ENERGY MASS PARTICLES FIELDS FORCES AND NEW ETHER (AETHER) OF PHYSICS

PHYSICAL SPACE WITH ITS PHYSICAL PROPERTY LIKE NEW ETHER

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Gravitational waves in space

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-- This text may contain grammatical errors. We apologize to our readers. --

Preface

In this and all other writings of <u>www.ricercaetereperduto.it</u> website, which can be found on Google, we identify ether with - physical space and its physical qualities - like has been proposed by P. Drude and M. Abraham towards the end of '800, and by Einstein after 1916, and as is widely described in the file - The New Ether of Einstein - which is always in ricercaetereperduto website.

So in this and in all the other files of our site we use the terms:

space, physical space, space-ether, ether, space-time, all with the same meaning of:

- physical space with its physical properties -.

The ether, then, is no longer something contained within the space, like older models were, but it is precisely the space with all its physical properties that here we try to highlight well, while they are systematically hidden from the words - empty space-, - vacuum space - and mathematical formalism, as the field in vacuum, the curvature of the vacuum, the waves in vacuum, and so on. So that - space - has become wrongly synonymous of – nothingness - . Instead, in reality, the space is the most important subject of Physics, as evidenced by

modern physics.

In fact, many physical phenomena occur in space: there are fields that can exert forces up the bodies, there is the curvature of space and gravitational waves, there are electric and the magnetic inductions, the displacement current and electromagnetic waves, there is the energy associated with fields and waves, there is a potential difference between two points in space, there is also the temperature of vacuum.

In addition, modern telecommunications shows us that the vacuum can contain and travel within itself a very large number of radio and television channels and many others telecommunications modulated in various ways.

And quantum mechanics teaches us that the vacuum is fluctuating of energy and it can be generated and annihilate virtual particles. Moreover it also has the presence of bosons, neutrinos, photons and other particles.

But many people are still convinced that in order to explain everything that happens in the vacuum is sufficient to exclaim - with the field-. And they always think the field as an abstract entity, a pure graphic-mathematical formalism drawn on a sheet, and not as a physical entity in space.

As if were enough to pronounce the magic word to explain all these phenomena that occur in the "vacuum". And they add that all depends from the intrinsic physical properties of the vacuum, but space is absolutely empty because the famous experiment of Michelson and Morley showed that ether does not exist and, moreover, with the theory of relativity, Einstein denied the opportunity of the existence of a privileged reference frame related to the ether and, consequently, also denies the existence of the ether.

If this explanation does not convince you, because the nothingness can't have all these physical properties and they can't be attributed to nothingness, and try to know more about this, soon you will find that the Michelson-Morley experiment did not show anything, and Einstein himself after 1916 introduced three new models of ether for which we can't establish an absolute system of reference so they are consistent also with his theory of special relativity.

Indeed, in 1915 Einstein explained the theory of general relativity, which discuss the reference systems in accelerated motion and gravitation. In particular, the gravitation is proposed as a result of the curvature that space assumes for the presence of masses. Curving space shows a further proof of its physical property (in addition to the

electromagnetic properties already known from the time of Faraday and Maxwell), making it also capable of interacting with matter and that can't be attributed to the vacuum, as a space with nothingness inside, because nothingness can't change state, and we can't have a nothingness different from how it was before or from another nothingness in another point of space, and nothingness can't interact with the matter.

Therefore Einstein stated that General Relativity would not makes sense without a spaceether, then he proposed to return to the ether, that he denied in 1905, and in the subsequent years he presented at least three new models of ether, identifying ether with - physical space with its physical properties-.

But all these ideas of Einstein were soon forgotten by physicists of the twentieth century, which instead were very committed to identify space with – nothingness-, and to reduce all physical phenomena of space to mathematical formalism.

(Perhaps because they did not want to, and do not want to, admit the existence of something that is not yet known)

The reader who wants to study this question can read the file - The New Ether of Einstein on our website - ricercaetereperduto - that you can find with Google, or the book - Einstein and the Ether - Kostro author. In this book the author just calls into question the widespread opinion that Einstein has permanently deleted the concept of ether in physics.

