because things are presented by the wave processes in its own energy which is in a balanced situation.

• Are there a lot of separate forces in every microscopic atom of matter? Or is there a common force (or decrease and destabilization in a common force) for all the atoms of the cosmos?

• Are the specifications in every atom of matter and coincidentally the same specifications everywhere in the Universe accidental and in null basis (i.e without basis) and do they exist after a certain process (like copy-paste), by which the structure of the atoms is copied in enormous distances of the free space? Or are the separate atoms of matter connected and created permanently by a common quantity and by the invisible presence of a common energy?

• Is the timing in the microscopic particles becomes accidental and the composition of constant things and the visible cosmos (even for a limited time interval) coincidental? Or do the limits in motion, in quantity of energy, which is exchanged, and the laws for the materialization of invisible space energy exist in advance? "Does each one of the particles dance as independent in the rhythm of the creation and destruction, or does the same music play and all the atoms listen to this same music"?

If therefore the structural elements are expeditious fluctuations of a shared and balanced energy (free space) then the change of energy has an upper limit. This means that there is an upper limit to the frequency[xiii] and to the quantity of energy transfer. Thus the conservation of energy is not an accidental phenomenon. But many other effects and the energy hf of particles in the structure of matter are related to such a limit. It is not strange, that the appearance of matter constitutes a particular phenomenon of oscillation in a balanced energy and of stagnant electromagnetic situations in decreased frequency, but way above $\approx 10^{15}$ Hz of the visible light. Space is not only a lack of energy, but it is instead the common energy that matter needs in order to be regenerated and sustained, since material bodies exist as minimal moments of loss and variation in the total energy. The free space fluctuates permanently and it is maintained in its equilibrium state by these fluctuations. Here we remember the following observation:

"*The equilibrium state of a system is where its dynamic energy becomes minimal*".

The fastest rhythms in microscopic dimensions constitute the rational and simplest solution of nature to achieve stabilized structures in short periods of time, with space and energy savings, and so that the phenomena can be combined creatively.

7.4. The particles as explained by rational thought

A microscopic carrier (an atom, a particle) as the simplest thing of the Universe, as a minimal part in the division of things, could not have other attributes apart from some relative attributes, that result from the change of their position. All the particles would exist forever accidentally and quantitatively like the molecules of a gas if the "empty" space and the presence of the total Universe did not set the conditions, that enforce them to be interconnected. Even the word "atmosphere" contains the concept of a sphere and the air mass does not have this form accidentally. It cannot be used allegorically so that the chaotic motion can be shown that would exist if one considered the meaning of chaos. Even the ability to name all the molecules with the same word and to understand their similarity is a complicated phenomenon, that is achieved because they do not originate from a different source and the separated molecules are not formed by different laws. We use a common word without observing, that the similarity of many parts and their quantity may be a fact, because some forces get involved that are specified by some laws. The similarity of many elements needs an explanation. Even the disordered motion of the molecules (known as Brownian motion) could not be materialized in a similar way and in statistical perspective for a quantity of molecules if matter did not exist already with certain properties and with such fluctuations, which are determined by its formation.

The rhythmical and synchronous change in the microscopic existence of material elements is all their quality and structure. **The rhythmic motion is the most simple and productive phenomenon explaining the forms and properties of the particles.** This is a theoretical observation is, so to say, something we would have understood even if we had not concluded, that the structural elements are the minimal ways, with which the full Universe is realized relatively and lastingly. We could have inferred this even if we had not previously considered that the things are ways of configuration in only one common substance (as the philosopher *Spinoza* wrote towards the correct direction of research in the 17th century). The particles are generated by the most rapid transfer of energy and thus their existence is rhythmical, fluctuating and related to wave phenomena. Now however, we understand furthermore, that the elementary structure of particles and every stability in their presence again is due to the conditions, in which a balanced quantity of energy oscillates in repeated or synchronized motions. They are motions imposed by the simultaneous energy of the free space (that is, by the simultaneous presence of the stabilized and totality of the things, namely of the complete Universe). Nobody can object, that it is much more likely and easier for a quantity of particles to approach each other and achieve stable

forms. When is this materialized? This is, when these particles are in an environment with more complex things, which have existed before these dust particles, in certain conditions, which prevent the infinite divergence of position amongst the particles. Some weak forces are needed at least to cause the encounter of the particles and a creative diversion to guide them if not to coordinate their interactions. The ones, who talk about a total creation of the nature out of nothing, assume apparently that such guiding forces existed before the creation of nature. And if they describe the creation of the cosmos like an explosion, they also assume that the forces were adjusted according to some laws.

If the material elements (structural elements) existed without a common basis, then their combinations and their interactions would be nothing more than an external addition or removal and random forms in short intervals. The material elements could not have stable connection ways. The interaction of many microscopic quantities would be casual and without uniform rules (not regulated). The laws of nature would be coincidental, in short intervals and would be no correlation amongst them. Every material component would act during the passing of time in an entirely different way and also destabilized, since it would be affected randomly and only indirectly by the unregulated influence of numerous others. So, the material elements as well as the multitude of other elements could not have (fixed) properties. But one of these fixed and common properties of matter in physics is the gravitational field - do not forget this.

By the theoretical analysis of a thing into simpler parts, which comes to an end with few particles, even today we can think like *Democritus*, as if the elementary particles were unchanged and without their own action. Thus, however, the known problem arises, what forces the elements to formulate stable forms and finally a world of variety with balanced forces and with unity, as we perceive it. This problem ceases immediately to exist when we consider that the structural elements are neither separate substances, nor immutable parts of things, but they are modifications which become somewhat stabilized. In old times, as in Spinoza's time, this was a conclusion that could not be verified and was very difficult to be connected to some other physical phenomena. In that time, the people had not recorded these phenomena and all the details or they ignored them entirely and a book referring to them was hard to find. After the 20th century and after a number of observations and in a time of advance in the sciences nothing can justify the narrow-mindedness and fear of the scientific thought, which left in theory the particles without foundation in a common reality, let's say so simply. Since a lot of decades, physics has been providing us with important observations, concepts, relations of motion and certain measurements, which help us to think of the structural elements, as if they were modes of a substance.

Furthermore, we have a lot of measurements and proportions about time, speed, rate of change, frequency, quantity of energy and other physical relations. **The tiny world of particles is the world of the shortest interaction times** and not just a world of most thin and smallest things. This is the second fundamental difference between the microcosm and macrocosm, after the difference of wave motion.

7.5. Modes of being consisted in what?

Do they have a common substance? What is such a common reality? These first questions were not so difficult to be answered briefly in philosophy with a little inspiration and imagination. On the other hand, these questions have no meaning according to the thought of a scientist, who begins describing things and their motion with the solid bodies that we all understand without a doubt. We do not observe any common or unchanged substance and no such reality, in which a multitude of modifications happens. And if we limit the concept of reality in the material bodies, which we observe to have an extent and which are composed by the particles and matter in the three dimensions (mechanistic concept as *L. Büchner 1824-1899* and many physicists in previous centuries), then, the "modes of existence" are creatures of our imagination.

But we have many observations of the structural elements as rhythmic changes. We have shown that logical thinking would be halted if the structural elements were separate substances. The maintenance of such a complex cosmos cannot be explained by accidental phenomena and unexplained properties or some ingredients. We have explained in general the repetition of many natural phenomena and we have found that the same physical phenomena are repeated in the microscopic structure of matter. Besides, we cannot leave unsearchable this characteristic of a cosmos where all things change constantly, while achieving equilibrium and evolutionary phenomena. The identification of time with things was one of the fundamental thoughts, which easily followed from all the other observations about the physical processes with which the Universe is preserved (having stability).

Cyclical motion with return to the same starting point can be considered as immobility and timeless motion or double motion with two inverse times. This is the meaning of the cyclical time. When we think and observe cyclical movement over long distances and at low speed, it is not easy to see how such a contradictory view of a cyclical time promotes the interpretation of nature. **The great margins of time and the slow pace of change show the return to the beginning and the repetition as something rare and unlikely**. In the case of uniform circular motion in tiny dimensions, and at the highest speed, the timeless movement has a particular importance: **The short margins of time and the fast pace show the return to the beginning and the repetition as a fundamental phenomenon**. The apparent relation of circular motion or recurrent motion with mass stability (in microscopic dimensions) and with the structure of matter should not be left unnoticed. As we know, inertia is a phenomenon of changing speed and resisting a force. This observation immediately leads to the first thoughts, we connect

motion within the microscopic structure of matter with the cycle, repetition and rhythm and not with linear motion, even if we were unaware of the phenomenon of electromagnetism. This simple observation is decisive for the interpretation of the structure of matter. Particles that are preserved and have their mass as moving would leave the structure of matter unexplained, if acceleration / deceleration effects were absent. The change in speed can be repeated regularly and smoothly only in circular motions and in periodic changes and exchanges.[xiv]

The concept of "change" so abstract does not help to we understand how it achieves stability and balance. We must think that change when repeated in the same way is still change. But repetitive change in the same way overturns what we imagined about the meaning of "change". Repeated change in the same way is not a random change in time. Change in the sense of completely random and subversive change is a deceptive concept for the interpretation of nature. Change as a phenomenon with periodicity, rhythm and repetition sheds light on the interpretation of nature. Because change "reconciles" with stability in another concept which is close to that of "balance" and "synchronization". Periodic and uniform change is not the opposite of stability and immobility, as everyone usually understands in the abstract sense of "change". Do not expect that the order and existence of laws in this vast world can be explained by absolute instability and disorder.

The structural elements (and consequently the material things) begin to be formed in periodic ways in the shortest intervals and by rhythmic and alternating phenomena. Even a child can think that the interactions will not be contiguous with such periodic changes and in the shortest intervals. Some changes in hf energy quantities of microscopic phenomena and in their other sizes fluctuate and are interruptible. They are slower or faster and have breaks or connections. This is similar to when we turn on and turn off a switch quickly, since technology has achieved the production of digital switches, the application of which proved to be valuable beyond any stretch of the imagination for the manufacture of electronic processors. With such a view about the structural elements, when we think of their motion in terms of wave motion and not linear and mechanical motion, then the microscopic world immediately appears to have its normal complexity. Because it is revealed in such a way furthermore:

- The decisive role of the short interruption of periodic changes for the formation of the structure of matter,
- Along with the decisive role of rhythm, timing and synchronization.
- It is revealed how mathematical relations are applied by nature itself, since these quantity relations and their proportions are created by

the limits and the alternations in motion.

Another logical thought, which is inferred when time and rhythm or rate are considered to be fundamental phenomena and in correspondence with length, but also with the angle of length is the following. Time has a meaning only when there are things and movement (as we have said in the first thoughts, since we have defined the Universe as "finished" total time). Time is everything along with its changes. Everything is not the wholeness of all its moments, and by definition it's always in a part of cosmic time (and that is why it changes). On the basis of these rational considerations, motion within the space accounts for motion over time. The distance of free space naturally accounts for a distance in time, depending on the speed or the pace of the motion. It is self-evident and a logical axiom, that the motion within space is in general motion within time and this should be remembered. All lengths can be defined by the maximum speed c multiplied by the time it takes to travel these lengths at this maximum speed of nature. We mention again that the distance increases the time for the interaction of things and at the same time reduces the energy that can be transferred.

For example, one of the first attempts could be to test the time-length substitution (and vice versa) in the known physics equations. Every action which needs a length in order to be realized, needs also a time interval. So we think quickly and simply, but also surprisingly, that the actions within the space produce always a result at a later moment and never exactly at the same moment. When we say that the intensity of light diminishes analogously to distance (per length), this observation coincides with the phenomenon that the intensity of light also diminishes during the passing of time as it is transmitted. For each 1m distance, a delay of t = 1m / c = 0.33335641e-8 sec is made. When, therefore, we say that a force or the intensity of a field is weakened by increasing the radius, it still means that there is a weakening for every 1sec, since a corresponding amount of time passes because of the change of position. In the formula of the gravitational force ($F = GMM / r^2$), we could replace the radius r with the time interval, in which this length is traveled by the light at the maximum speed c.

The (absolute) length is: $r = c\ t \rightarrow r^2 = c^2\ t^2$

The (absolute) time interval: $t = r / c \rightarrow t^2 = r^2 / c^2$

Note that the relation $G / c^2 = 7.424159e\text{-}28$ is also a constant, which could be called Θ (Greek letter). Its dimensional content is simpler: $G / c^2 = m / kg$

7.6. Inertia and motion. Another example of rational thoughts

The stabilized ways of distance (for indirect interaction), which are called in particular shape, cohesion, hardness, volume, elasticity and so on, are generated by the time interval in the ways according to which the particles interact (carriers of indirect interaction), by the rate at which the particles transfer their energy to each other and the synchronization of their changes. The existence of particles through fluctuations in a common and constant amount of energy (of free space), with the same time intervals, lengths, speeds, rates and amounts of energy, ensures a process exactly the same for the creation of matter everywhere in space and in time. Thus, matter with its stabilized structure is preserved by a certain process, by synchronizing certain fluctuations and achieving its balance of changing forces. The discontinuity in the structure of matter and its vacuities are not due to the static boundaries of the size of the particles but to **distances and lengths that maintained by dynamic processes**, by wave phenomena and the rapid interactions.

When an external action does not destabilize the ways of connection (or interaction) the material carriers (particles) of a thing, then they move as a whole or, on the contrary, cease their movement as a whole. One thing moves like a body in space because it is influenced by forces, which do not disturb its parts in relation to each other. The ways in which its parts are connected and exist together (its structure) are not destabilized. The movement or the stopping of movement within space is a common consequence of the relative stability of things. Conversely, **the ability of things to move is a common way of the structure to remain stable against the effects of other things**. The movement of a thing presupposes a relative immobility of its material parts, an immobility maintained by some other associated movements of its parts. When we talk about the movement of a "body" within space, we have to take into account that it is realized in such a way (and effect) that it does not disturb the unity, quality, structure and balance of its interconnected parts. The "resistance" of the body and its reaction are related to the maintenance of the body mass and the structure of matter, while the retention of the body allows energy being transferred to another body within the space at a different time and to a different direction. Note, that the free space does not have its three dimensions at the same time for a certain body movement.

In the case of large bodies or increased masses (such as astronomical bodies), the application of a weak force causes local variations. Their increased mass is not due to the fact that they consist of different materials or new special ways of joining and clamping their parts. If we think of it more

carefully, we will see that there is a limit not only for the division of matter as a static quantity, but also a maximum resistance limit to change, which seems to be the most difficult to overcome and appears in microscopic dimensions. That is, we can apply forces and make quick moves and change them fast (acceleration / deceleration) and eventually the bodies will be dissolved. But in the end, the smallest pieces, the smaller debris and the structural elements of matter remain. These contrive to be maintained and need another (faster) way to get energy and change.

