

The essays on this book are the notes from the e – learning courses that were given by the thinker Alexis Karpouzou during the winter of 2014. Students studying in London, Amsterdam, Berlin and Paris took part in the courses, which were held by the educational and cultural center “Think Lab”, located in Athens.

Published by Think.Lab, Athens, Greece 2015

ergastirio-skepsis.tumblr.com

think-lab.tumblr.com

anoixti-skepsi.tumblr.com

open-thought-blog.tumblr.com

Translation: Georgia Pirounaki

THINK LAB

Contents

Chapter 1

The adventure of modern physics.....	4
The united and timeless universe.....	6
The nature of light, uncertainty and teleportation.....	7

Chapter 2

About the nature of subatomic physics.....	10
Vacuum and Material.....	12
Key elements and principles Material = Energy.....	13

Chapter 3

Quantum Vacuum or Zero Point Field and consciousness.....	16
Quantum Information.....	17
Quantum Logic.....	18
Imaginary Numbers and Quantum Information Theory.....	18

Chapter 4

The String Theory (1).....	21
The String Theory (2).....	23

Chapter 5

The fate of the universe The concept of matter in relation to the curved space-time and its geometry.....	25
---	----

Chapter 6

The Geometry of the Universe.....	27
The Dimensions.....	27
The Non Perceptible Universe.....	28
The space - time Continuum.....	28
How can material be defined?.....	29

The Elusive Concept of Time.....	30
Time, Entropy, Brain.....	31
Mathematics of Imagination.....	33

Chapter 7

The End of Certainty - From Being To Becoming complexity and self-organized systems.....	36
---	----

Prigogine’s first challenge concerns the phenomenon of irreversibility. The second challenge has to do with the sense of simplicity.....37

The role of the dispersing structures and of the Bifurcations.....	39
Examples of dissipative structures.....	41

Bifurcation: Window of divided routes.....	42
The role of the Bifurcations in the evolution of life.....	44

Self - organising and life.....	45
Creative chaos.....	46
Is time ahead of the being? The pre – universe.....	47

Chapter 8

The paths of knowledge - Ancient knowledge and contemporary physics The universal nature of soul.....	52
--	----

Chapter 9

The metaphysical and the epistemological question.....	56
Basic scientific assumptions.....	58

The Adventure Of Modern Physics

The indeterminacy of the quantum universe constituted a radical transformation of the thought about the natural world. Before the formulation of the quantum theory, the physicists believed in a universe that worked with the principle of causality. Laplace, at the “Philosophical Essay on Probabilities” summed up his thesis: “we owe to consider the present situation of the universe as the result of its former situation and as a cause of the one which will follow. If only could we imagine a genius that would understand all the forces of nature and the relative state of affairs that constitute it, then for that genius nothing would be uncertain. The future, as well as the past, would be present in our eyes.”

However, the particles of quanta present the principle of complementarity, since they present the properties of a particle and of a wave at the same time. The physicist Erwin Schrodinger developed a mathematical equation that describes the dual behavior of particles. Yet a reason to justify the behavior of the particle can be found neither in the formulas nor by observation. The consequences of the indeterminacy are better depicted at the thought experiment designed by the physicist Erwin Schrodinger, which was known by the name Schrodinger’s cat. At the famous Schrodinger’s thought experiment we cannot determine with certainty whether the cat inside the box is dead or alive before the observation. Before the observation the cat is dead and alive in equal proportions (50% - 50%), as is a particle that performs an infinite number of possible behaviors at the same time.

Which is, however, the point of Schrodinger’s wave function ψ ? The conventional interpretation that is accepted by most quantum physicists about the thought paradox of Schrodinger’s cat is known as the “Copenhagen Interpretation”. M. Born supported that the square of the wave function ψ^2 gives the probability that the electron is found in a particular position. This interpretation that relates the wave to the material substance of a wave particle introduced a probabilistic state, displacing the classical causality. According to the above, when the equation is divided into two, then one of its representatives at the schematic area, just collapses. Instead of the equation leading to a plethora of results, it is reduced to a single result. A schematic

space is a pictorial diagram in which an object is illustrated in the three dimensions of space depending on the time.