Actually Einstein, before 1915, mainly considered superfluous the concept of ether postulated by Maxwell and Poincare and, of course, also all previous models which considered the ether distinct from the space and contained within the space.

While Einstein, after 1916, as already written, identifies the ether with - physical space with its physical properties -. And we follow this idea and use the words: ether, space, space-ether with the some meaning .

This work takes up precisely the last model of space-ether proposed by Einstein.

In this model the matter is seen as an effect of energy in the ether, and not as a foreign body. This allows overcoming all contradictions of all previous models of ether, principally the wind of ether, and also permits to find a rational and acceptable explanations to many phenomena of vacuum, as the interference, and corpuscular and wave properties of the particles.

Among the reasons that support this new proposal of the ether, there is a rational and credible explanation of the forces at distance, also called interactions, as is widely described later.

Unfortunately, also in this case many people believe that to explain the forces acting between two bodies away from each other is sufficient to exclaim: - with the field! - And then draw two vectors on a sheet of paper, or on the board.

That is, they use the simple graphical and mathematical formalism without any physical interpretation.

But it is not so, because in this way the field is only the map of the forces and not the explanation. And instead it is necessary to understand what happens in a region of space with the field and how the space with the field interacts with matter, and these answers can't be found in nothingness.

For the current physic, the field is defined as a state of vacuum, so it's a purely abstract concept (Feynman's words). But since nothingness doesn't exist, while the field in space exists, and produces real effects in the world of matter, than we should have doubts on identification of empty space with nothingness.

Descartes highlight the absurdity of the concept of space made of nothingness in this way: the space exists and is measurable in extension and volume, while nothingness just does not exist; therefore argue that the space is made of nothingness it is a contradiction because it is equivalent to say that nothingness exists.

In other words, the fact that the space can be measured already shows its substantial physicality. And one hundred cubic metres of space, or thousands cubic metres of space, have a precise meaning.

Instead one hundred, or one thousands, cubic metres of nothingness do not mean anything, and it is a contradiction of terms.

About gravity, Newton, in a famous letter to Bentley, wrote: - To thought that two bodies can act on distance each other without the presence of an intermediate medium, it is complete senseless -.

He attributed the properties of gravity, not to the masses, but to the medium that fills the space; although in the *Principia* he did not propose interpretations as this happens, and said (in Latin):- Hypotheses non fingo-. (I frame no hypotheses). While a few time later, in the *Optical Queries*, Newton looked for an explanation of the forces in the different density of the medium (ether) that fills the space, and wrote: - .. if the elastic force of this medium is extremely large, it may be sufficient to push the bodies from the densest parts of the medium towards the more rare, with all that power we call Gravity. –

Not even the exchange of particles between two bodies (QED theory) is the real answer to the interactions, because it simply translates the problem from large objects to smaller objects.

Similarly to the fields, the physics of the twentieth century has also reduced electromagnetic waves to pure graphic and mathematical formalisms, depriving them of any physicality, and claiming that they can also exist in the "vacuum" understood just as - nothingness. But dear Sirs, if there is a wave in the space, it means that there is something waving! And if space were nothingness, what could swing?

We agree that it is not necessary an ether understood as the old models that described it like something distinct from space and contained within space, and that for electromagnetic waves only swing the induction D and B of the space. But it is precisely these inductions of space that must be at the centre of our attention because they are "physical facts" that actually happen, and prove that space has physical properties. And they are not just abstract equations written on a sheet.

(We talk about it later).

We must also consider that electromagnetic waves carry energy, and in the "empty" space where electromagnetic fields exist we have a certain energy density, expressed by the following equations:

W el. = $1/2 \epsilon_0 E^2$ and W magn. = $1/2 \mu_0 H^2$

with W (Joule/m³) energy density, true and really existing in the space where the fields are present. And this energy may be also very high with Laser rays or Radar impulses . And this means that space is necessarily "something", not yet well defined and that it is not matter, but that with its physical states gives a physical sense to this energy, as well as to the fields and electromagnetic waves.