Inertia and resistance of a body, when it changes its motion and its speed, are related to the resistance that the connected parts of its structure have. This resistance and inertia related to the change of the motion (or immobility) of the parts of a thing is not infinite. Infinite inertia would mean that a force could be applied to a body without limits, a force of unlimited power and in infinite time without causing phenomena of dissolution of the structure of matter and first of all of the body itself ... Theoretically infinite inertia is connected with indivisible bodies and with matter that has not a dynamic structure. Thus rationally, we can conclude from the mere existence of material things that the change in their motion is within the limits that allow them to be created and maintained (!) In other words, inertia is not just a reaction or an effect of the change of their motion, but it is also a prerequisite for their motion within space.

The motion and the change of motion of material things within space occur within the limits that allow these things to be created and maintained. When a physical body is destabilized and dissolved, then the action is interrupted, energy is not transferred and the meaning of speed, acceleration, duration of action is lost. Also, the number of parts, which are affected as one thing (or synchronized) can also be reduced. A receiver, a fixed presence and a time interval for the application of force are needed so that energy can be transferred and force can be applied. The phenomenon of mass ensures this possibility in nature, the application of a force and the transfer of energy. We can say in general that forces are applied because resistances are shown in movements (of bodies) and delays allow the approach of things. The phenomena of resistance and delay in nature correspond to mass and inertia. The relation between the momentum of the bodies and the force, which *Newton* mathematically formulated in the 18th century ($\Sigma F = dp / dt$), in agreement with the experimental measurements, stems from a more general relation of nature: Force can be applied accordingly to the resistance and the time interval of resistance. Of course, force is not only revealed by the external motion that it can cause to the bodies. The ground prevents our acceleration towards the center of the Earth, the gravitational field of which would cause. The resistance of solid ground changes the effect of gravitational force and the force is applied to it because of our weight even when

we are standing. The lack of visible and external motion does not signal the absence of forces. On the contrary, equilibrium states and static relations favor the application of force and prolongation of time. Where the strongest forces are applied permanently or for a longer period of time, there are probably no fixed intact bodies, but their debris, dust and radiation. Therefore, for the presence of the bodies it is a prerequisite not to apply the maximum force Fmax or at least such force not to be applied continuously for a longer period than a minimum time. For this reason, we can suspect and assume from the first thoughts that the presence of the Universe as an complete wholeness applies permanently the strongest force Fmax near the minimum time t_{min}.

8.0. Stabilized Universe, maximum period and conservation of energy

Notice how the empirical view of an unstable and evolving universe is disturbed by a carelessness in the formulation of the principle of the conservation of energy. We say: The energy can change, be shared and transformed into various forms without ever being lost. The quantity as a whole in a closed system remains constant. Nobody denies this. But in the view of the unstable or evolving universe and of the meaning of the Whole without any temporal or spatial limitation (a different set of events or the amount of energy each time) we should say consistently: The amount of energy as a whole remains always the same regardless of the initial amount. (!) We expect that this will be done in the future for any other amount that we will calculate. Given each time a different quantity of energy, we anticipate that this will remain the same for a "countless" number of times.

Eventually, when does the energy stabilize, after endlessly changing and being converted and thus we talk about a different amount every time? Which amount is constant, since there is no system completely isolated in space and time? A closed system completely and forever isolated would be called " universe " with the vocabulary of our physical interpretation. We have to ask more accurately: What is the fundamental and general principle, which does not allow for the loss of energy in its endless course and in the maze of its change? Further, we would add: What is the fundamental and general principle that prevents all the energy to be converted in only a single form and an uneventful stability finally to ensue (such as the heat death of the universe)? If the universe was not stabilized within a total time (in a maximum period) so that all the energy could be a constant amount, then the change of energy in shorter periods of time (as a part) would be realized without limits, in any amount regardless of the time interval and then, it would be always incomplete and it would remain during its allocation constant by chance. The total energy of the completed Universe is always the same and fixed in a maximum period of time and this relation - which stemmed from the philosophical thoughts - has dimensional content of power ($P = E / T$) in physics and this must not be left unnoticed.

If the energy reduction of the free space was to continue boundlessly, then this would mean - in addition to a lack of a limit to the speed and the transferred quantity - also a failure for the energy to be preserved in the course of time. The physical carriers (or particles) are moments in the periodic change of a stabilized quantity of energy (free space), that is, some moments when energy begins and ends being transmitted and consequently they are moments when energy is diminished and re-compensated (fluctuations). It is not possible to transfer more energy per unit of time and there is

a minimum time (t_{min}). Respectively, more energy per unit of time cannot be diminished and compensated. There is a limit to the amount of energy that can be accumulated or detached per unit of time. The energy cannot be transferred faster than a minimum time t_{min} and the change in its quantity cannot also be done boundlessly. Now, we can say in other words that the quantity of material carriers and the material reality in general exists, because the energy reduction is not unlimited at the same time (and it is not a reduction in the total energy). Energy is diminished and constantly transferred to compensate for its shortages, while this is realized not only with a limit to quantity but also with a limit to a minimum time t_{min}. Thus, the total energy cannot be transferred at one moment or in an unlimited quantity. (Conservation principle of power). This is a concise explanation for the non-continuous transfer of energy.

8.1. Balanced total energy and free space

The transfer of energy or its flow and the material interactions require a reduction and detachment of the energy, that is similar to the flow of time and the moments, which require change and the lack of time. So that energy can be transferred and absorbed somewhere, it must be detached and get lost somewhere else. The presence of material elements with their interactions and the change in energy presuppose the principle of the reduction of energy. The total energy of the Universe is unchangeable and always the same and this is not because the change is missing. It would be a contradiction and a “play of words”, to talk about energy without any change or exchange. By defining the concept of energy in such a manner the Universe would be unchanged and as if it were frosted and in the best case, its energy would constitute only a vast, homogeneous and empty space. The total energy of the Universe is unchanged and is always the same quantity, because the change and the decrease of energy are such that **all reductions are counterbalanced and the total amount of energy remains stable** within a maximum time interval. In the intervals in which the things are limited the total energy is always reduced and altered and thus (for this reason) matter exists. So, the total energy of the Universe manages to be stable simply and without imaginary laws, since the structural elements of nature maintain a permanent connection with the energy of a complete Universe. Free space exists for material things as something dark, stationary and uniform, while everything is connected in microscopic dimensions as rapid fluctuations in its balanced energy. Energy changes in the higher frequencies are presented as material carriers with smaller wave lengths in a tiny area of the free space. The rest of the energy of the Universe, which does not relatively fluctuate (or is kept in balance with a constant rate of fluctuation), is -for the material things- the finite space acting as gravity. The energy of the entire Universe fluctuates rapidly and the empty space has a role of string instrument in the "hands" of the principle that keeps the energy constant throughout the time (in the Tuni period). The poetic description of the free space in the lines above as a total amount, which trembles, is simplistic, but it is not dumber and more imaginary than the thought of the expansion of the free space. Imagine a tank of water that vibrates. This simple vibration of a single surface causes small waves to flow across the amount of water, which is bounded by the surfaces of the tank. **The common amount of energy is the simultaneous Universe that is presented externally as a vacant space**, ie relatively absent.

> The stability of the completed Universe (in the maximum time).

> Its simultaneous (direct) presence (the immediacy of its existence)

> and the constant amount of total energy.

All of these are prerequisites for the preservation of the wave structure of matter. There is a common basis which we cannot touch and which we detect indirectly as a unity of all the separate things and more specifically by the natural phenomenon of the gravitational field. The force of attraction and the gravitational field are not caused externally to matter, but on the contrary: Because a wave process of conservation of matter takes place and the energy of the space itself is transferred in the fastest rhythms of nature. The matter is presented with the same dynamic structure and the same relations within its structure in all the distances of the free space. Also, the gravitational field is correspondingly presented by the same ratio and by the same relations between mass, radius and amount of energy that is concentrated.

If matter, therefore, were a presence independent of the "specifications" of free space; if matter were within space with properties defined only externally by its interaction with neighboring matter and its presence were not directly related to the properties of the free space; if the space did not correspond to an amount of energy due to the presence of the completed Universe; then we would make some questions leading to a deadlock like these: Since the space contains so long distances without dense matter, why is there not more matter and celestial bodies? How is the amount of matter regulated? Which properties of matter do not allow its more frequent and denser presence? Why does the gravitational force not concentrate all matter around a single center? The explanation of matter as a phenomenon of wave changes in the energy of the space itself or as the dynamic mediation of the finite space prevents us from questions leading to a deadlock and such traps. So the search deals with the real phenomena, which can explain the big gaps in the allocation of matter. This is, because these space gaps "reflect" the amount of energy and time that is (relatively) missing from the developments in the material world... In other words, the "enormous" reality of the 100% Complete Universe is for us a "tremendous" possibility, it is an amount of energy for the infinite developments and the infinite things that we expect to be done. Their relative absence is called "empty" space. Everything we see or touch is the free space that we do not see and touch. What we see and touch and identify with a material is a complex of some points like a foamed wave, where the wave energy of the free space takes diminished and increased values (is oscillated) at an extremely high speed which fluctuates also rhythmically. It is the tip of the iceberg, as we would say. The microscopic wave processes, by which the material carriers are preserved, **create and maintain the free space** (with its dimensions) simultaneously and do not just use it. **The free space does not exist without matter and vice versa.**

The cause of the concentration of matter is the energy of the free space which returns and offsets the points in which the energy is reduced or the compensation is delayed. We detect and describe this reverse wave process as gravity effect. This process never stops. For this reason, there is a limit to the amount of matter that can be gathered. This limit ensures the conservation of the total amount of energy (the free space), since this quantity cannot be reduced all in just one moment. Then the free space would disappear and there would be only a quantity of matter, without gaps, we would say. In conditions of concentration of matter close to the limit of maximum gravitational attraction its structure is destabilized and the energy in the form of all the electromagnetic waves returns to the constant energy of the same space. Finally, when the structural elements form the celestial bodies, then the space surrounding the bodies is a stronger (gravitational) field, because more quantity of corresponding energy is derived (in a wave manner) for the matter of the body. This amount of energy is not available for another approaching body. Let's say that the dynamic space around the material bodies is depleted and is not suitable for food to the others. This means that the energy is diminished in the periphery of the bodies, because it is transferred to their centre of gravity. Thus, **bodies "prefer" areas of free space where energy is balanced and available so that their own matter can be maintained**.

<·> The wave flow of energy for the compensation of the reductions in the common ammount (free space) and its centralizing behavior explains rationally and simply:

· The formation of astronomical bodies approaching the shape of a ball. The energy returns centrally (or radially) from each direction and the structural elements are limited to their linear motion. So they approach each other from all directions.

· The existence of the gravitational field and the force applied amongst the astronomical bodies.

· The existence of the same field and the same law (a shared amount of energy of free space) for a large number of astronomical bodies, everywhere in the universe

· The preservation of the distance amongst the astronomical bodies and the relation of the gravitational potential to the radial energy transfer toward the body.

· The rotational motion of the bodies around their imaginary axis, since this concentration of energy resists linear motion and the bodies are compressed to a center.

· The independence of gravitational field from the chemical properties of

atoms.

8.2. The centralizing behavior of space towards matter and the gravitational field (reverse waves)

The force of attraction (with the constant of Newtonian gravity G) is isotropic to all directions. This force limits the space and time in which the structural elements interact for the formation of things. When many material carriers interact in the most direct and briefest way, they are connected through the least possible others, in the shortest time and the shortest possible length. So that the structural elements can interact in the most direct way and at the shortest distance, they must not exist in one direction (in a straight line of priority) but in all possible directions. Thus, the structural elements are induced in a spherical or circular shape and in repeated (periodic) connection modes. This is the ability to interact at a common time, the ability to synchronize, and to have a simultaneous presence within the space. By the simplest thoughts, **the role of radius in nature is linked to the phenomenon of synchronization**. When the energy flow of the space (the gravitational field) increases to an amount of material carriers, then the time and space in which the interactions of these material carriers occur is more limited. The possible ways of interaction are more limited and the material carriers approach as much as possible. On the contrary, moving away from the center of attraction is the surface in which the masses interact more loosely, in slower ways and changes and in longer lengths. These phenomena can be described simply and naturally, without the need for allegorical terms. The cause of the concentration of material carriers is the same that limits it: The energy of the free space that offsets the points in which the energy is reduced or the compensation is delayed. Since the concentration of matter cannot be increased boundlessly, the consequence of this limit (for the amount of matter, which can be gathered) is **the cause of the simultaneous concentration of matter around many separate centers within the free space and not just around one center** (for all the celestial bodies of nature)! An area of space would be special to the Universe and would be the focus of all the other material worlds if matter were created for the first time and as a whole. Equally, the gravitational force did not appear at first either at any particular time point or in a particular area of the free space by having the advantage of the priority or a separate area, as it has happened occasionally in human history. Moreover, this attractive force is limited by itself, since matter cannot exist concentrated in its constant structure without limits.

8.3. Summarizing the close relation between physical phenomena and free space:

Instructive observations for the research. The role of matter for the complex things is revealed when we think of a **Universe that is complete within the interval of a Maximum Period**. Then the totality is revealed as a constant quantity and limits apply to time and length. By a sequence of logical inferences we can think of more details and observe:

1) A finite space corresponds to the complete (in all possible ways) Universe which is not present entirely through material bodies (relative to the material world / nature).

2) The free space has a limit of longest distance (for things), that is the same for all the things (= a finite space being described by non-Euclidean geometry). In every point of such a free space there is a limit to maximum distance.

3) The max limit to the increase of length and to the longest distance (of free space) signals a threshold value of a minimal curvature. Respectively, the limit of a minimal length signals a limit to the increased curvature.

4) This finite free space offers simultaneously two opposing destinations to the bodies: the departure and the approach.

5) The distance in the free space is also a distance (delay) in time (because inevitably, the distance takes a time to be traveled).

6) Given that a maximum speed exists, the limit to the increase of length is also a limit to the maximum time of an interaction. The limit of minimal length also signals a limit to the minimal time of the interaction.

7) The empty (free) space is connected dynamically with the structural elements, because the free space is identified with a constant quantity of energy, while the structural elements are identified with fluctuations of this constant energy.

8) We infer the direct relation of the finite space with the structure of matter (simultaneous for the totality of matter) and its wave behavior. The visible mass has a permanent relation to the invisible wave changes. These wave phenomena include at part the known electromagnetic phenomena and the gravitational field.

9) We infer the isotropic / equivalent conjunction of free space with the material things, since there is no absolute beginning and termination of its finite length.

10) Such a free space, which is relatively finite (as the surface of a sphere without radius), can form everywhere with its fluctuations the same structure of matter. In other words, the finite and dynamic space behaves like a (common) center to structural elements in microscopic dimensions.

11) The energy of free space is in a state of equilibrium and when this equilibrium is disturbed, then it can be reverted to the state of balance in the minimal time.