At the “Copenhagen Interpretation” the equation does not depict reality; the equation is simply an algorithm, a mathematical method for creating statistical forecasts. For example, the result of the experiment with the cat will be a dead cat or a living cat. John Wheeler, a physicist from Princeton University considered that the term “observer” should be replaced by the term “participant”. A participant is someone who does not only observe one event, but he transforms it by the simple act of his observation. “Maybe the universe comes to a state of existence, in a weird manner, by the participation of those who participate. The vital act is that of the participation.” For Wheeler “subject” and “object” create one another. Sir James Jeans supported that the creator of the matter is, probably, the mind. Jack Sarfatti expressed the hypothesis that the “structure of matter, may not be independent of the consciousness”. For Eugene Wigner, the paradox of Schrodinger’s cat takes place the very moment of the experiment when the human observation intervenes. He supported that the consciousness is the hidden variable that decides on the outcome of any event.

During the 1950s, Hugh Everett expressed the theory of multiple universes. His interpretation supports that the universe is continuously divided into a surprising number of parallel realities. In such a universe, not only do we exist in an undetermined number of worlds, but also at the same universe all the possible outcomes of any incident are inherent. According to the theory of multiple universes, the universe is divided into an infinite number of universes, which come from the interactions of the thousands of its components. In that universe every quantum transformation that takes place in whichever star, of whichever galaxy or at whichever position at the universe, divides our earthy world into a myriad of imperfect copies of itself, which, however, ignore one another. In Schrodinger’s experiment, the moment of the selection, when the observer opens the box, the universe is divided into two identical copies, identical in all details, apart from the fact that at the one the cat is dead and at the other it is alive. Both probabilities (cat dead and cat alive) are equally real but exist in different universes. Every cat that survives in our universe dies in another universe or vice versa. Everett’s interpretation about

a cat that is simultaneously dead and alive, in equal proportions, proves and disproves itself at the same time. This way, the solution to the dilemma of the indeterminacy is possibly at a universe in which all the probable results of the experiment coexist. The theory of multiple universes supports that every time we decide between two alternative solutions, the act of observing cuts the thread connecting the two alternate realities and in that way, it leaves each one to follow its own path through space and time. In other words, in space - time landscape all events coexist. Our choices are those who define which events will become “real” for us and which we are never going to learn about. The physicist John Gribin mentions: “Everything is possible and we in our actions choose our paths through the worlds of quantum”. In the language of the theory of multiple universes, the choices created by ego, separate the quantum worlds, which increasingly go away. On the contrary, the choices that restrict the ego, act as attractors that connect separate universes, communicate with nodes, which get information from multiple sources simultaneously. The emergence of the universal consciousness is the deep knowledge that develops when the Ego of the consciousness collapses.

The United and Timeless Universe

The Ego of consciousness makes an incision at the architecture of the four dimensional space – time universe and distinguishes the man from the world and the beings. In that way, the conscious subject is created on one side, and the object is created on the other one. According to the cosmologist Lide, the Universe and all the physical laws appear as a quantum fluctuation and are represented by a wave function which does not depend on time. The observers have a feeling that the cosmic events evolve as a function of time. This happens due to the fact that the consciousness of Ego separates the united universal world into two beings, the “observer” and the “Universe”, the “Ego” and the “Nature”. The wave functions of the two separate beings depend on time. If, however, these two entities are amalgamated, time stops affecting their mutual function, and as a result their being. In that sense the United Universe is Timeless.

The fact that the ego of the consciousness makes an incision at the united universal world and separates the world into “ego” and “nature”, and introduces in that way the “Arrow of time” (Arthur Eddington), namely, it produces entropy, does not mean that the human is no more a being of the universal and timeless world. It is the ego of the consciousness, according to the special theory of relativity, that always realizes the time and the world compared to its reference frame. This way, the ego separates itself from the other egos – selves, namely, it separates the time into past, present and future. This, however, is a mythological construction of the world, an illusion. The quantum space – time universe is united and timeless and its beings are four dimensional and have got quantum properties, namely they are carriers of the holistic information of the universe. The whole universal information that existed in the past, exists in the present and will exist in the future, is in the man. Every being of the four dimensional space – time is not simply a part of the universe, it is the universe itself! The fact that the humans believe that they think individually constitutes a self - illusion and leads humanity to suffering and disasters. The thought is a process of the united and four dimensional universe. Its expression, however, depends on the level of the cognitive and consciousness development of every human being.

The Nature of Light, Uncertainty and Teleportation

In order to comprehend the science of teleportation, we have to study the nature of light. Quantum physics opened new horizons in human perception and created a series of new principles that assist the knowledge of the universe. In 1900, Max Planck, in his attempt to explain the black body radiation based on the laws of thermodynamics, was obliged to separate energy into tiny parts, the quanta, by introducing a new principle, $h=6,6/10^{-27}$ erg.second which is called Planck principle. That is how the biggest crisis in the history of physics took place, since for the first time after Newton’s era it was supported that the energy is not continuous, but divided into finite measurable parts. The above is considered as the principle of quantum theory.