Instead, in - nothingness - this energy could not really exist. But not even the News and all other television broadcasts could exist in - nothingness -.

The discourse is even more evident and clear for gravitational waves, now that their existence has been confirmed; because in this case the curvature of the space oscillates. And when gravitational waves meet the matter, like the two arms of the LIGO interferometer, they are able to change the lengths of the two arms, clearly demonstrating the remarkable physical

properties of the space.

But even in this case some physicists try to reduce everything to a pure mathematical formalism, and someone has already had the impudence to write that only the Riemann tensor oscillates, just on the sheet of paper where it was written!

There are also the phenomena came to light at the end of nineteenth century thanks to Fitzgerald and Lorentz, describing the increase in mass, the length contraction and time dilatation depending on the speed, expressed by famous equations:

- 1) $L = Lo\sqrt{(1-\beta^2)}$, 2) $m = mo/\sqrt{(1-\beta^2)}$
- 3) dt '= dt/ $\sqrt{(1-\beta^2)}$, with $\beta = v/c$

(v speed of the object, c the speed of light, mo rest mass, Lo length at rest, t rest time).

The state of rest can be defined with respect to the observer, but more properly, it can also be defined with respect to the "fixed stars" or to background radiation.

We define: 4)
$$\gamma = 1 / \sqrt{(1-\beta^2)}$$

where the greek letter γ (gamma) is called gamma factor, or Lorentz factor, and is one of the fundamental elements of the theory of relativity.

Then the 2) can also be written in this way:

5) $m = \gamma^* m o$ here m indicates the relativistic mass (as the old way).

These three phenomena, even if they have been checked and accepted as real fact by science for many years, continue creating wonder and disbelief. In fact we are accustomed to consider the mass, the size of the object and the time's rhythm immutable, because our experience includes motions of bodies at speeds much smaller than c. But these three formula say explicitly, and unequivocally, that if the velocity of an object reaches values that are not negligible compared to the speed of light, then its dimensions parallel to the motion

are contracted, all its particles move more slowly and its mass is increased compared with the values of rest.

Of the three, the increasing of mass with velocity generates more reluctance, although, in reality, it was the first to be verified since the early years of '900.

In fact, the contraction of bodies is within our physical experiences, and in the case specifically, it can be explained by the contraction in the direction of motion of electromagnetic fields according to the speed of charged particles, called - Lorentz contraction - and because the fields are the link between core and electrons cloud and between atom and atom, these contracting, contracts also objects.

Regarding the dilatation of time there are examples of mirror clocks, or moving atoms, or other examples, which clearly show that for systems moving at speeds close to that of light, everything happens more slowly.

While the increase of the mass of an object moving in empty space, really seems inexplicable. Because we have to ask ourselves: where can come the increase in mass, if there is nothingness all around the object?

And the question is more than legitimate. But since the mass increment really happens, because it is s experimentally verified in particles accelerators of all the world, then we must have doubt on vacuum, and on the historical concept, but still rooted to these days, of the independence of object from the space that surrounds it.

For some years the equation 2) m = mo $/\sqrt{(1-\beta^2)}$, with m called relativistic mass, is no longer used by some texts, while other university textbooks continue to use it today.

The university textbooks that do not use the relativistic mass, however, express the momentum with this new way:

6)
$$p = \gamma * m * v$$

and the energy with: 7) $E = \gamma * m * c^2$ (new way)

Now in the equations 6) and 7) m denotes the rest mass, as the new way. While in the 2) the rest mass is indicated by mo (old way).

But also the 6) and the 7) contain the gamma factor, therefore implicitly reaffirm the mass variation with speed, because within them the gamma factor always multiplies the rest mass; being, in the first, the speed known with great accuracy by measures in particle accelerators;

and in the second, c a constant, also it known by such a high precision that can be considered an exact value.

So the mass variation with speed returned immediately with the momentum and the energy, which always contain the gamma factor that multiplies the mass.