12) A change of energy is caused when the energy is transmitted or disturbed (waves and oscillations).

13) The tendency of space to transfer energy in order to compensate for (counterbalance) the points where the energy is decreased. When the energy of the free space is disrupted, then the energy transfer can occur with centralized or decentralized waves.

14) The presence of matter and particles is considered to be moments in the change of balanced energy (fluctuations of the free space), due to certain conditions where the energy replenishment is prevented or delayed. (The flow impeded and delayed and stationary waves). Since the structural elements derive from waves and dynamic processes, their presence is accompanied by some permanent microscopic energy fluctuations, such as heat and other microscopic fields.

15) The structural elements are needed also in the case of the completed Universe, because the energy is dynamically conserved. The fastest changes and their synchronization are achieved by matter and thus combinations of particles are achieved (more indirectly) and separate things are created.

16) However, the structural elements alone do not create the things, since they are fluctuations of a total and communal amount.

17) The structural elements are neither autonomous things nor indivisible or immutable quantities, they do not approach accidentally each other and they do only after exterior actions.

18) The structural elements are periodical changes with the presence of a common quantity, while these changes are realized in extremely fast rhythms. Without that common and balanced quantity the structural elements would not exist or have their specific attributes. Matter near us or far away from us is connected with something common, with an energy amount and in such a particular way, that matter maintains everywhere the same structure.

19) The specifications of every atom of the matter are not accidental. The configuration of matter and the same specifications of atoms everywhere in the Universe (in enormous distances) are not coincidental and do not derive

from an accidental " copying " of the atomic structure. The separate atoms of matter are connected and conserved together with a common quantity, with the invisible presence of balanced energy. Microscopic forces and motions are created and regulated by their common energy. They are not a lot of separate forces in each one microscopic atom of matter...

20) The timing of microscopic particles and their formation in material things (bodies) of the visible and astronomical world (even for a short time interval) is not achieved accidentally and coincidentally. This is, because the beginning of the microscopic structure of matter (and the energy by which it is maintained) does not emanate externally from the transfer of energy to space or from motions of some bodies.

21) All the physical laws are enforced because the Universe is complete and stabilized and exists as a balanced energy for matter and for the interactions. Certain constant proportions (laws) are enforced for the materialization of the invisible total energy (of free space, so as it appears to us).

These previous theoretical thoughts and observations can be inferred (and so they have been deduced rationally) without any mathematical calculation. The only trap is to think of the change of energy of the free space simply like the flow of a liquid. In contrast to the mechanical inertia, which is the resistance that a body exerts against the change of its movement, the free space has the ability to return rapidly to the original state of its energy balance. This is achieved because the free space is not in a zero motion / change state in advance but it is in equilibrium “in a wave mode” instead (like the standing waves). **The free space is in balance because it oscillates at an extreme high frequency (pulsating in most microscopic lengths) and not simply because it is something motionless**. This was a postulate in the cosmological theory of a Complete Universe, that was deduced after the first mathematical investigation (in 2008). There was a need to explain the following phenomena:

1) To interpret the very fast alterations in microscopic lengths, which do not begin from the motions of the big bodies and do not synchronize owing to them, but they do due to their immediate connection with one common quantity.

2) To interpret the maximum speed of the wave disturbances of the free space (the speed of the light), because these waves do not appear to begin from null speed such as the motions of visible bodies.

3) Finally in order to correct the meaning of "mass". The creation of structural elements is interpreted by wave phenomena (of fast and repeated motions) and can be described without the term " body or particle " and by

avoiding the units "kg".

<·> Global space has been explained as a finite quantity as summarized below:

· Due to the correspondence of the physical space to a stabilized universe, which is in all possible ways within a maximum time.

· Due to the correspondence of a maximum length with a maximum time for all things.

· Due to the correspondence of the space with a total amount of energy and the explanation that the shared energy quantity is a balanced quantity (an explanation that matches the isotropy and the equivalence of the free space to the structural elements).

· Subsequently, because of the isotropic connection of the structural elements of things with the space as if it is their common center and since the explanation of the structural elements as fluctuations of a shared amount of energy.

· Because of the energy concentration and decentralization phenomena that have the characteristic of a radial movement (gravitational field and electromagnetic radiation).

· Eventually, this finite and isotropic space fits with the observations on the limit on the quantity of matter that can be gathered and about the rotational movements of the astronomical bodies (since, they are not rectilinear).

• Already since the 20th century, some researchers have been expressing thoughts and opinions about the decisive role of the free space in the structure of matter. The clues and paradoxical phenomena have multiplied because of the modern research, and some physicists have recognized the impasse of a physical interpretation of the structure of matter if we begin with separate particles. However, all these advanced thoughts are not able to interpret the presence of the free space, transferring again the problem of the creation of matter to be solved in the unknown future! No one explains, even in general, how the free space itself participates in the formulation of the structure of matter,

how the free space has its attributes

and for what reason it has this dynamic relation.

If some researchers thought of the free space as a common quantity of energy (even without mathematical language), then their contribution for

the cosmological research would be more useful and original. But all researchers were looking for a solution having in their mind... particles and kilograms.

The material world is not the result of a previous process that has taken place in the past and is now continuing without those initial conditions. The material world can not exist without its simultaneous connection to the Universe that seems to be shared over long distances. The completed Universe is always present and relatively absent as a free space and matter is oscillations of its balanced energy! Thus, energy changes do not occur asynchronously, only by the occasional interactions of individual things and exclusively by mechanical motions. Therefore, the relation between matter and free space is a result of the inseparable relation between the material nature with a cosmos that is absent. But **the cosmos, which is absent, participates in the energy of material nature through the microscopic structure of matter** (in the regular form of the free space and by wave phenomena)**.** Its presence is not detected by exterior change, because **it is altered in the shortest time intervals.** It is not altered in long time intervals, where the material things move and each one exists in relation to another, while the most complex things are created at a slower pace and by slower interactions (by slower exchanges of energy).

9.0. The isotropy of the free space and the stability of the total energy

One can easily imagine the Universe or the total space having a spherical shape so simply and inexplicably or by intuition. In the ancient times and even in primitive myths some people considered the globular and oval shape to be more suitable for the whole world or for the beginning of creation. In the ancient Greek philosophy, the choice of this form was supported by logical thoughts such as in *Plato's Timaeus*. All intuitions come from some observations and thoughts that seem to strengthen our views. However, these observations and our thoughts were not recorded carefully, we did not think much about them and we do not remember them well. We remember a bit, that some things look like they are together, that some events are connected and repeated and we estimate hurriedly that a good explanation is given. Thus, the spherical shape really stands out from the other shapes because we do not see any angle or protrusion. We do not see a point on the spherical surface that we remember in relation to another point. Together with this observation of uniformity, we notice that if we chop the sphere and think of its inner depth, then we will find a single point that equals the same distance from the uniform surface and we call it a center. Uniformity and the lack of a particular point on the surface of the sphere is linked to the single distinct point of the center, which is not so quickly and precisely visible regarding other shapes that have many angles.

Therefore the spherical shape can be attributed to the Universe and free space by intuition or as a simple view so that some reasonable explanations can be given.

"The Universe does not interact as a part with other things. This is the same always and the sole cause of itself and it is not as something external to any environment. It is immobile and it is not inside what we perceive as an empty space. From such a simple thought we can deduce like *Parmenides (c. 515 ~ 440 BC)* that the Universe has no volume, no temperature, no weight, no shape or dimensions, and it is not in any direction or distance. These common features and attributes, which appear in the perceptible things, there are only externally amongst the things with their relations and with their interactions. Directly and regardless of relations there is only one substance. To ask what lies outside the Universe, it is as silly as to ask what lies behind the imaginary mountains that we see on a painting".

The previous thoughts within the quotation marks were formulated in modern times, but similar thoughts have been made by many philosophers. However, we do not think of the necessary relations of this geometric shape with the other space-time possibilities of the material things and with mo-

tion. It is not clear what the necessary relation of this shape with nature is. From the thoughts that have preceded our physical interpretation of the complete and stabilized Universe, we can understand the necessary relation of this geometric shape with the structure of the Universe and with the physical processes, perhaps for the first time. One of the first theoretical conclusions of our interpretation (about a complete and stabilized Universe, in all possible ways) is the concept of a common and finite space, with a limit to maximum change of position. **For every body there is the same limit of a maximum distance of change of position**. The maximum period in which the Universe is complete is also a cyclical phenomenon and is related to the wave (and periodic) movements occurring in nature.

The necessary relation of the geometric shape of the sphere and the circle with the existence of nature becomes more apparent, when the finite space described as an amount of energy which swings rapidly and is exchanged with the physical carriers (structural elements) in microscopic dimensions. This **total amount of energy is the same for all things, and all things exist by the same energy oscillations** of one and the same potential space. This amount of energy which is attributed (or corresponds) to finite space is the same for all things, regardless of where they are in space and at what time they exist. This means that all things are connected with the common quantity of energy (the complete Universe, do not forget it) anywhere in the space (isotropy and no separate direction) and at any time (maintaining isotropy in rectilinear time). In addition, all things exist by the same energy oscillations and the same numerical proportions with which these oscillations are regulated and many common phenomena are produced. Things cannot exist without space or cut off by the same amount of energy.

The amount of energy in the form of finite space is isotropic: This is not just as an external phenomenon lacking of separate direction. The maximum distance in a finite space is also the same from each point. But the free space has this property of its isotropy as a dynamic and inner phenomenon, because:

the total amount of total energy is constant

and begins oscillating and producing waves and particles

with the same fluctuations,

with the same amounts of energy being altered and exchanged.

This dynamic association of the constant total energy with matter, which is altered and regulated by the same fluctuations and numerical relations is also a "isotropic" phenomenon. It has an equivalence and the same conditions. So the phenomena of the structure of matter are produced at the same rates and ratios. That is, an amount of energy is regulated by the same

change limits, in the same ways, with high velocities and microscopic dimensions, and therefore an amount of energy is identical toward any created (and relatively separate) thing. We chose the composite word "isotropic", which is used by modern researchers, because it clearly expresses the notion of equality along with the concept of the way, that is associated with the motion or with a dynamic process. In our general interpretation we could use other words, such as "uniform", "symmetrical", "neutral", "equivalent" and others. We would not draw wrong conclusions, simply because our thought would be stuck with an inflexible definition of a word like the bureaucrats or the software that operates with errors by being unable to overcome a small difference in code, since it was not programmed for such a deviation.

Theoretically, we observe that the word "isotropy", which we consider to be an adjective of the finite space is not limited to static and external relations amongst things. The sphericality of the finite space is related to the stability of the total energy of the completed Universe. It also serves to implement the laws of motion, since it thus creates and regulates the material carriers of things by fluctuations of one and the same quantity. Every celestial body could have its own random shape and form (pyramid, polygonal, triangular, random and irregular shape, random dimensions) and move in a polygonal line and their velocity could alter randomly (and their distances between them could be random, also). Galaxies and galaxy clusters could have extreme and more differences in shape, size, structure, mass, and sudden transformations every day. Wondering why this is not the case? In the field of science such questions are usually pointless and have no priority. They accept some phenomena as comprehensible data and even worse, as coincidental, that do not hide anything great. While in many cases the opposite is the case, nature reveals its choices through the most obvious and coincidental phenomena. In the last decades (20th century), despite the opportunity to provide a mature scientific answer, some modern researchers have given a silly "explanation" (namely that uniformity existed since the beginning of a Big Bang). Instead of explaining these observations (uniformity, isotropy, periodic phenomena, laws) they accepted them without them being foreseen in their theories. But in order to interpret the peculiarities of the physical cosmos they had to devise small anomalies within the great anomaly. How do electromagnetic waves and gravity appear simultaneously in all directions and in reference to a radius length? It is not self-evident that these widespread actions, which accompany all the bodies of nature, should occur in a circular and spherical manner. A free space, without a dynamic connection with the structural elements and with dimensions defined by straight lengths, would not impose the role of the radius for the spread of the waves. The radius into action in distance would be a random effect.

The distance in free space is not just distance as increment of length and for the change of position of bodies. **It also allows for the approach of things**. The distance in free space is also direction, that is, a "concentric" multiple distance, in other words, **radius**, and this is not a random phenomenon and is not irrelevant to the structure of matter. The possibility of direction in finite space is the **possibility to interact with many elements simultaneously** and in the shortest way for multiple elements and not just between two points. This possibility is offered to matter as a spherical distance (ie as space for divergence and approach at the same time) because the free space is the beginning and the end of the structure of matter and matter exists as a rapid oscillation of its own energy. The space is the same principle and the same amount of energy for the existence of all material entities. This equivalent relation of the common space to matter, regardless of location and moment is called isotropy and uniformity. The isotropy of the free space is a dynamic phenomenon related to the possibility of the simultaneous action of many structural elements in a state of equilibrium, with a maximum length, with radius, circle, and sphericity for the structure of nature.

A specialist clearly separates one phenomenon from another with some different words and would probably have an objection. In order to anticipate their objection, the shape of the free space is not exactly like the three-dimensional geometric shape of the sphere. We conclude this from the thought (reductio ad absurdum and from general principles) that if the free space had a common center towards its maximum circumference or its total surface, then the material world would not have the same matter, the same physical processes and the same natural laws. We would have all the references of an uneven distribution of astronomical bodies in space and of worlds made by different matter depending on the direction of observation. Above all, however, we have concluded the lack of a common center (deductive reasoning), because a finite space without the possibility of unlimited length for motion cannot have by definition an unlimited straight line of distance. So what would be the end in a finite free space? Would there be an obstacle? The only way according to which the increasing of length could not be unlimited while the distance in the free space doesn't have an obstacle is to think that the length cannot be straight. So that the free space can be finite, without end and without a border where the bodies would stop moving, this free space must be of limited volume. We can imagine it as an immaterial sphere. So that the increase of length cannot be boundless, while the distance in free space has no obsacle, we can only think that the displacement cannot be a straight line. Bodies can move without stopping, but their distance cannot be increased without limit. This is similar to the possibility to travel endlessly on Earth's surface, but we will never go further than the diameter of our planet. The increase of the distance

– for every body – deviates from the straight line and has a curvature. The free space has no unlimited length as diametric and straight, so no body can be a common center to all other bodies.

We use the shapes of the sphere and the circle as a first approach, because they are the most familiar, well known and visible shapes. Some mathematical relations apply to these shapes, which we observe in many dynamic phenomena and in periodic changes. We detect these proportions in particular in the microscopic phenomena by which nature is created and maintained and we describe it with wave processes. Some relations and proportions such as the center with the circumference, the radius, the arc, the chord, their lengths, and the angles formed between them and so on. If we think of these shapes as being retained dynamically by certain movements, these same relations describe velocities, spins, periods, frequencies, phases, tensions, time intervals, and many phenomena that seem unrelated to each other. So, look why the spherical and circular shapes are so important for the interpretation of nature and not one of the many fantasies of philosophers and illiterate people.