From the new theory the following paradox emerged: the light behaved once as a wave and the other as a particle. To be more precise, it was verified that when we are looking for photons, the behavior of the light is clearly that of a wave. However, when we want to observe a photon, its behavior is that of a particle. The first signs that the material world is a lot different than the impression it leaves, were found when the researchers Geiger and Marsden discovered that the α particles (helium nuclei) present quantum properties. Some years later, Bohr discovered that the electrons in the atoms of the matter can take only specific energy values, proving that the matter is constituted of quanta. The next big step was made by Heisenberg, with the new quantum theory, known as well as quantum mechanics, according to which it is impossible to measure in absolute accuracy the position and the momentum of a particle. According to the “uncertainty principle”, the more accurate we are on one measurement, the less accurate we are on the other. This theory proved determinism wrong. Since then, the “uncertainty principle” is being verified continuously in physics laboratories, introducing that the behavior of the matter depends on the measurement we make. In that way, a special relationship between the observer and the object being observed is displayed. This relationship proves the infinite possibilities of the quantum world that take place every single moment. The “uncertainty principle” means that we cannot fully decipher the structure of an object, so that we teleport it. This happens because it is impossible to measure its position and its velocity or its momentum at the same time. That way, namely, the measurement of the specific situation of an object is impossible. However, such a measurement would be necessary in order to obtain all the information needed for the creation of a similar object. The scientific solution was given in 1993, when scientists discovered a way of using quantum mechanics for teleportation in which Heisenberg’s uncertainty principle is not abolished. This property is called entanglement.

Common logic regards the objects as independent to one another. In the quantum world, if a particle interacts with another body or particle, then these two are very strongly connected. In a way, they stop acting independently of one another and can be described only when they are associated to one another, as if they were connected by a natural bond. The quantum correlation phenomenon (entanglement) applies whether the distance between the particles is one millimeter or 10000000

years of light and seems to happen instantaneously, i. e. outside space and time. This paradox is known as EPR paradox, named by the three scientists (Einstein, Pontoski, Rozen) who analyzed the consequences of the entanglement on great distances. EPR paradox as was proved experimentally as well, constitutes the base of teleportation and of quantum computers as well. John Bell replied to this paradox. Bell proved a theorem, according to which the correlation phenomenon can be detected only if we do not know the characteristics of the objects we wish to measure in advance. Otherwise the measurement results do not obey the laws of quantum mechanics. Bell's observation introduces philosophical questions about the objectivity of science, namely, what we observe is the result of the measurement. In other words, the observer affects and alters the observed and vice versa. The "subject" that observes and the "object" that is being observed form one another. One of the most interesting conclusions that arise from the correlation phenomenon (entanglement) is that the whole universe is connected in subatomic level since 14 billion years ago the whole matter in the universe was concentrated in a tiny spot. This means that whichever transformation takes place in nature, it instantaneously affects the whole universe.

About the nature of subatomic physics

1. Material and energy interchange one another. The material can become energy and vice versa (nuclear energy) $E=mc^2$ (A. Einstein).
2. The particles can manifest as material or / and as waves. Something may now be acting as a particle and later on as a wave spread in space.
3. Heisenberg's Principle. We cannot define the position and the speed of a particle at the same time. We can measure one or the other. Viger supports that when we observe a particle, we affect its behavior. The observer affects and thus influences the observed.
4. What we realize as dense and impervious material is actually vacuum – There are large electron fields with minimal material / compact energy in the center. We live in a universe that is created by "objects" that are actually 99% vacuum.
5. Also, it has been observed that an object can appear from vacuum and disappear in it. It is there, and then it is not, and then there it is again. It seems that vacuum and material is the exact thing.
6. Even stranger is the fact that a particle can appear simultaneously at more than one position. The existence of a particle at 3000 different spots at the same time has been experimentally tested.
7. Non local affect. A particle can have an engagement with another, in such a way that we can affect this particle, when we influence another particle with which it is somehow connected, not physically though.
8. Quantum leaps. The Electrons can change positions spontaneously. They suddenly appear in another orbit with higher energy or distance from the nucleus.

9. Quantum fields. There is a probability field, an invisible order or quantum field, according to Bohm (Einstein's student) where all the particles and the waves interact with each other irrespectively of time and space. There is only one undifferentiated field from unexpressed yet, chances. Some perceive this field as the primary consciousness. This field is expressed as outdoor visible order or world of beings, objects and facts when we start observing it and in fact creating it by observing it through subconscious beliefs. That way, the observed "object" emerges from the quantum field and gets a specific form and measurable status only when it is observed.