At this point, there is the doubt that some texts do not want show explicitly the relativistic mass, contained in the equations 2) and 5), because it indicates clearly that in the modern physics is missing something fundamental, and precisely the physical substantiality of space. Because if we consider the space made of nothingness, that formula is just unexplainable, while it is confirmed by thousands of experiments in particle accelerators of all the world. Therefore we will continue to use the relativistic mass, in accordance with many university

textbooks.

Considering the particle such as an energy effect in the physical space, increasing the kinetic energy also increases the mass of the particle, then we find a clear and simple explanation for the increase in mass with velocity, as well as for the famous equation:

7bis) E = mc^2, here m indicates the relativistic mass, as old way (m = $\gamma * mo$)

From many years, quantum physics defines the vacuum as a fluctuating energy and a dense swarm of virtual particles. And the standard model currently presents a unified field that reminds to a continuous medium. It seems that we need only the courage to call the space with its historic name: ether.

Even corpuscular and wavelike properties of particles and interference phenomena can't be explained by considering the particles as foreign objects to the vacuum space that surrounds them. While they become fully interpretable with our hypothesis.

To summarize briefly the innovative concepts proposed by this text, we can say that the new model identifies the ether with the physical space. Then, ether, space-ether, physical space, space or space-time are synonyms, as already said. And the word ether is useful precisely to highlight the physical substantiality of space.

Space-ether is presented as a medium continuous, isotropic and homogeneous, in which, due to energy, particles are produced in "some way", not yet known, perhaps very small changes of state, or as punctiform vibrational states. And the last one is perhaps the hypothesis that

seems more reliable.

Each particle is not a foreign body in the ether, but is an physical event that happens in it following the fluctuations of energy, taking shape where the energy exceeds a specific density level and annihilating when energy falls below this levels.

Also macroscopic bodies (including ourselves, being made of particles) are generated by energy in the space, and entirely belong to it.

The energy contained in the space corresponds to a perturbed state compared to the state of rest of space. Matter and energy are two states of space-ether those can move in it, in the sense that the particles are formed where energy has shifted and it exceeds the specific level already said. (See the examples of chapter two).

This new concept allows us to understand the motion of bodies through the "medium" without encountering any resistance (the ether wind).

It clearly explains the corpuscular and wavelike nature of particles and the equivalence between mass and energy expressed by the famous equation

$E = mc^2$.

The interactions, or forces at distance, are clearly explained like the effect of the tendency of the space to assume the state of minimum potential energy.

All these points are widely exposed in the respective chapters.

The current physics, however, is still anchored to the notion of the nineteenth century that consider the particles, and the bodies formed, as "objects" autonomous and foreign to the space in which they move. But many discoveries of the twentieth century contradict these assumptions. For example we know that the electron during its motion can disappear in one place and can reappear in another place, in other words it can move from one point to another without passing through intermediate points. And it is practically impossible to give a rational physical explanation with the current assumptions; so that this motion is interpreted only with abstract mathematical equations.

Considering the particle as an effect of energy in space, not empty but with its physical substantiality, that we can express with the word space-ether, with the concepts presented before, instead, we find a rational and logical explanation to this and other phenomena already said before, as is widely exposed in the next chapters.

We also know that the volume of protons, neutrons and electrons, which are made all atoms of a macroscopic body, is very small. For example, for a man we have about a millionth part of a cubic millimetre of these particles arranged in an orderly fashion throughout its volume.

If we consider these particles as "events in the ether" produced by the energy, then we see that ourselves are not strangers to the space around us, but in reality we belong entirely to its substantiality.

Practically we are small flames of energy in the space.

And the phrase : -- We are such stuff as dreams are made on – is very near to reality.

Furthermore, we can also find a meeting point between the science and the interpretation that some religions give of the world by making an analogy between the energy and the Creator Breath of Western religions, or with Prana and other similar concepts of Eastern religions. In this direction everyone can proceed according to their own personal convictions.

Chapter 1

In search of lost ether

Until the beginning of the twentieth century all the great men of science believed that the space emptiness is so only for our senses and our instruments of investigation, but in reality it was full of ether, a mysterious substance difficult to define.