Since the beginning of this theoretical research effort space has been considered to be an unexplained phenomenon. The fact that it has three geometric dimensions needs also to be explained. As it can be inferred by the above brief thoughts, the isotropy of the free space is described and interpreted by motion phenomena and is associated with measurable quantities, such as the one of energy. The isotropy of the free space in the interpretation of a (complete) Universe in all possible ways and always the same is neither an axiom nor the starting point of the interpretation of nature. This isotropy emerges from and is interpreted by other fundamental concepts, which are logically connected with each other for the first time with the prospect of explaining a multitude of phenomena by the use of deductive reasoning. First, certain concepts have been identified, namely concepts of stability, period, total energy or complete universe, equilibrium through recurrent movements (not absolute immobility), the concept of direct connection between the part and its total. Via deductive reasoning the isotropy and the uniformity of the free space (which have been empirically defined) are reduced to the first fundamental concepts. For this reason we can think of more consequences than if we viewed the free space as a static and exterior uniformity. Fundamental concepts and relations, some of which we have just mentioned and which are logically connected are the following:

- The concept of a complete or simultaneous Universe (relatively, within a maximum period of time).
- The maximum period in which the Universe is in all possible ways.
- The concept of a total quantity (or common substance) and its per-

manent relation with the parts.

- Cyclical time, period and pace in motion.
- The stability of the whole or of the total energy.
- The concept of starting in short ways without the whole being missing.
- The concept of structural elements as the relative absence of the Universe (ie the minimal reality with the removal of almost the whole world).
- The close relation of the structural elements with the fluctuations (variations and modes in general) in the fixed quantity of the total energy.
- The fundamental distinction of wave motion, followed by a number of known phenomena.
- The minimum and maximum limits to the fluctuations (of the sizes) from which averages, the world physical constants and many other first universal concepts result. They are general concepts (of global phenomena) on which only a few hurried philosophers could concentrate their attention for many years with the same zeal and great expectation as some researchers do with their eyes on external things and with the most difficult experiments in a laboratory.

9.1. The gravitational field

Gravity or force of attraction or gravitational field is a generalized phenomenon inseparable to matter (physical bodies). This is, because matter is from the beginning a "process" in the transfer and in the fluctuation of an amount of energy which is present as a common and isotropic space and which is inextricably linked to the structure of matter. Where there is accumulation and concentration of a quantity, some detachment, diminution and decentralization occur at the same time and vice versa. Hence, the presence of matter is inseparable from the gravitational field that is manifested as a force of attraction amongst the physical bodies, while the "source" of gravity is the space itself. The direct and common energy of the finite space exists as a flow to all material things (gravitational field) and in the same fastest way (as imposed by the simultaneous presence of the free space for the return to its stabilized state). The cause of concentration of material carriers is **the wave flow of the energy of the free space for the compensation of its deficiencies,** which are presented as material carriers and as local variations in space energy. The gravitational field restricts (what does it mean that it “deforms”) the space and time into which the simpler elements interact with each other, while it also restrains their movement (within the gravitational field).

This is, because all things and the material carriers themselves are extremely fast ways of change of a total amount of energy and certain moments in the transfer of this same energy. The reason why the spatial energy affects all of them regardless of their quality, form and their composition, as it is known in physics, is the fact that all things do not differ in substance and exist by such fluctuations. That means that they do not differ in substance regardless of the way and the time that they exist, they are made and combined, irrespectively of the energy that they exchange and regardless of their quality and their external distance. In other words, gravity acts on the mass irrespectively of the chemical composition or the type of matter, as it is known and here deliberately reiterated in another wording. The field of gravity behaves without discrimination of things due to their chemical composition and morphological differences and causes a mere acceleration in all them. That is, gravity has a so simple behavior that allure us for a simple explanation. If one had predicted this phenomenon, then his thinking would be as childish as if we thought about the free space as were a quantity of liquid or an elastic surface. This phenomenon is explained because the presence of a body (localized as a body) occurs with the energy, which derives isotropically and equally from the common space. Consequently, the gravitational field can be considered to be the spherical (or radial) space from which spa-

tial energy derives isotropically and concentrically to maintain and create matter.

Modern researchers need to talk about the multitude of phenomena they observe in the Universe according to the same physics that they apply near the Earth. For, if at the laws of motion and of the structure of matter change at the distances they observe, then the observations will not interpreted correctly and the calculations will be misplaced. If the relations of physics are disputed at longer distances or in the future, then nature research will be discouraged, will be in vain and many researchers will be left without job. Therefore, they accept philosophically some phenomena as secure data (uniformity, isotropy, periodic phenomena, same laws) and they are right. But it is provocative when they accept them as symptomatic phenomena that do not hide anything significant. It is even more provocative when they downplay the rationale of the philosophers who dared to talk about the whole of nature from some their local observations.

We all know that the steady world, in which we spend our lives, is a planet that does not rely on anything solid. In the beginning of the essay some questions were raised, which a reasonable person would ask if they were informed very briefly, that the division of matter leads to tiny particles which move and interact at high speeds or in very short intervals. How do tiny quantities, which are moving incessantly, acquire a more complex and stable form? Also why does the mass "ignore" the force of attraction and manages to keep it is extended by its own internal movements? And from where do the fields appear in the microscopic space of every atom? The first logical answer, which can be given by little thought is this answer we have just achieved by interpreting the close relation of space energy with gravity, and its isotropic concentration with the presence of matter. The velocity and the movement with which the mass is generated or maintained through the microscopic energy flow is not a velocity of linear motion within the free space.

· The high speed of motion.

· Oscillation, rotation and alternation.

· The high frequency of transfer and fluctuation of wave energy within the structure of matter.

· The synchronization of action at microscopic distances.

The above facts are basic preconditions for the creation and maintenance of the mass of the structural elements. Along with these phenomena we note with particular interest the phenomenon of concentration of the waves that transfer elementary amounts of energy. Gravitational attraction is a result of the energy that is derived into this inverse wave process from the free space

itself, a process which is caused by wave phenomena and with the properties of the free space. Unlike the decentralized motion of the electromagnetic waves, which move away from a center, the gravitational waves approach a center and we know that there is a minimum length (λ_{min}) of the Universe. So, the phenomenon of the concentration of waves is quickly interrupted and we should search for what happens at the moment of the end of the concentration of the wave energy.

One of the first questions regarding the investigation of the relation that gravity has with the structure of matter and electromagnetism is: How small can a material body be or how little mass can a gravity field have and in order to exist? Do atoms of matter have a (extremely weak) gravitational field? Because the force of this field is perceived by the celestial bodies, it is easy to think that this is an insignificant force and thus we should not search for it in tiny things, when we know other forces that obviously affect things. This logical thought impedes research by drawing a conclusion from the magnitude of the force and from the role of the gravitational field in the celestial bodies. However, the gravitational field is neither a random phenomenon nor a detail of nature. Of course, this is, first of all, because the insignificant gravitational field of the ordinary things that we use in our daily lives proves to be important for the structure of the Universe.

However, the most important thing for research and cosmological theory is not the magnitude of the force of attraction and what it can cause externally. The most important is to explain according to which processes this field is created and how these processes are associated with certain other phenomena, which also accompany matter everywhere. We have succeeded in thinking about what to look for in order to investigate this phenomenon and to solve great unresolved problems. All logical thoughts and observations of the phenomena show that the phenomenon of the gravitational field, can exist everywhere and accompany all material things because is created in microscopic dimensions. We have to look for the answers in the structure of matter and in the wave motion phenomena that we describe.

9.2. The relation of the maximum time period (or the age of the Universe if you like) **with the amount of matter**[3]

We have said and we will always remind the reader: The Universe of the largest time period (within which the Universe is complete in all possible ways) is absent relatively, but it is involved in material developments as a whole. The Complete Universe participates in the proceedings as a total amount of energy, which occurs in the form of the finite and isotropic space, that is, with the shared possibility of the maximum distance for the material bodies. For this reason, **the limits of the maximum possible distance are proportional to the maximum time period**. The Complete Universe participates in the proceedings as a total amount of energy of a maximum period of time, and **the maximum time period is in proportion to the total amount of energy**, as well as to the length limits of the free space. These are fundamental relations of nature that predetermine the amount of energy that can relatively decrease in the unit of time (and the speed that can be reached). In other words, these are fundamental relations which predetermine the number of the structural elements that can be created in the unit of time (since the structural elements correspond to the decreases and fluctuations of the common energy). The Universe is completed in a maximum period and with its total energy (which appears as a free space). The minimum moment of the Universe is not an only moment, as it should have been, if the Universe really had begun to be created and with long-lasting processes. The maximum period is divided in a number of minimal moments, which appear in nature with the periodic fluctuations of its structural elements. **The limits of a maximum period and a total amount of energy are associated with the minimum limits in time, length and amount of energy**. Thus, they predetermine even the properties of the material carriers (structural elements). That is why the number of atoms which are present in the entire space is not irrelevant either to the limit of the maximum distance of the free space or to the age of the Universe (that is, the maximum time Tuni in which the Universe has all its energy).

By the initial thoughts of the physical interpretation of a completed Universe within a maximum time period and of the closest relation of time to the variable things (to the principle of the minimum time in abstract matter) have we already understood the prospect of linking the maximum limits with the minimum limits. The length, the radius, the acceleration, the curvature, the periodic motion, the variation of the energy and the limits in their

3 The general explanation also of a known strange coincidence... that has been commented by earlier physicists

change are obviously related to the phenomena of gravity, electromagnetism and nuclear energy. We expect the most surprising conclusions to emerge from this engagement and to calculate easily the mathematical relations between these phenomena. This is the logical and scientific approach to the solution of the great mysteries of the Universe and not the random attempt to conduct experiments, observe the celestial bodies and wait what will arise by chance... Our initial reflections are not clear and do not provide answers to our important questions. But they guide us and tell us what phenomena and what relations we need to investigate more carefully and stubbornly.

The relation of the free space with a total amount of energy in which wave changes are caused opens the way to link the maximum limits of the Universe (mainly the length and time) with:

- The shorter wavelengths.
- The fastest changes in nature.
- The shortest time intervals.
- The amount of the energy of the particles.
- The presence of stable particles in the structure of matter.
- Microscopic forces and energy exchanges between material carriers.
- The fluctuations of sizes.
- And a variety of wave phenomena in the invisible lengths.

If the maximum time period of the entire Universe were shorter then the same amount of matter would be shared in a space of lesser distance or the amount of matter would be less. A shorter period of the entire Universe would mean:

- Faster compensation for decreases of energy (in shorter minimum time Tmin). But also the delay of the compensation of energy would allow it to be lost and be reduced more quickly.
- A higher limit to maximum speed and frequency.
- Smaller space and distances (since the free space corresponds to entire energy of the full Universe).
- Structural elements with faster rhythms and higher energies or vice versa (due to faster compensation).
- More intense concentrations of matter and astronomical bodies.

- Stronger gravitational and electromagnetic fields.
- Fewer and faster developments.
- Universal physical constants would produce results according to the above phenomena.

In this case, the matter could surely not have the same structure and would not exist in the same quantity. The amount of the structural elements would probably be less and would have a larger mass number. Generally, the amount of matter in the finite space, the range of reduction of the space-energy, the period of wave phenomena and the rate according to which the particles are created and by which the structure of the matter is formed, depend predominantly on the amount of energy which corresponds to the free space and over the maximum period. In general, the energy of the free space "flows" in order to be balanced and its rapid flow (at certain extreme rates) creates and retains its decreases, which we call particles and "matter". So, the presence of the free space is not the random result of the external connection of the material things.

10.0. Summarizing the close relation of matter to motion

A multitude of phenomena, properties and relations about the structure of matter have been observed by research of at least a century. These observations have confirmed the general finding of many philosophers, that the structural elements that we call "matter" are neither separate and closed quantities nor tiny things that are regulated by their external interactions. By the first rational thoughts of our cosmological explanation (starting with the fundamental concepts of the whole, the part and the change and balance) the following findings have been inferred:

• The so-called matter (structural elements) consists of the original ways in which the entire (and without mediation) Universe begins as an indirect and external existence. The structural elements are the minimum moments of change of a (constant) reality, which is complete in advance within the limits of a maximum time period. For this reason, motion is inseparable from of the mass and substance in the microscopic space.

• The multitude of structural elements is absence of reality, since they are less complex than the larger things and they are the minimum quantities.

• Structural elements as simpler things cannot simultaneously create many interconnections with a large number of things like the more complex things.

• Their structure, their stability and the ways that they act do not depend only on the occasional environmental actions. By the first thoughts we noticed and suspected that it is more sensible to investigate how the same forces and the structure of matter occur by the energy fluctuations in a constant quantity.

• The maintenance of structural elements (or matter) reveals despite dynamic relations, fast processes and permanent mobility occurring in tiny quantities of their structure (and in interaction with each other) as unlikely the fact that they are formed by external actions and interconnections. Time, rhythm, length, angle and synchronization are key determinants of the structure of matter. The visible things appear to have more “flexible” time intervals, more variations in their behavior and shape, with unnecessary and random movements and without a constant rate.

In the cosmological theory of a Complete Universe or the Finished Time, where Philosophy meets the issues and problems of modern physics, the interpretation of the nature as a unified whole and synchronously as particles gives the solution. The solution is provided by the natural and wave role that our explanation attributes to the finite and dynamic space,

namely as a balanced quantity of energy.

<·> We took into account the information which we obtain from the scientific experience. We observed theoretically, that we discover the relation of stability with fast and circular motion after multiple division of matter and in most microscopic space, instead of some stable minimal mass quantities and a clear end to independent and stable components.

<·> The subatomic matter cannot exist or have a structure with no movement. The essence of the microscopic materials, the components of the so-called matter are made by an energy sharing, by some energy exchanges and not as something compact and unmodified (as if this were a static substance). However, we perceive this rapid transfer and exchange of energy as moving particles and in individual moments (through quantum of energy, which interact momentary with that rapid exchange). In the structure of matter it is not possible that the "thing" is separated from its motion, because the thing is created there in the "depth" by some motion and the "thing" does not exist as something separate and complete.

<·> Taking into account the data of micro-physics and astrophysics we also noticed that the stability in rapid tiny movements, which are made in the structure of matter (at a large extent in space, in the depth of time and under very different conditions) cannot be explained by the energy and movement of the external (and random) actions.

<·> We concluded that the principle of the microscopic structure of matter and the energy which maintains its structure is not derived from transfer of energy through space, from movements outside of the matter and from composite bodies.

<·> We concluded that matter, either nearby or far away, is associated with something common, a common reality and even in such a way that matter retains the same structure everywhere. The conservation of matter is made by internal processes, that are everywhere the same. Matter has and maintains its structure by the same laws throughout the space and these processes are associated with wave phenomena such as the light. The microscopic motion, by which the structural elements are formed and retained, is a periodic, alternating, rhythmic and has all the features of the wave motion.