- Bohr: The internal order, the quantum field or the primary consciousness
- a. All particles and waves are interconnected irrespectively of space and time.
- b. There is no space because a particle can be located on more than one spots. Simultaneously it is affected by the influences another particle gets, with which it is not obviously connected.
- c. There is no time, because time is not needed for a particle to appear at another position and it can appear at more than one position at the same time.
- d. A result does not depend exclusively on a local cause, since everything is connected in a cohesive space and time and conclusively everything affects everything and all is affected by all – inside the cohesive space and time.
- e. There are no separate beings, objects, facts or situations. When visible beings and objects are manifested, they correspond to the particular observer who happens to observe them.

Vacuum and Material

Democritus' as well as Newton's views on atoms were based on the fundamental distinction between material and "vacuum" space. As far as general relativity is concerned, this distinction is abolished. Where there is a body with great mass, there will necessarily be a gravitational field. This gravitational field is expressed as the courtesy of the space that encloses this body. However, we should not believe that the field "fills" the space up and forces it to become curved. There is no distinction between these two meanings: The field is the curved space. In general relativity, the gravitational field and the structure or the geometry of the space are identified with each other. They are expressed by the same mathematical quantity in Einstein's field equations. Einstein says: "We are obliged to see the material as a synthesis of the areas of the space, where the field displays a special intensity. In this new type of physics there is no place for field and material. The mere reality is the field." The discovery that the mass is nothing more than a form of energy, made us radically reform our views on particles. In contemporary physics, the mass is no longer connected to the material substance, and, as a result, the particles are no longer considered as fundamental components of material, but as concentrations of energy.

The particles should not be depicted as stable three dimensional objects, as uncountable tiny balls or grains of sand, but as four dimensional beings of space - time. From the aspect of space, they look as objects that have got some mass, while from the aspect of time, they look more as evolutionary processes that request the corresponding act for their realization. The theory of quanta proved that the particles are not isolated grains of material, but models of possibilities, bonds of a non separated cosmic grid. The field theory, which is proposed by the contemporary physics, obliges us to abandon the classical distinction between space and material, since it has been proved that the elementary particles can be born spontaneously from vacuum, without the presence of nucleon or any other strong particle. The vacuum is not a vacuum! On the contrary, it encloses an unlimited number of particles that are created and then vanish constantly. In reality, vacuum is absolutely alive! Most of the contemporary physicists believe that the discovery of the dynamic character of vacuum is the most important in the history of science. Vacuum was no more a passive and neutral frame of the acting of the physical phenomena and was

recognized as a dynamic situation of great importance. “When we are healthy, we do not understand the different parts of our body, but we realize our body as an unseparated total. This understanding creates the feeling of healthiness and joy.”

Key Elements And Principles

Material = Energy

Material and Energy interchange with each other and we cannot separate them. The energy can become material and vice versa. The energy becomes material only when we observe it. The particles can be reported as material or waves. They can behave as particles (they can be defined in space) at one time and as waves in space at another, where it is impossible for them to be defined.

What we realize as dense and impervious material is actually vacuum. We are talking about large electron fields with little material (compact energy) at their centre. Basically, we live in a universe that is created by “objects” that are actually 99% vacuum. The sense of material arises from the move of the electrons around the atomic nucleus.

Accordingly the following applies: if the atomic nucleus has the size of a basketball, then the space occupied by the atom (with the electrons roaming) has a diameter of 22 kilometers!! Namely, let’s think that even a nut consists of atoms. Imagine how far we are from its centre...

It is very important to understand that when we say “great density” we mean “*less distance of the electrons from their nucleus*”. For example: One cubic centimeter of material near a black hole weighs 10 million tons. The rarity of the material here on Earth is immediately perceived...

Basic Theory:

A particle is located at the state of the probability field, it is spread at the space, it is not found in a particular position, until it is observed by the observer and in that way it “collapses” from the probability field at a particular position.

Namely, our way of thinking creates the reality (the material i.e. as we know it) as a result of the act of observing. Every form of consciousness is defined as an observer in quantum mechanics.

Explanation:

A “probability field” is a tendency to become something. It is located between an idea (a possibility) of a fact and its material realization. Namely, once everything had been ideas that were made true in such a material level that our sensory system can perceive.

Non - Locality

It is possible for a particle to be located at more than one spots at the same time. The existence of a particle at 3000 different spots at the same time has been experimentally observed. The above principle applies 100% at quantum level.