Before Aristotle with the - horror vacui - of nature he affirmed that "nature avoids emptiness" (nature abhorret a vacuo), and after many dark centuries, Newton, Descartes, Huygens, Fresnel, and others, argued and tried to define the cosmic ether.

There were subsequent processing by W. Thomson, Faraday, Maxwell, Hertz, H.A. Lorentz and other less famous scientists, that defined different models of ether, the most important of which was the luminiferous ether as vehicles of fields, forces, electromagnetic waves and the displacement current contained in the famous equation of Maxwell.

In particular, Maxwell, who is considered the greatest scientist between Newton and Einstein, was a passionate supporter of the ether in a period in which already began emerging the supporters of empty space, understood as "the nothingness".

We see what he wrote in 1890 in "Field and Ether" : - The immense regions planetary and interstellar space will no longer be regarded as deserts of universe that the Creator did not

think it suitable to be occupied by the symbols of the manifold order of His Kingdom. We find they are occupied by this wonderful ether.... it extends the same from star to star....The hypothesis of an ether has been supported by various thinkers for reasons very different. For those who supported the existence of a plenum as principle of philosophical nature, the horror of nature for the vacuum was a reason to imagine a ether that pervades everything, even if all the evidence was against it.

For Descartes, who made the substance a necessary condition for the extension, the simple existence of bodies distant from each other (and that interact one with the other) proved the existence of a continuous medium interposed --. (From Field and ether, contained in – Relatività, esposizione divulgativa – Italian Editions Boringhieri).

Maxwell and Descartes thought so. And they are among greatest personalities in the science of all time.

For them, the ether was distinct from space and content within the space.

While at the end of nineteenth century P. Drude and M. Abraham proposed to identify the ether with physical space. This new idea was picked up by Einstein after 1916, and even in this paper we proceed for this new route, and we will use the word ether, physical space, space, space-ether or space-time with the same meaning to indicate physical space with physical properties (as already written).

For supporters of the ether the forces act at a distance through the physical medium, the electromagnetic and gravitational fields were considered as states perturbed of the ether with respect to the ether state of rest; the electromagnetic waves were considered fluctuations of the polarization of the ether, as well as the waves sound are air pressure fluctuations; the potential gravitational energy could think contained in the volume of the space curved by gravitational fields, such as the elastic energy of a spring is contained in its mass deformed by external forces. Even the energy contained in the space subject to the induction of electromagnetic fields had a logical sense.

And the displacement current, produced by the change of polarization of vacuum, was considered a real current that occurred in the medium.

By contrast, the old models were all wrong, mainly because they considered particles and objects as foreign bodies, and this hypothesis makes impossible to explain the motion of bodies through the ether, for example, the planetary motion, without any dissipation of kinetic energy by viscous friction with the wind of ether.

With different experiments, observing only what happens inside the laboratory, they tried (in vain) to measure the observer's velocity with respect to space, in other words an absolute motion with respect to the absolute reference of the ether considered motionless in space. But all had a negative outcome.

The most famous of these is the Michelson & Morley experiment.

Experiment of Michelson and Morley



Michelson's interferometer

Fig. 1

Michelson, true supporter of the ether, wished to prove its existence and built the instrument shown in Figure, just known as Michelson interferometer, in which a beam of monochromatic light, produced by a source bound to the interferometer, is sent to a semi-transparent mirror tilted by 45° and able to split the beam in two parts, one goes in a straight line, while the other is reflected, so as to obtain two beams perpendicular one to another. The two beams are reflected by two mirrors and both come to the eyepiece of the interferometer, so as to allow to observe the phase shift. The beam parallel to the motion of the earth should take a little time

higher in its journey, and this would cause a phase displacement with the other beam. Orienting the interferometer in different directions respect the motion of the earth, the observer should detect variations of the phase difference between the two rays of light. Michelson in 1887, with the help of E. W. Morley, made several attempts to this type, but the interference fringes were always the same.

Similar experiments were carried out later by other researchers, all with negative results.