<·> Analyzing by rational thinking the phenomenon of inertia as it is shown by the relations of Newtonian physics, we said: If mass is a phenomenon caused in general by the change of a motion and by the continuation or repetition of this change, then mass is not a different phenomenon than the motion itself, speed and force. The mass begins from the general phenomenon of inertia and delay, which is not missing from the motion that has a maximum speed limit. The most obvious difference between mass in

tiny things and the mass of large bodies is in the speed and rate at which the particles have their inertia and at tiny lengths/distances.

<·> We have concluded theoretically, that the energy of the free space "flows to fill the points" which have reduced energy and thus to be balanced, but this flow creates again and maintains its reductions (because energy is absorbed from elsewhere by the flow of energy). The points in which this phenomenon of regeneration, feedback, conservation of energy and balancing process rapidly occurs, are initially presented as e/m waves. This is, while the more intense fluctuations (we investigate for more details) are presented in the form of particles and eventually as "matter." The things are constantly connected with a common space, which must be a finite space and exchange energy with them, in the smallest lengths and shortest intervals of nature.

<·> By the finding that the empty space is permanently connected as an amount of energy with the structural elements, and that this energy is balanced with the maximum speed and rhythm of nature, we attained the theoretical connection of physical phenomena. However, this connection of natural phenomena has been sought by simplifying the concepts: We started with the general concepts of motion, time, length, quantity and the periodic variation. The minimal deceleration in fluctuation of balanced energy (of free space) displays with a short delay a maximum pace of retention / balance of this energy. This pace of maximum fluctuation seems to correspond to the maximum speed c (ie to a minimum time in which the free space returns to the state of balance). We detect this fluctuation, which occurs with minimum delay, ordinarily in the e/m spectrum. In lower decelerations we detect the e / m fluctuations of more low frequencies. In increased decelerations we detect the higher frequencies of the electromagnetic spectrum, as the visible light and above. In more increased decelerations, we detect the fastest fluctuations (which have shorter wavelengths) as momentary particles. The common space is the core of e/m waves and of all individual structural elements. The light is not the motion of some particles, but the oscillation or fluctuation of the space itself. We measure this fluctuation slightly reduced in the spectrum we perceive[xv]

We have achieved a lot of theoretical observations and important findings after investigation about minimum and maximum limits in physical proccesses by taking advantage of physics and by certain initial calculations:

After the analysis of global physical constants c, G, h, in obvious relations of length, time, change in speed, of rate and energy.

After the introduction of the minimum and maximum limits to changes of sizes (and dependence between them).

Eventually, after the unknown mathematical correlation between inertia and speed and by the important observation, that this respective speed is paradoxically associated with the speed as we calculate it according to the known relation of the gravitational field $V=\sqrt{(GM/\lambda)}$. We will see this correlation later in the treatise.

The microscopic structure of matter itself reveals the wave motion of free space and the relation of free space with the creation and conservation of mass. Until now we have not understood this, because we have been observing the material world and the phenomenon of mass as clearly individualized phenomena (bodies) and as if they were dependent only on external forces. A lot of phenomena (eg electromagnetism, restless particles, subatomic forces, quantum interlocking) are revealed by the observation of the structure of matter and by theoretical thinking ,which cannot be described like the material bodies, namely as some amounts of matter moving at some speed and traveling unimpeded until they meet some external force. We proceeded to a consolidation of more phenomena through the more abstract descriptions of phenomena. Thus, the different phenomena in microscopic dimensions are revealed as phases and time moments in rapid periodic variations or moments in which the balance in a common quantity is disturbed.

Given that we describe the motion more generally without introducing the concept of the body and the mass, we encounter certain same phenomena, which we thought they were impossible without a material body: Phenomena such as inertia, potential difference, energy transferring, force are never missing from motion in nature. Motion gets new features when we still add certain remarks such as the angle, repetition and synchronization. Furthermore, motion is revealed as a variety of phenomena unrelated with each other from a limit to the speed and variation of motion - which are also time and length limits. Motion may seem like immobility and immobility may seem like something moving. But this hidden identity of the different phenomena is revealed to have the most diversity in shorter lengths.

The wrong direction (and with random observations) of modern research is revealed by a known query. Modern cosmologists raise the rational question: How do all the different parts of the Universe were able to synchronize the beginning of their expansion and to evolve in all directions according to the same laws? This called "horizon problem". They attempt to avoid the problem by the theory of an inflationary Universe. They claim that the expansion was faster than light at the beginning of the cosmos and for a brief interval. Here we have formulated the question somewhat differently and more aptly: How does matter have its structure? How are the laws applicable and how is matter not dissolved, but the same matter is rather formed in the depth of space and time? How is matter distributed so creatively and ac-

cording to laws and thus preserving a global balance? Matter is displayed at distances of billion light years with the same particles, charge, masses, nucleo-synthesis and other processes etc. It is not obvious that tiny amounts manage to form bonds and have properties. The stability would be a rare phenomenon, if not impossible, and any sequence of things could not exist. The fact, that there is a material body in a position and has a form or that the particles are particles with properties is an inexplicable phenomenon. In order to explain this fact **laws are needed, which are not based on any body or in individual particles**. When we say abstractly, that the laws are applied to nature or that there are laws in matter itself, then we conceal a multitude of phenomena, which are investigated in modern physics. Matter is an unimaginably large amount of components (structural elements). Is the origin of laws in every tiny component separately? Does every individual particle have within itself the same laws that all the other particles have? How do the laws stimulating every particle act in such a way that molecules are formed after the meeting with some other particles and new properties and things are created that have duration? How does every particle have the same settings or how it is mobilized by the same laws mobilizing all the other particles? The subdivision of bodies reaches some minimum quantities. Are these quantities initial for the cosmos or are they in the end of a theoretical division of the cosmos?

Nobody is persuaded, how something starts randomly or by a plurality of individual things, and even more improbably by tiny and invisible things like the particles, which all together manage to be arranged and be combined complicatedly for a long time. Nobody is persuaded that they are combined in such a way that laws ensue, balance is achieved and the particles to be creative and constructive over time. All philosophers, who tried to explain the beginning of things and the laws of the world, encountered the same difficulty. Modern researchers have been stuck until today despite the most advanced knowledge and the most developed organs to this point: How are the laws introduced and moreover, in an endless cosmos and in unstoppable motion. If we cease our effort by making the general statement that the cosmos is governed by laws, then we will overcome this theoretical problem. This is similar to how some modern researchers have overcome the theoretical problem of how the Big Bang (which created the space-time) was realized, when they say, that the laws of physics had not applied before such a moment of total creation. They accepted a conjecture without rational thought but then relied on logical thinking to conclude that physics is canceled. Indeed it is neither obvious nor enough if we say so abstractly, that the material cosmos is governed by laws. This is a simplistic thought for children, which is similar to when philosophers were talking about matter, without saying anything about how it has structure and its properties and

how a multitude of phenomena is produced by the mobility of molecules. We have to stop this identification of cosmos with matter. The cosmos as a single and complete total is something unique and opposite to matter. Matter is just few pieces of the puzzle or as a young man had written: Matter is a lack of reality or it is a minimal reality inside the full Universe. According to us, "same structural elements" throughout the global space, it means "same energy fluctuations" and "same processes" to restore balance.

Part 2
The universal physical constants and mathematical limits. Rational investigation and first calculations

11.0. The first steps for the most successful interpretation of the structure of matter and the limits of the Universe

<·> The total quantity of energy is the same for all the things and all the structural elements and takes shape with the same fluctuations of energy in one and the same dynamic space. The free space neither expands nor shrinks. The free space is a communal and balanced quantity of energy with fluctuations, that create phenomena of centralization and decentralization in the isotropic transference of energy with waves. The free space compensates with the fastest way (almost c) the deficiencies of its energy, the deficiencies that constitute the material world. But the wave flow creates again extremely fast certain deficiencies in order to compensate for the past deficiencies and so it maintains the material elements. The centralized transfer of energy explains the phenomenon of the gravitational field, while the decentralized transfer explains the electromagnetic field.

· Electromagnetic fluctuations and fields.

· No restoration of the equilibrium, wave phenomena, synchronized changes and stagnant situations.

· Particles and their interactions.

· Gravitational field (a reverse wave in the process of energy transfer).

All the above are inseparably included in a broader process where energy varies at the fastest rhythms in order to return to the equilibrium. Whatever happens in the microscopic space, which we can observe very indirectly, using sophisticated instruments and computers, is nothing more than elemental changes in quantities and sizes of length, time, pace and energy. They are periodic changes with insurmountable limits, because they are caused to a quantity that remains constant. All other physical phenomena (such as heat, electric charge, the transfer of energy in certain proportions, the strange properties of the particles and ultimately the formation of atoms) are explained by this synoptic process. By the first thoughts, we have noticed that the change in the fixed amount of energy of the free space, causes wave changes, rhythmic motions and feedbacks with a faster pace. If we ignore how these phenomena are produced as waves, then the phenomena can be described as being entirely different. It is now clear by all these thoughts about the close relation of the free space with a quantity of energy and its fluctuations and about the limits in natural processes, where we should investigate using the measurements of known physics. We understand where we need to investigate and what relations we look for in natural phenomena. The question of how much a body can be divided and how many particles can exist and with what characteristics is not the most important for cosmological research. It is more interesting to explain how the particles of known

matter are produced exactly by the fluctuations of a common amount of energy and by what effects these fluctuations are stabilized and ultimately form the structural elements. Here is a summary and a series of selected remarks to be stated regarding the problem of the relation of gravity with matter and electromagnetic phenomena.

<·> In order to investigate and prove these first observations, we need to introduce the units of motion and some proportions, that generally describe the motion. We have learned the known units from physics, which measure the speed and the change of speed per unit time ($1m/1s \rightarrow V$, $1m/s^2 \rightarrow a$).

<·> Because we observe the motion easily in our daily life, such as the motion of the material bodies, we have got further the known physical units, which measure the inertia of a body in relation to the application of a force, which we perceive again easily when the bodies meet or touch each other. (Newton's laws and mechanics).

<·> From the first observations (for a full Universe always same), we concluded that there are limits to motion, ie time limits, length and speed. By these limits we think further of a limit to the pace, according to which the speed is changed (acceleration ± a) and a limit for the delay of the change, that is to say, inertia. We introduced quickly and easily these limits in the known relations of physics.(t_{max} - t_{min}, l_{max} - l_{min}, V_{max} -V_{min}, a_{max} - a_{min}, M_{max} - M_{min}).

<·> The limit of a maximum speed is also considered to be a limit that is imposed even on the pace of a change.

<·> We were forced to think rationally, that the motion of electromagnetic waves (or some other variations that are somewhat rhythmical) is not the continuous motion of a body that we see in the free space. By many thoughts and observations we were obliged to consider, that these faster motions which begin with microscopic processes are closely related to a disruption or perturbation onto a fixed amount of energy (empty space). So we thought that there must be another opposed inertia: The inertia / resistance which a fixed amount has when it is disturbed. For liquids this resistance is related obviously to the density. Accordingly, we had to introduce besides the speed of motion the term of rhythm (or pace) and frequency, phenomena which are also associated with time, length and speed (according to the known relations of wave motion).

<·> By even more advanced thought and by the first observations on the information of physics about the structure of matter and about the electromagnetic phenomena we encountered certain fixed quantities and relations that govern the nature of all individual variations. We learned a few physical constants such as the maximum speed **c** and a minimum quantity for the

action **h**, which we use for e/m waves. We find again these physical constants in the structure of matter. So we got the known physical relations, with which we can calculate the quantity of energy of e / m waves and the equivalent quantity of mass ($E= h \cdot f = M \cdot c^2$). But the frequency and the pace is not missing from these relations of the energy and mass, with which the motion of e / m waves is described. By having a lot of thoughts and observations and by the enforcement of limits in motion we also accepted a limit to the increase of frequency and therefore a minimum time T_{min}.

<·> We gathered very easily the first and the most simple relations of physics, linking all these phenomena together: speed, acceleration or deceleration, length, time, frequency or rhythm, period, cyclic length and radius, energy and mass or generally “inertia” and force. The (maximal and minimal) limits, which we generally set in the beginning of the physical interpretation for length and time, for speed and frequency, are now extended and we easily set these limits to two essential phenomena: The limits were set even to energy and mass, as these phenomena are related closely with the motion and its laws. We expect that these first and necessary relations of motion (in time and length, mechanical and wave motion) are repeated in the most complex motions and in changes of very different phenomena.

<·> The quantities of energy and mass, which we know about the structure of matter, are connected with the pace, the period, with a length and with the maximum speed of light. Now, in addition (to a sample of the primary particles of the material structure such as nucleons and electrons) and given the limitations resulting from the physical constants h and c we investigate how these balanced quantities of energy and mass are related to speed, to the change of speed and especially to the complicated constant of the gravitational field G. Of course, we have generally described, that the structure of matter is not a phenomenon of a single wave. We estimate by the initial explanation of matter as motions in a constant quantity, that many phenomena with many wave changes synchronized and all the wave effects are created in the microscopic space. But these processes begin from somewhere and are somewhat related to the limits that we set to motion. The most simple relations of motion are needed and are applied to more complex processes.

<·> The most simple and logical explanation of the structure of matter - that is our main problem of this physical interpretation - is that the motions are so synchronized, regular and changing in so fast rhythms that equilibrium situations and standing waves are created. And all these motions are realized into a global quantity of balanced energy and by forces generated by its fluctuations. In nature, the elementary and most simple phenomena are

motion and inertia. With these features nature as a whole manages to create equilibrium phenomena, starting (relatively) from its inside with its structural elements.

We have unfolded the simplest explanation of the creation of the nature in the usual vocabulary and we utilize the simpler relations and equations of physics. From these relations can we begin easily, with less "equipment" and fewer suppositions in order to approach in important observations between phenomena and their relations, which had not be observed or they were random and were not used for the study of nature as a whole. Our success will be greater if we simply:

· Confirm the existence of limits to the change in size of the fundamental physical phenomena by calculations.

· Explain how exactly the energy quantities are stabilized and constitute the structural elements (matter)

For this reason, we need to investigate very carefully the constant of gravitational force G and to connect it creatively with electromagnetic phenomena and with the wave move of free space. Creatively, that is, with relations and equations that will inform us:

· With which exactly relations of motion comes this physical constant.

· When or how these relations are created

· What changes or is achieved in the microscopic space, when the waves (or the corresponding particles) are regulated by this proportion, as is comes out and is maintained with content ($N \cdot m^2/kg^2$) and which has been locked in the constant G. The known relation $g = GM/r^2$ is fundamental and it correlates the attractive force with material body and mass. This relation allows us to calculate the acceleration that a celestial body of mass M causes and in distance of its radius r (in any body which would fall freely). Here are some first and necessary observations on this physical constant.