Example of non – locality: Let’s suppose that we are watching a football match. When we are not looking at the football ground, the ball exists in every probable position that it could be found (probability field). Only when we look at the ball, does it collapse in one of these (positions).

The position in which the ball will collapse depends exclusively on our sensory system. They define the unique position of the ball in the field. Certainly, whoever watches the specific football match can see the ball at the same spot because all the people have got the same sensory-input system.

“Photons in love”

Two electrons that at some point had contact or were created together are indivisibly connected. Namely, if one electron undergoes a change (in whichever point), then this change “is experienced” by the other electron at the same time and regardless of the distance separating them.

This leads us to two conclusions:

- 1) The information that is transferred and connects the two particles is traveling faster than the speed of light or
- 2) there is no space. Namely, the particles are always together even if, for us, they are located in two different positions in space. This means that they are in different time dimension but not in different space dimension.

Quantum Leap

The electrons are able to change position, defining in that way, other properties and forms of the material that consist it, or they are able to change orbit towards a higher or a lower energy layer, without the intervention of time. The form and the presence of the material (as we know it in general) with its properties, are due to the two things mentioned above, namely the change of the position and the orbit of the electrons.

Quantum Vacuum or Zero Point Field and consciousness

The distinction between material and vacuum space was abandoned the moment of the discovery of the fact that the elementary particles can spontaneously arise from the vacuum and afterwards be absorbed by it. According to field theory, phenomena like this, take place all the time. According to quantum physics, there is no absolute vacuum and every spot of the universe is pulsing by an invisible activity.

Even at the temperature of the absolute zero, the vacuum carries huge quantities of energy which due to homogeneity is not directly perceived, but under certain circumstances leads in observable and countable phenomena. A volume of vacuum space, which is not bigger than our little finger, encloses so much energy as ten billion, billion, billion, billion universes together!

The energy of space can explain the genesis of the universe. So, the vacuum is not empty, but it encloses all potential forms of the world of particles. It seems, however that these forms are in turn transitional and temporary manifestations of the eternal and omnipresent Vacuum.

The ontological interpretation of quantum physics of *Bohm* supposes the real presence of particles and fields. The particles have got a complex internal structure and are always accompanied by a quantum wave field. They are affected not only by the classical electromagnetic forces, but also by a thinner force, the quantum potential, that is defined by their quantum field.

The quantum potential transfers information from the whole environment and provides direct, non-local connections between quantum systems. They correspond to what *Bohm* calls inherent class, which can be considered as a vast energy ocean in which the physical or developing world is a simple ripple. A universal quantum field, the Vacuum Quantum or Zero Point Field is the basis of the material world. Its explanation opens the gates to a function of deeper and more cognitive levels of reality. The catholic associations that were proved by the mildness of the radiation depth are maybe an example of non – locality. Since the early universe presented

quantum correlations, when we conduct observations and find these correlations, we find out the deep interconnection of the universe that is suggested by the quantum theory.

A “non – locality” is a non – locality either it is focused on the relatively small dimensions of the laboratory or on billions of light years. When we understand the one, we understand the other as well. However, we cannot equalize the understanding to the description of a non – locality in space and time, since a non – locality goes beyond space and time limits. As a result, it denotes a single entity that ceases to constitute a whole if it is subjected to space-time description.

Quantum Information

During the whole procedure of the appearance of the particles at the universe, we have to identify the existence of a factor which is neither material nor energy. This factor is already identified not only at humanities and social sciences, but also in the physical and biological sciences.

This factor is information! This information configures the parameters of the universe at its genesis. As a result, it governs the evolution of its basic elements in complex systems. We are not talking about the type of information as it is considered to be spread among people. The “formative information” exists in the world regardless of the will of the people and their actions. The formative information of the world is connected to the laws of interrelation and interaction of its elements, which are created by the Unified Vacuum. It is referred to the consistency of the Universe through which its recipient is formed. It can be the quantum, a galaxy, or a human being. This mutual information relates everything to each other. It is the carrier of all known information under the usual definition of the term “information”.

The mutual information is a refined, permanent connection among the elements that are located in different positions in space and in different moments in time, as well as the consciousness associated with these elements. The characteristic of the coherent universe is the formative information that is created, preserved, transferred

Thank You for previewing this eBook

You can read the full version of this eBook in different formats:

- HTML (Free /Available to everyone)
- PDF / TXT (Available to V.I.P. members. Free Standard members can access up to 5 PDF/TXT eBooks per month each month)
- Epub & Mobipocket (Exclusive to V.I.P. members)

To download this full book, simply select the format you desire below