Explanation of Fitzgerald - Lorentz

The M & M experiment was immediately interpreted as proof of non-existence of the ether. But in 1893 the Irish G. F. Fitzgerald proposed a curious and ingenious explanation of the experiment. He argued that the side of the interferometer parallel to the travel speed of the Earth is shortened as a function of the speed in order to make exactly equal the same journey times of two beams, according to the equation:

1) $L = Lo\sqrt{(1-\beta^2)}$.

This hypothesis very daring for that time, but absolutely true, as was demonstrated later, was the first concept of the modern theory of relativity.

Shortly after Fitzgerald, by independent way, also Lorentz introduced the lengths contraction and the two other relativistic phenomena, which are: the increase of mass and time dilation, expressed by equations 2) and 3) already written in the preface.

The length contraction with the speed, at that time, seemed an assumption just made for the occasion, but in the second half of last century, was confirmed in countless experiments with particle accelerators, and currently is recognized as true all over the world.

It is also one of the basic concepts of the theory of relativity, known as a "contraction of the length with the motion" contained in the transformations of Lorentz.

Moreover the three formulas 1), 2), 3) of Lorentz-Fitzgerald are also the basis of Einstein's theory of relativity, and we can say that they are also supported by the completeness of this theory.

Clear descriptions of the experiment and the causes of its failure are in many books, for example :

Space, Time and Gravitation of Eddington,

Laws of nature of R. E. Peierls,

Six Not So Easy Pieces of Feynman.

Other books, such the old edition of Halliday-Resnick, and some encyclopaedia, omit these considerations; however, in all other chapters they expose the contraction of the moving length.

Einstein and Infeld in the book: -The Evolution of Physics - in the description of M-M experiment they do not consider the contraction of the interferometer side parallel to the motion and say: - It is time to forget the ether and no longer pronouncing this name. Then we will say that our space has the physical ability to transmit some waves. But the omission of a word from our dictionary is not a remedy. Our embarrassment is very -

But 14 pages later they expose the contraction of rulers in motion, which instead, have not considered prior for the experiment of M & M.

In our days should be well known and accepted by all that the experiment of M - M committing the systematic error of neglecting the contraction of the side of the interferometer parallel to the travel speed of the Earth, because then it was not known, and therefore its negative conclusions on the existence of the ether are not valid.

Anyway, Michelson continued to believe strongly in the ether until last moment of his life. We can therefore say that the M & M experiment failed to demonstrate the existence of the ether, but it has not demonstrated that the ether does not exist.

It is surprising (and disconcerting) to note that, even today, the experiment of M & M is defined by some writers as "the most important experiment with failure in the history of science". But, in this way they commit a serious misrepresentation and, consequently, their interpretation becomes: the greatest imposture of the history of science.

Anyway, the experiment was useful to science, because discovering the length contraction as function of speed, and the gamma factor, it gave a fundamental turn point to physics, opening the street for the theory of relativity.

Not observable or not existing

From the three phenomena described by the Lorentz equations 1), 2), 3) (accepted for many years from all academics world) it follows that the ether is not observable, like it has been described by Lorentz in his " Principle of Corresponding States", and later by Poincare.

It has been turned into "non-existence of the ether," according to the Einstein's criterion arguing that what is not observable does not exist, or it is as if it does not exist.

This question is highly debatable, but it was accepted by the majority of physicists, so in the first decades of the '900 they claimed the hypothesis of non-existence of the ether, and afterwards the empty space, with "nothingness" inside, had successful.

What is - not observable - depends only on the state of science and technology of the period.

Many things have been not observable for a long time: bacteria, virus, electrons, protons, neutrons, quarks. Even the four bigger satellites of Jupiter were unobservable before the invention of telescope, and the planets of other star systems were unobservable until a few decades ago.

Physics has often suggested the existence of particles - not observed – but including within well-defined theories, and their existence were verified experimentally after years of research and technological progress, only when new and more powerful means of investigation are achieved. It happened with the quarks, it happened with the Higgs bosons, and other particles, first provided by the theory and then observed only after years; some, like gravitons, not still observed.