11.1. Investigation of the gravitational field and how it is created

The dimensional content of the constant G (that reflects a regular rate in change of speed in relation to the gravitational force and the distance):

Length^3 / Mass × Time^2 | or in simplified units m^3 / kg · sec^2

$$G = \frac{F \; r^2}{M_1 \; M_2} \quad \left| \quad G = \frac{\ell \times \ell \times \ell}{M \; t \; t} = \frac{\ell}{M} \times V \times V = \frac{a \times \ell^2}{M} \right. \quad \left| \quad F = \frac{M \times \ell}{t \; t} \quad \left| \quad \frac{\ell \times \ell}{t \; t} = V^2 \right| \quad \frac{\ell}{t \; t} = a$$

· A single material body itself is surrounded by a field (if not the field is caused by it), which acts invisibly to another body. We call this "gravitational field" or "attractive force". This observation leads us to think of the gravitational field regardless of the approach of a body with other bodies. This is a field surrounding the material things, whether they are next to one another or not. The acceleration g in physics coincides with the intensity of the gravitational field.

· We detect and observe more easily this field in bodies containing a large amount of matter in the unit of volume or mass such as the celestial bodies. The things that we know and we can observe in our daily lives do not reveal this attribute to attract each other, a characteristic which all bodies have. We don't observe any force being applied from one body to another and accelerating the other body, without the physical surface of the one touching the surface of the other. Only in special cases we observe bodies that attract each other such as the phenomenon of magnetism and the electrical charging. But these phenomena are described successfully and are considered to be phenomena different than the gravitational attraction.

· The proportional relation, which is summarized by the formulas $g=GM/r^2$ and $F=GM1M2/r^2$ are not so clear and well defined relations and cannot be applied with accuracy. It is not so easy to identify which the center (of gravity) of a body is, what size the center has and how much exactly the radius is unto the body surface. It is even more difficult, when the body shape is not perfectly spherical and when its structure is not stable and uniform, which seems to be the norm in the astronomical space.

· Observing the relation $G=V^2 \cdot r/M$. When the constant G is given by $V^2 \cdot r/M$ then the distance r is a radius, the motion is elliptical, the mass is the one of a separate body and the attractive force is centripetal. The mass, the speed of a body and the distance manage to acquire the quantity or size, which is needed, in order to maintain the physical constant G. If the constant G does not ensue, then there no rotational motion occurs, the speed V in the

formula $M=V^2\ r/G$ is not one of a periodic motion in an orbit and the time in the formula $M\cdot V\cdot 2\pi/T=F$ is not a period. The constant G ensures the elliptical and circular motion and not generally the motion with the attractive force. When we hear that the bodies attract each other, as *Newton* observed and expressed quantitatively, then one of the first thoughts is the observation, that celestial bodies do not fall on top of each other. By this attraction the celestial bodies had to be accelerated and to fall immediately on top of one another. The attractive force F (between bodies) increases in proportion to the mass, but it seems that the increase in mass is accompanied by the increase of the possible distance between them, while the radius of a separate body can be reduced. It appears that the presence of this constant is due to a specific "inner" relation of mass with the spatial dimensions and length.

· The intensity of the gravitational field ($g=GM/r^2$) or the attractive force F between the bodies does not depend on the chemical properties of matter.

· Theoretically observing the contrast.

The gravitational field is closely related to the presence of mass. But the presence of mass is also associated with some absence of gravity ... In fact, we find that the gravity of a visible body is not attractive in an unlimited manner and cannot bring all the masses together until disappearance of distances. The mass of a body does not eliminate the extent that it occupies (somewhat organized). The gravitational attraction is so strong that there is a distance amongst the bodies and these bodies exist as separate (and they have an extent). We could say from the outset that mass, distance and expanse begin with such movements, that exceed (or fool) the energy of gravitational attraction and they do not let it "gather" and "produce" work to infinity. The limitation of the gravitational attraction is somehow associated with an opposition that is raised by the energy flow (or fast motion) into the structure of matter, in shorter distances and dimensions. Therefore, we might assume by the first thoughts that the appearance of material bodies (and a limit for the gravitational attraction) depends on the rate and speed of changes, which are repeated, on the amounts of energy which are exchanged in microscopic dimensions and on the rate of change of energy in general (increases, decreases, rhythms and transfers).

By an initial finding of a contrast between the mass and gravity we can easily reach the following conclusion: The mediation of a common base is necessary for the existence of matter, so that matter can have the energy, with which it is maintained despite the external influences. This is, because the motion inside the tiny matter and the stability of its structure cannot be explained by the energy and motion of external (and random) effects. The structural elements of matter are found in large quantities in different condi-

tions and with different things. We should observe different structural elements in the unit of volume. Such a matter maintains its structure and we know that matter exists within the vast distances of astronomical space and over time. This single observation leads to the conclusion that matter, either nearby or far away, is associated with something in common, a common reality and even so, that matter has the same microscopic structure. The common reality, which is needed as a base for the maintenance of matter and has same properties, could be looked for in the realm of metaphysics. This common reality is none other than the free space.

Note that here we have not ventured in explaining the structural elements as fluctuations and wave effects by introducing directly the concept of a dynamic space after an assessment of the information of modern research. We conclude that there is a common and simultaneous quantity (energy) and we identify it with the phenomenon of free space. We explain the free space itself and thus it is revealed how it is dynamically connected to matter.

12.0. The amazing combination of three physical constants c, h, G

12.1. The universal physical constants

The philosophical interpretation of a complete and stabilized Universe has easily entered the field of physics through the "physical constants" and general concepts, of which science cannot be freed. The search for the limits was enhanced particularly by establishing minimum and maximum limits to time, length, rate of change, and the introduction of the known formulas of physics. Thus it was possible, to extend the cosmological interpretation by mathematical calculations and equations and of course by using the known measurements. Nobody knows how many observations and measurements have been made for the development of physics. Only a few measurements and few laws (of fundamental physical proportions) from the inexhaustible collection of observations, which have contributed to the development of physics since the entire history of this science, regulate a variety of physical phenomena and summarize their inexhaustible descriptions. These measurements of certain physical proportions and laws regarding the fundamental forces of nature have been “consolidated” into a few symbols and have been named universal physical constants. These physical constants somehow sum up a multitude of proportions regarding fundamental physical sizes and facilitate our calculations. They were called "universal" and "stable" because they seem to be applied everywhere in nature. By their numerical expression can the other ratios be calculated in natural sizes and they are considered to be one of the greatest mysteries of Nature. These constants are the speed of light (c), the constant of gravitation (G), the Planck constant h, the electron and proton charge (±e), the mass ratio of the proton to the electron, the dimensionless constant of fine structure (α), the number pi of the circle and still few tens of them. These constant quantities and proportions of nature were determined by measurements. They have been calculated with satisfactory precision and are used in each calculation required for technical or scientific application. And yet, to this day, nobody has explained where they come from. Physicists ignore the origin of the physical constants, namely, by which physical processes these constants are produced, if they have always been the same, and how these proportions are ultimately kept so much stable in the Universe. Many recent researchers doubt this universality of natural constants. In our theory - which explains the formation of things by wave phenomena in a common and balanced quantity of energy - it is obvious that many numbers will appear unchanged and will be repeated in fundamental physical processes.

12.2. Very briefly about the constant c

The speed of electromagnetic waves and light denoted by the letter c is considered to be the maximum limit of motion. By claiming that this speed limit exists, *Einstein* formulated theories (special and general relativity), which were "pillars" of research and evolution of 20th century physics. The measurement of this speed was not an easy task. In the first attempts this speed was calculated by astronomical observations, but it was more accurately measured by later attempts using experimental devices. We suppose that *James Clerk Maxwell's* work (1831 – 1879) on electricity and magnetism is known, and how it had been predicted that light is the e / m waves having the same speed. In modern physics and astronomy, there are researchers, who attempt to explain some phenomena supposing that the speed of light is not unsurpassable. The speed of light is introduced in a multitude of mathematical proportions, by which a multitude of natural phenomena and equations are accurately computed, which are effectively applied to the more complex technology. Let us think that a multitude of electronic circuits (oscillators, resonance stages, etc) have been calculated using the speed of light and they need to operate with high precision in order to be able to control a space device on the surface of another planet. In order to operate any high-frequency amplifier RF circuit or an antenna at maximum performance, conductor lengths and distances in subdivisions of millimeter need to be measured. The best performance coincides with the theoretical calculation, for which the speed of light was introduced. If we calculate the lengths of the conductors by entering a different speed of light in the equations, then the electronic circuits will not work properly and the measurements will indicate an abnormal operation. So, if there is some difference in the speed of electromagnetic waves in relation to frequency, this difference will be so little that it has not yet been observed by any human application. Here we have started our research by saying that the speed of light may not be unsurpassed, but it is undoubtedly not a random speed and it is a common limit for the changes in nature. This careful view, namely that the speed of light is a decisive limit within nature, does not contradict to the possibility of observing any excess of that limit or a little deviation, while we would expect it to be exactly equal. The fact that the speed of light is a definite limit within nature cannot be denied by anyone, since it has been observed and has been confirmed in a large number of cases and it has been used in the calculations with success in technology. Observation of a case where a limit is exceeded or is not applied, is insufficient to immediately draw the conclusion of the turnover and so to reject (overall) the limit. The hasty controversy in scientific research shows perhaps the ambition, the motive that someone was trying to reveal negative

feelings, but not intelligence and creative logic. Simple logic does not rule out the possibility of a limit, but in some other cases this limit is exceeded. A physical process can have a limit, which is common to a multitude of things and crucial to starting or ending some other processes. This does not mean that the limit can never be overcome in a few cases.

It is wrong and reckless to discard a confirmed theory imminently when it is disconfirmed by a result or by a measurement. This would be for example, if we measured a speed faster than the one of light c. From such an observation the theory of special relativity is not refuted and the limit of the speed of light does not cease. This is for two main reasons:

1) Because theories are never applied to all cases and everywhere in nature. There are some other phenomena that are regulated by different laws and then there is one of the laws which happens not to be applied or is suppressed. For example, gravity with its law keeps us down to the ground. But we stand on the ground and we can move, because this ground is formed by the application of other laws (except for gravity) and opposing forces hinder our physical body to move downwards. A craft flying to escape from the gravitational field of the earth accelerates with the opposing forces. When one ignores the opposing forces and the combination of some phenomena, then one realizes that the experience is contradicted.

2) A theory is not applicable everywhere and has limitations, but it is applied and the observations are confirmed for a large number of phenomena and under certain conditions. Although we might measure somewhere a speed faster than light, however we will measure in a number of other phenomena that the limit is the speed of light as we know. Technicians use the speed of light to calculate the construction of an antenna and many other electronic resonance circuits of high precision (the $\lambda = c / f$ equation is fundamental). Ultimately, from the calculation they find the length exactly that a wire must have or the distances that the antenna pieces must have between them. When the antenna is constructed by calculating the speed of light, then it operates at the maximum output and thus the measuring instruments show. If we calculate it with wrong speed rather than light, then the antenna does not perform, it has lesser gain and the measuring instruments show loss and poor coordination. I do not know whether some physicists, who are prone to rejection of a theory with pleasure, have ever had the opportunity to apply their knowledge in practice (in nature) and not only in mathematical calculations. The speed of light is indeed an insurmountable limit in nature for a multitude of natural phenomena and we will continue to apply the earlier theory. This is similar to the Newtonian theory which was limited by the theories of relativity, but it is still applied and is not wrong in a multitude of cases. But, obviously, when a theory is not applied and the result is different than the one predicted, of course a new theory will be required that will interpret the new observation (eg, the higher

speed) without canceling the previous theory (eg, the limit of the speed of light). Therefore there is a difference between a theory being refuted totally and it being entirely erroneous and the refutation being partial or the disproof being rare and an improvement of the precision in the calculation being required.

12.3. We are lucky! The amazing ratio

It is known, that the constants h, c and G combined together give rise to a quantity called mass consolidation or *Planck mass*.

$M_{pl} = \sqrt{(h \cdot c/G)} = 5.456244 \times 10^{-8}$ kg

The quantity of this mass and its equivalent energy is many times higher than the known particles observed in the structure of matter. The particles in microscopic dimensions have a lower mass, lower frequencies and longer lengths in accordance with the equation $M=hf/c^2$. The investigation of this theoretical mass and possible relations of it with the masses of smaller particles is important, because it is not a random quantity. It results from the three most crucial physical constants in accordance with physics and some questions arise that direct the investigation. Therefore, when we form and solve equations containing that amount M_{pl}, we maintain thus our relations in accordance with the physical constants. By the known formulas of equivalence between mass and energy (such as $M = hf/c^2$) can we easily calculate some of the possible limits of physical processes. First of all we can calculate a frequency $\mathbf{f}_{pl}$, a length $\boldsymbol{\lambda}_{pl}$, a quantity of energy $\mathbf{E}_{pl}$ and other quantities that correspond to the theoretical mass $\mathbf{M}_{pl}$.

Some equivalences with theoretical mass $\mathbf{M}_{pl}$

$$M_{pl}^2 = h\, c\, /G \qquad \text{as even}$$

$$M_{pl} = h\, f_{pl}\, /c^2 \;=\; h/c\, \lambda_{pl} \;=\; c^2\, \lambda_{pl}\, /G$$

$M_{pl}\, c^2 = h\, f_{pl}$ and $M_{pl}^2\, G = h\, c$

Which are the units contained in the physical **constant h** that has units of angular momentum kg m^2 / s ? $h = M_{pl}\, c\, \lambda_{pl} = M_{pl}\, \lambda_{pl}^2\, f_{pl}$

The energy $M_{pl}\ c^2$ of the equivalent mass without further investigation, seems to coincide with:

a maximum frequency: $f_{pl} = M_{pl}\ c^2/h = 7.4008 \times 10^{42}$ Hz

and a minimum length: $\lambda_{pl} = c/f_{pl} = h/M_{pl}\ c$

The coincidence and the combination of these three physical constants c, h, G is not the solution to a problem. It does not explain and show, how from a plurality of possible particles only a few of them seem to be essential for the fixed structure of matter. It doesn't elucidate how the structure of matter is formed by these particles and the specific relations between them in an atom. In addition, it is a theoretical quantity and not a particle observed in nature. Some questions arise by this meeting of the three physical constants and the limits which result theoretically, which direct the investigation in accordance with the known physics. However, it turns out mostly from the relation of the three physical constants, that the quantities exhibit certain numbers and sizes which are within the limits of nature and particularly in microscopic physical processes.

The equivalent amount of energy of this theoretical mass by the relations between the three physical constants is a comparatively large amount. Perhaps this is another reason why this coincidence of the three physical constants has not been viewed as much as it was necessary and we cannot find a lot of studies regarding it apart from a widespread copy of some relations for potential limits to the physical sizes. In order to estimate this quantity and to be familiar with the energy unit "Joule", we will make a comparison with the kWh.

$1\text{kWh} = 3.6 \times 10^6$ J (=3 600 000J) | $1\text{J} = 2.7778 \times 10^{-7}$ kWh

$E_{pl} = 49.038 \times 10^8$ J = 1362.17 kWh

But where is the so-called Planck mass [$M_{pl} = \sqrt{(hc/G)} = 5.45624 \times 10^{-8}$ kg] which is theoretically obtained by the three physical constants c, h and G? The investigation for the answer to this question reveals finally the closest relation of the phenomenon "mass" with the energy of electromagnetic waves and with the change in the energy of free space. We observe among others with a little research and by virtue of many coincidences that the maximum amount of inertia is almost the inverse of the maximum speed of light! ($1/c \approx M_{pl}$ και $c \approx E_{pl}$)

In known physics some relations and measurements already exist by which some maximum and minimum sizes are quickly obtained. In such a short and simple way some physicists had been motivated to do some calculations about the likely upper and lower limits to certain fundamental sizes of nature. Anyone could start a philosophical investigation directly by the

relations of physical constants in order to argue that there are limits in nature. But, unfortunately, again for the Philosophy is an insistent effort of philosophical interest not known and only some specialized physicists have investigated this possibility with their flavorless mathematical skill. We have started with fundamental relations and universal concepts, that describe a Universe that is complete and stable within a maximum period of time, in such a way that we could achieve it at any time and anywhere in the Universe with theoretical thinking, ordinary skill and experience. Now we focus on certain relations and measurements of physics, after an exhaustive analysis and observation of more general phenomena. We attempt to do it, while being aware of what we are looking for, we know and await that we will find many constant relations, we are aware of what laws are needed for all phenomena and we already know how certain general phenomena are interrelated and how they are caused.

SOME THEORETICAL LIMITS ACCORDING TO MASS $M_{pl} = \sqrt{(hc/G)}$

$\mathbf{M}_{pl} = \sqrt{(\mathbf{hc/G})} = c\sqrt{(50h)} = 5.456246 \times 10^{-8}$ kg

$\mathbf{E}_{pl} = M_{pl}\, c^2 = 49.038293 \times 10^{8}$ J

$\mathbf{c} = \sqrt{(h\, f_{pl} / M_{pl})} = \sqrt{(G\, M_{pl} / \lambda_{pl})} = 2.997924 \times 10^{8}$ m/s

$\mathbf{f}_{pl} = M_{pl}\, c^2 / h = 7.4008 \times 10^{42}$ Hz $= E_{pl} / h$

$\mathbf{T}_{pl} = 0.13512 \times 10^{-42}$ sec $= 1 / \mathbf{f}_{pl}$

$\mathbf{a}_{pl} = \mathbf{c^2} / \boldsymbol{\lambda}_{pl} = \mathbf{f}_{pl}^2\, \boldsymbol{\lambda}_{pl} = \mathbf{c}\, \mathbf{f}_{pl} = 22.18710 \times 10^{50}$ m/s^2

$\boldsymbol{\lambda}_{pl} = \mathbf{c} / \mathbf{f}_{pl} = 0.405080 \times 10^{-34}$ m

$\mathbf{F}_{pl} = M_{pl}\, \mathbf{a}_{pl} = E_{pl} / \boldsymbol{\lambda}_{pl} = 121.05829 \times 10^{42}$ N

$\mathbf{E}_{min} = h\ 1\text{Hz} = 6.62606 \times 10^{-34}$ J

$\mathbf{M}_{min} = h\ 1\text{Hz}/c^2 = 0.73725 \times 10^{-50}$ kg

$\mathbf{V}_{min} = 1\text{Hz}\ \boldsymbol{\lambda}_{pl} = \sqrt{(GM_{min} / \lambda_{max})} = 0.405080 \times 10^{-34}$ m/s

$\mathbf{M}_{pl} / \mathbf{M}_{min} = E_{pl} / E_{min} = 7.4008 \times 10^{42}$

$\mathbf{G} = F_{pl}\, \boldsymbol{\lambda}_{pl}^{\,2} / M_{pl}\, M_{pl} \rightarrow$

$1.21058 \times 10^{44} \cdot 1.640898 \times 10^{-69} / 29.770555 \times 10^{-16} = 6.6725 \times 10^{-11}$

CONSTANT 1.2143×10^{-26} (m^2 / sec)

$[\boldsymbol{\lambda}_{pl}\, \mathbf{c}\,] = [\mathbf{h} / \mathbf{M}_{pl}\,] = [\mathbf{c^2} / \mathbf{f}_{pl}\,] = [\,\mathbf{f}_{pl}\, \boldsymbol{\lambda}_{pl}^2\,] = [\boldsymbol{\lambda}_m\, \mathbf{V}_m\,] = 1.2143 \times 10^{-26}$

THE CONSTANT OF THE COMBINED CONSTANTS IS MASS

$\mathbf{M}_{pl} = \sqrt{(\mathbf{hc/G}) = \mathbf{h} / \boldsymbol{\lambda}_m\, \mathbf{V}_m} = h / 1.2143 \times 10^{-26}$

A mass to the square is obtained (double quantity) from the three universal constants. This shows that some physical sizes and phenomena in the equations are contained twice and it was remarkable, as will be proved.

$M_{pl}^2 = h\ c\ /G = (h\ f_{pl}\ /c^2\ ) \cdot (h\ f_{pl}\ /c^2\ ) = (h\ f_{pl}\ /c^2)^2 \rightarrow$

$c\ /G = h \cdot f_{pl} \cdot f_{pl}\ /c^2 \cdot c^2 = E_{pl} \cdot f_{pl}\ /c^2 \cdot c^2 = M_{pl} \cdot f_{pl}\ /c^2 = M_{pl}\ /c \cdot \lambda_{pl} \rightarrow$

$c\ /G = M_{pl}\ /c \cdot \lambda_{pl} \rightarrow G \cdot M_{pl} = c^2 \cdot \lambda_{pl}$

13.0. The gravitational constant G

(Some of the first thoughts of investigation is an attempt to comprehend what the constant G of gravity signifies)

Let us observe how much the known formula of the gravitational force expresses the things:

$\mathbf{F_{grav} = G\ M1\ M2 / r^2}$

As we say, the force is equal to the product of two spherical masses M and inversely proportional to the square of their distance r^2 (from their centres). If we do not introduce the gravitational constant **G**, then the result will not be correct in units of force (Newton). The masses alone and the distance r that separates them are considered to be static sizes. The effect of attraction is not present except for the presence of the two masses at a distance from each other. We introduce the constant **G**= m^3 / kg·s^2 separately, which (in its dimensional content) includes time t (sec) or acceleration (m/sec^2). Without the time could this constant not express the effect of motion and acceleration, which a force between two masses causes. We introduce the constant **G**, because it has been observed that the sizes (M, r, F and g) increase or are altered at a same rate and proportion. When we introduce the constant **G** then the numerator in the fraction is minimized, since this is a smaller quantity than the unit (10^{-11}). Thus, for two masses of 1kg and at distance 1m we have the result:

$F_{grav}=(6.6725 \times 10^{-11}) \times 1kg \times 1kg / 1m^2 = 6.6725 \times 10^{-11}$ N

$$F = ? \frac{M_1 \quad M_2}{r^2} = \frac{M\ V^2}{r}$$

Even if the formula gives a result, which is a force of attraction, we still observe in the denominator the distance r^2 that separates two (bodies) masses M, which are attracted by each other. This distance r^2 is expressed as a straight line that links the centres of two bodies, while the bodies are considered to be spherical and we know that they attract each other from each radius of their sphere. The gravitational force exists towards every radius on the overall surface of masses and in the opposite direction from the interior of the bodies.

The straight line r^2 which links the two bodies, constitutes the conceivable straight line, that links only one of the radius of every sphere with the other sphere. We could consider that the gravitational force F in the Newton's formula is only one percentage of the real gravitational force of every mass and it is also the percentage that corresponds to only one radius and only in a straight line. The constant **G** gives the force of attraction at a distance in a straight line from every direction. We could still think, that the force of attraction from the opposite directions of the same body causes possibly a distortion in its effect and so we could introduce the angle of the force. The attraction of astronomical bodies does not cause a rectilinear motion until their collision.

13.1. Radial flow to compensate for the decreases...

The questions on the concentration of matter in free space and on the gravitational field of astronomical bodies (and according to natural law) lose their meaning only with an explanation. This is an explanation that could have been formulated (with imagination) many centuries earlier: The reason for the concentration of material quantities is **the flow for the compensation for the decreases in spatial energy**. Any direction is not different to the flow of spatial energy. Thus the material carriers are limited by the spherical flow of spatial energy. Large quantities of matter are concentrated, and this phenomenon of concentration is due to the fact that no direction is separate so that the material carriers can escape. This is again explained by the fact that the free space around the bodies is a shared amount of energy that is isotropically transferred to the material carriers and at the same rate. The attractive flow to the accumulated quantity of carriers occurs in all directions (i.e., radial and spherical) and thus at the same time from opposite directions. The phenomenon of self-rotation is related to this concentration of energy, which is transported from opposite directions. The movement of the accumulated quantity on a straight path is blocked by the energy flow that is concentrated in all directions. Therefore, an amount of energy flows in each one of two celestial bodies, which are spaced apart in the free space, and **the flow towards the one is opposed to the flow to the other**. So when they approach, one body attracts the other and at the same time resists the attraction of the other. So when they approach, one body attracts the other and at the same time resists the attraction of the other. When more amount of spatial energy is concentrated toward a total of material carriers, then the time and distance, in which the material carriers interact with each other, is more limited and these carriers are connected at closest distances and in all possible directions.

By the flow for the compensation of the decreases in spatial energy and by its centralized behavior are explained rationally and unitary:

· The formation of astronomical bodies with preference for the shape of the ball.

· The existence of the gravitational field and the force that is applied between them.

· The existence of the same field and the same law (shared energy amount of free space) for a large number of astronomical bodies.

· The maintenance of the distance between the astronomical bodies and the relation of the gravitational potential with the radial energy transfer to the body.

· The rotary motion of the bodies around their imaginary axis.

13.2. Some proportions hidden within the constant G

By the units, which are found in the dimensional content in the constant G, the result in the formulas is in agreement with physics very simply without the need to make more numerical calculations. The constant G of gravity results from the *Kepler's 3rd law*[xvi]:

$$\mathbf{G = 4\pi^2 \cdot r^3 / M \cdot t^2} \quad (= m^3 / kg \cdot s^2)$$

An example accordingly to the measurements for the Earth and Sun.

$$4\pi^2 \cdot (1.495978 \times 10^{11})^3 / (3.155421 \times 10^7)^2 \cdot 1.99 \times 10^{30} = G$$

If the distance r is in meters from the central body M, the time t is in seconds and the mass M in kg. The central body is the Sun. The distance r is between the Sun and the Earth. The time t is the orbital period of the Earth around the Sun in sec instead of the 24-hour period.

Actually, we could not calculate this constant, if the phenomena of mass, gravitational force and distance were not altered according to certain laws, so the one depends on the other in such a way, that they do not violate certain limits. We will understand their relation with an example of the mass M and radius r of our planet Earth.[4]

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4 G: 6.6725×10^{-11} | M_{earth} : 5.973×10^{24} kg | r_{earth} : 6.3787×10^6 m

$g = G\,M / r^2 = 9.795\ m / sec^2$

	Mass (kg)	Radius (m)	Acceleration (g) m/s^2	Ratio g / M	Mass × g (F)
M	5.973000×10^{24}	$(6.3787 \times 10^6)^2$	9.79527	1.6399×10^{-24}	58.50714×10^{24}
$\sqrt{M}$	2.443972×10^{12}	$(6.3787 \times 10^6)^2$	0.40079×10^{-11}	1.6399×10^{-24}	9.7952
$_2\sqrt{M}$	1.563320×10^6	$(6.3787 \times 10^6)^2$	0.256372×10^{-17}	1.6399×10^{-24}	0.40079×10^{-11}
$_3\sqrt{M}$	1.250327×10^3	$(6.3787 \times 10^6)^2$	0.205044×10^{-20}	1.6399×10^{-24}	0.256372×10^{-17}
$_4\sqrt{M}$	3.535996×10	$(6.3787 \times 10^6)^2$	0.579877×10^{-22}	1.6399×10^{-24}	0.205044×10^{-20}
	1	$(6.3787 \times 10^6)^2$	0.163992×10^{-23}	1.6399×10^{-24}	0.163992×10^{-23}

We observe that the acceleration of gravity g increases depending on the mass M (for the same radius).

When the mass **M** increases by being squared and thus it becomes $\mathbf{M^2}$ then the acceleration **g** of the M increases **M times**, that is to say $\mathbf{g \cdot M}$

If the mass **M** decreases by square root $\sqrt{\mathbf{M}}$, then the radius $\mathbf{r^2}$ should decrease to $\mathbf{r^2 / \sqrt{M}}$ so that the same acceleration **g** results.

For example: If the mass 5.973×10^{24} kg decreases by square root then it is equal to 2.443972×10^{12} kg. This mass 2.443972×10^{12} kg for acceleration $g = 9.79527\ m/s^2$ must have a radius $r^2 = (6.3787 \times 10^6\ m)^2 / \sqrt{M}$:

$r^2 = (6.3787 \times 10^6)^2 / 2.443972 \times 10^{12} = 16.64823$ m.

Then $G\,M / r^2 = G\ 2.443972 \times 10^{12} / 16.64823 = 9.79527\ m/s^2$

as a mass 5.973×10^{24} kg which has radius $r^2 = (6.3787 \times 10^6\ m)^2$

The mass therefore has this proportion to its radius and its gravitational field. This close relation between mass and radius is revealed by solving the equation for the constant G: $G = \mathbf{g \cdot r^2 / M}$. How is this analogy exactly regulated for astronomical bodies, if not by their closest relation to a common amount of energy?

$$F = G \frac{M_1 \quad M_1}{r^2} = M_1 \times g \qquad g = G \frac{M_1}{r^2} \qquad F = M \times a$$

$$g = G \frac{M_1}{r^2} \equiv F = G \frac{\sqrt{M_1}\ \sqrt{M_1}}{r^2} = \frac{E}{r} \qquad F = M \times a$$

Mass of the Earth square rooted √ M1 : 2.443972×10^{12}

F = G $\sqrt{M_1}$ $\sqrt{M_1}$ / r^2 →

F = G $(2.443972 \times 10^{12})$ $(2.443972 \times 10^{12})$ / $(6.3787 \times 10^{6})^2$ = 39.8548×10^{13} / 40.6878×10^{12} → **F = 9.795 N**

g = G M_1 / r^2 → G × 5.973×10^{24} / $(6.3787 \times 10^{6})^2$ = **9.795 m / sec²**

The gravitational force F between two same spherical bodies is equal to gravitational accelerator g that causes the product of these two masses at the same radius r. Or the gravitational accelerator g is equal to force F that the 2 smaller masses, which would be smaller to the square root of the initial mass √M, but in the same distance r would exert to each other.

► The formula is equalized for the constant G and with the example of Sun - Earth

$$G = \frac{F \quad r^2}{M_1 \quad M_2} \qquad F \times r^2 = M_1 \times M_2 \times G = E \times r = M \times V^2 \times r$$

$$V^2 = \frac{G\,M}{R} \qquad G = \frac{V^2 R}{M} \qquad M = \frac{V^2 R}{G}$$

Still we observe :

r_{ers} : απόσταση μεταξύ Γης - Ήλιου

$$F \quad r_{ers}^2 = V_{earth}^2 \; r_{ers} \; M_{earth} \qquad F \times r^2 = M_1 \times M_2 \times G$$

$$\frac{F \quad r_{ers}^2}{r_{ers}} = \frac{V_{earth}^2 \; r_{ers} \; M_{earth}}{r_{ers}} \qquad F \; r_{ers} = V_{earth}^2 \; M_{earth} \qquad V_{earth}^2 = \frac{F \; r_{ers}}{M_{earth}} = \frac{G\,M_{sun}}{r_{ers}}$$

By the equation $\mathbf{V^2}_{earth}$ $\mathbf{r}_{ers}$ $\mathbf{M}_{earth}$ = **M**1 **M**2 **G** we can find the mass of the Sun.

We find the same by the equation $\mathbf{V^2}_{earth}$ $\mathbf{M}_{earth}$ / $\mathbf{r}_{ers}$ = **F**

Observe, how the information " is hidden " in the one type of equation,

while it is revealed in the other type :

$$\mathbf{F}\ \mathbf{r}_{ers} / \mathbf{M}_{earth} = \mathbf{G}\ \mathbf{M}_{sun} / \mathbf{r}_{ers}$$

$$V^2_{earth} = \frac{F\ r_{ers}}{M_{earth}} = \frac{G\ M_{sun}}{r_{ers}} \qquad V^2_{earth} = \frac{F\ r_{ers}}{M_{earth}} = \frac{F\ r^2_{ers}\ M_{sun}}{M_{ear}\ M_{sun}\ r} = \frac{F\ r_{ers}}{M_{earth}}$$

► The gravitational constant **G** in the Newton's law shows, that the force between two spherical bodies **can be altered in relation to** their mass and distance, but this can be materialized with such a proportion that **an immutable relation results from all of them**, which we eventually determine by the physical constant **G**. The answer, which we seek, is already found in the constant G. We do not do something apart from "dissolving" the constant G mathematically so that the force F or the acceleration ±a can remain.

$$G = \frac{F\ \ r^2}{M_1\ \ M_2} \qquad F \times r^2 = M_1 \times M_2 \times G \qquad F \times r^2 = M_1 \times M_2 \times \frac{F \times r^2}{M_1 \times M_2}$$

G: 6.6725×10^{-11} | M_{earth} : 5.973×10^{24} kg | r_{earth} : 6.3787×10^{6} m |

If the constant **G**=Fr^2/M_1M_2 of gravity were a larger number, then the bodies would give higher acceleration, higher speeds and higher traction forces. The astronomical bodies would probably approach each other with a stronger force of attraction between them and at higher speeds. The intensity g of the gravitational field of a body could increase faster, with less mass. If, however, the constant G were a smaller number, this would mean less traction force F. The rates of change of speed would be slower and the intensity g of the gravitational field would be less for the same mass. These relations and ratios are imposed by the gravitational constant G.

If the attractive force F between material bodies is increased in the equation **G**=Fr^2/M_1M_2 or only the distance r (for the same force) is increased, then the mass M will be increased so that the same constant G is maintained. The product of the masses and the proportional force F could be increased indefinitely without a limit. However, the force F between the bodies is adjusted by the distance r raised to the square. As it is shown by the relation F = GMM / r^2, the attraction force F between the bodies changes (exponentially) x^2 times if x is the change of the distance r in the denominator. That is, if

the distance r increased 10 times, then the force F is attenuated $10^2 = 100$ times. This means that the attractive force F appears more reduced (x^2 times for each x increasing of distance r) in longer distances. Conversely, the attractive force will be exponentially increased x^2 times if this distance diminishes x times. If, instead of increasing the distance between the bodies, their mass is reduced by the same measure so that the same attractive force F results, then the mass should be reduced x^2 times. That is, the force F be reduced 100 times, if the product of the masses also is reduced $10^2 = 100$ times (for the same radius r).

The fact that the gravitational constant G is a number of the order of 10^{-11} ensures that astronomical bodies can exist with their known masses. It ensures that the force of attraction requires such an increased amount of concentrated matter until it acquires the strong gravitational field that causes thermonuclear reactions. Since this constant G requires a long period of time until the highest velocity is reached from a gravitational acceleration. Smaller accelerations can be caused (at a slower pace), in longer distances and cyclic movements at longer radii, and thus in longer periods and intervals. And as it seems, low accelerations and larger distances need bodies of larger mass (mass / volume, more correctly).

The mass of a body could be increased so much in less radius or within a few meters that the body would be destabilized and transformed into nuclear bomb or a black hole, because of a too strong attraction force. We find in nature instead that the structure of matter allows the concentration of matter and the increase in mass until the formation of bodies in astronomical dimensions. The gravitational force does not exceed the limits of conservation of the structure of matter prior to the merger of a large number of material elements. A large number of material elements may be concentrated in a much larger radius (until they undergo a destabilizing pressure). From this observation alone comes the safe conclusion, that the structure of matter and the microscopic processes are not easily to destabilized by the forces, which we observe amongst the visible bodies.

The gravitational field and the force of attraction begin from the structure of matter, favor the concentration of material elements and allow it with limits (length and strength), which are predetermined by their very structure. These limits, which allow the bodies and attractive forces of astronomical dimensions to exist, indicate that the large concentrated bodies, while they have more mass, are however less stable than their components (material elements). We can easily articulate this finding with the usual vocabulary, but - attention! - it should not be concluded, that the structure of matter is maintained by more powerful forces than the force of gravity. The maintenance of the dynamic structure of matter and the approach of some particles,

which repel each other, is not only an issue about the size of a competitive force (provided that energy exchanges are made in certain rhythms and fluctuations). But, although powerful forces may appear within the dynamic structure of matter, the thought of a physicist should not be so poor that it cannot discern, that if the application of a force is periodical and with fluctuations, then it is not necessarily the same phenomenon such as the force that we observe to be applied continuously to a body, when it pushes another. **The time interval, in which a force is applied, and how a dynamic process unfolds are also crucial**.

14.0. Some essential data of physics.[5] Physics is inevitable and fruitful in the philosophy of the 21st century

A sample of the measurements of energy quantities and of other sizes of motion within the structure of matter is needed in order to investigate microscopic fluctuations. Our priority is not to make calculations of high precision, but to assess whether the free space is closely related to the particles as we have said and whether the explanation of structural elements with wave effects is correct. If we can make high-precision calculations, we will do so at the right time. So, this mathematical investigation began with the following logical steps:

- Gathering initial information for numerical values of various sizes and quantities.
- Knowledge and conversion of units for the right choice.
- Familiarity with the essential formulas and calculations.
- A reminder of simple mathematics when a calculation is needed. No complex numbers or diagrams were used in this treatise. Certainly, the rational thoughts of the cosmological interpretation would be more revealing with the extension of mathematical methods.

In order to avoid misconceptions, certain capital letters have been used to symbolize speed, mass, energy, force and period. Capital letters were selected because most calculations of the physical interpretation focus on these fundamental phenomena. Frequency is always denoted only by the letter f. It is our purpose that the formulas are clear and the letters are not confused with units of measurement or with symbols of other phenomena, since they sometimes happen to be the same. The other symbols will be clarified where it is necessary. Attention to the decimal point (separator)! This is different mark for many countries. Here it is a dot (.) The collection of mathematical results in tables was a means for the investigation, so that the same calculations and any relations, which will be revealed amongst the results, are not repeated. In the combinatorial tables of numbers many coincidences and relations were observed, which helped and inspired the inquiring thinking. Below, we can see a little summary, as it was done for the start of the investigation.

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5 We refer to the last pages of the book (supplements and notes) for more information that is necessary for our rational research. The information we have obtained for this investigation is the most widespread and without the requirement of the highest accuracy. Everyone can find them even in school physics textbooks and that is why the sources are not listed.

A SAMPLE OF TABLES WITH INFORMATION, PHYSICAL CONSTANTS COMBINED WITH EACH OTHER FOR THE INVESTIGATION

$\mathbf{c}_o$= **2.997 924 5** $\times 10^{\mathbf{8}}$ **m/s**	$\mathbf{c^2}$ = **8.9875513** $\times 10^{\mathbf{16}}$ $\mathbf{m^2/s^2}$	$1/c^2 = 0.1112650 \times 10^{-16}$
h (Planck)= **6.626069** $\times 10^{\mathbf{-34}}$ **J s**	**h/2π** = **1.0545716** $\times 10^{\mathbf{-34}}$ ($\mathbf{h}_{bar}$)	**G** = **6.6725** $\times 10^{\mathbf{-11}}$ $\mathbf{N\ m^2\ /\ kg^2}$
π = **3.141592**653589793...	2π = 6.2831853	4π =12.5663706
√10 = 3.16227766	1/2π = 0.1591549458	
√0.50 = 0.7071068	√2 = 1.4142135...	Φ=1.618034
c/h = 0.452444 $\times 10^{42}$	h/c = 2.210218 $\times 10^{-42}$	h c = 19.864451 $\times 10^{-26}$
c/G = 0.4492955 $\times 10^{19}$	G/c = 2.2257064 $\times 10^{-19}$	G c = 20.003651 $\times 10^{-3}$
1 light year (ly)=9.46073 $\times 10^{15}$ m | 1 year =31.5576 $\times 10^6$ sec	1 parsec = 3.2615 ly (light years)= 3.0857 $\times 10^{16}$ m	1Mpc = 10^6 pc = 3.0857 $\times 10^{22}$ m
μ_o =4π 10^{-7} H/m =12.566368 $\times 10^{-7}$	ε_o =1/36π 10^9 = 8.8542 $\times 10^{-12}$ Fd/m	$\sqrt{(\mu_o / \varepsilon_o)}$ = 376.73 Ω ≈ 120 π
H constant ≈ 70.1km/sec/ Mpc	$\mathbf{k}_{cb}$ =1/4π $\varepsilon_o \rightarrow c^2 / k = 1 \times 10^7$	**α** = 7.29735229 $\times 10^{-3}$
1**C**b =6.241509 $\times 10^{18}$ eV	1eV =1.602176462 $\times 10^{-19}$ J	±e=1.602177 $\times 10^{-19}$ Cb

SOME ESSENTIAL DATA ACCORDING TO PHYSICS AND SYMBOLS

about the electron	about the proton
$\mathbf{M}_e = h / c\ \lambda_e = h f / c^2$ = 9.10938 $\times 10^{-31}$ kg	$\mathbf{M}_p = h / c\ \lambda_p = h f / c^2$ = 1.672621 $\times 10^{-27}$ kg
$\mathbf{E}_e = M_e c^2 = h f_e$ = 8.1871 $\times 10^{-14}$ J = 0.510998 MeV	$\mathbf{E}_p = h f_p = M_p c^2$ = 1.5032765 $\times 10^{-10}$J = 938.272 MeV
$\mathbf{f}_e = E_e / h = M c^2 / h$ = 1.23559 $\times 10^{20}$ Hz	$\mathbf{f}_p = E_p / h = M c^2 / h$ = 2.2687335 $\times 10^{23}$ Hz
$\mathbf{t}_e = 1/ f_e$ = 0.80933 $\times 10^{-20}$ sec	$\mathbf{t}_p = 1/f_p$ = 0.4407745 $\times 10^{-23}$ sec
$\boldsymbol{\lambda}_e = c / f_e = h / M c$ = 0.24263 $\times 10^{-11}$ m	$\boldsymbol{\lambda}_p = c / f_p = h / M c$ = 1.3214086 $\times 10^{-15}$ m
$\mathbf{a}_e = \lambda_e f_e^2 = c^2/\lambda_e$ = 3.704209 $\times 10^{28}$ m/s^2	$\mathbf{a}_p = \lambda_p f_p^2 = c^2/\lambda_p$ = 6.801491 $\times 10^{31}$ m/s^2 = c f_p
$\mathbf{F}_e = E_e / \lambda_e = M_e a_e$ = 3.37431 $\times 10^{-2}$ N	$\mathbf{F}_p = E_p / \lambda_p = M_p a_p$ = 11.376318 $\times 10^4$ N
$\mathbf{p}_e = F_e t_e = M_e c$ = 2.73093 $\times 10^{-22}$	$\mathbf{p}_p = F_p t_p = M_p c$ = 5.014391 $\times 10^{-19}$

Neutron particle: $\mathbf{M}_n$ = 1.674927 $\times 10^{-27}$ kg = 939.565 MeV / c^2. This is a neutral particle to the electrical charge of the proton and the electron.

±e = 1.602176462 $\times 10^{-19}$ Cb (= 1eV)	**c** = $1/\sqrt{(\mu_o\ \varepsilon_o)}$ = 2.997924 $\times 10^8$ m/sec
$\mathbf{r}_e$ = 0.28179367 $\times 10^{-14}$ m (atomic radius)	**G** = 6.6725 $\times 10^{-11}$ m^3 / kg sec^2
$\mathbf{r}_B$ = 5.291772 $\times 10^{-11}$ m (The Bohr radius)	**π** = 3.141592653
α = **2π** $\mathbf{r}_e$ **/** $\boldsymbol{\lambda}_e$ = 7.29737 $\times 10^{-3}$	**h** = 6.62606 $\times 10^{-34}$ kg m^2 / sec (J sec)
Boltzmann (**k**) = 1.38065 $\times 10^{-23}$ Joule/k)	$\mathbf{h}_{bar}$ = h / 2π
$\mathbf{M}_p$ / $\mathbf{M}_e$ = 1.83615 $\times 10^3$	$\boldsymbol{\mu}_o$ = 4π $\times 10^{-7}$ = 12.56636 $\times 10^{-7}$ Henry / m
$\mathbf{F}_{\eta\lambda} = k e^2 / r_e^2 = E_e / r_e$ = 29.05356 N	$\boldsymbol{\varepsilon}_o$ = 1 / 36π $\times 10^9$ = 8.854 $\times 10^{-12}$ Farad / m
K = 8.987551787 $\times 10^9$ N m^2/Cb^2 = 1 / 4π ε_o	$\mathbf{z}_o = \sqrt{\boldsymbol{\mu}_o / \boldsymbol{\varepsilon}_o} = \boldsymbol{\mu}_o\ \mathbf{c}$ = 376.7 Ohm

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