A analogous fact occurred with the discovery of remote planets of the solar system, Neptune and Pluto, theoretically expected, examining the perturbations of Uranus orbit, before being observed directly.

The space-ether currently is - not directly observable - as the motions relating to it. But it is not absolutely excluded that in future we can find an experiment that allows observing it.

With regard to the principle of relativity of motions must be said that the observer can't determine its motion with respect to the space only if he looks at the effects of the experiments inside his own laboratory, without looking out.

If he looks also out, then he can extend its investigation domain even at far away stars, the so-called "fixed stars", or to other galaxies, and their observation can obtain information

useful for determine own motion with respect to the space, for example by means of two physical phenomena: the Doppler effect and the aberration of starlight.

There is also the background radiation of the universe and from some years we can measure the motion of the Earth with respect to it, that indicates an absolute speed of about 400 km/s. As it is described in the following paragraph.

The current non-observability of the space-ether directly implies the impossibility to define a reference system bound to it, called absolute, or privileged over the other inertial reference systems; so there is no incompatibility with the first principle of the theory of relativity, and it is wrong to claim that the first principle excludes the existence of the space-ether.

It 'should be noted that is the first principle that depends from the non-observability of the space-ether and of motions with respect to it, and the impossibility to define an absolute system of reference (looking only inside the laboratory), and not the contrary.

Aberration of light, Doppler effect and background radiation

As we just mentioned, the aberration of starlight and the Doppler effect make clear the relative motion between the observer and the "fixed stars."

Let's examine the first: to observe a star the angle of orientation of a telescope must be adjusted according to the vector sum of the speed of light from the star and the speed of the Earth, that is not fully negligible compared to the speed of light. And it is well known that the speed of light in space is independent of the motion of the source that generates it.

The vector sum must be made in accordance with the method of Lorentz.

However, since the term $(v/c)^2$ is very small (v speed of the Earth, c speed of light), the result is little different from the sum made with the classical method.

To better illustrate this phenomenon there is the simple example of the rain in a day without wind: for an observer standing on the roadside the raindrops fall vertically, while for another observer in motion, for example in a car, the rain hits the windshield with inclined direction. A similar fact happens to photons of light coming from the stars and received by the Earth moving in space.

It should be noted that this involves only a change in the direction of speed of light received by the observer, and not as a variation of the module because the sum of speed must be made with the Lorentz method. However, for correct interpretation is necessary to consider the velocity of the observer that influence the angle of incidence light.

The aberration of light was discovered by Bradley in 1726 and it provided further evidence of the mobility of the Earth in the space, particularly important at the time. It also allowed to calculate fairly accurately the value of c.

Currently, instead of the fixed stars, other galaxies are taken as reference points. In this way we can evaluate our motion due to the rotation and the translation of Milky Way.

The Doppler effect shows the relative speed between the source of electromagnetic waves and the observer, just as a change in frequency.

It's very important and is known in astronomy in the field of optical and in that of radio frequencies.

It also occurs for sound waves and is easily detected it, for example, with the passage of a helicopter or a whistling train.

So these two phenomena give precise information about the motion of the observer; as well as the observation of the background radiation. Indeed, recently there are also observations of the Earth's speed compared to background radiation, and show us that the Earth has a speed in relation to the space of about 400 km/s, which almost coincides with the previous valutation of speed compared to other galaxies.

And today some scientists, for example Selleri, propose to use the observation of the background radiation to define a new privileged reference system.

In conclusion, if the observer looks at only the effects produced by the experiments made inside the laboratory, then he can't determine its motion with respect to space. Instead, looking something out of the laboratory and observing the light of the "fixed stars" or the background radiation, the observer can obtain information relevant to his motion. And this is valid for the observer who is in the hold of the famous ship of Galileo, as for who travels within a hypothetical spaceship super-fast.

In this way you can easily solve all the paradoxes of the Theory of Relativity, the main one is that of the two twins.

Difficulties of definition of the ether and inconsistency of previous models

In the past centuries there were also some objective difficulties to defining properties of the

ether, and this contributed to his downfall.

In fact, in addition to the ether wind, there were the following questions: light waves are transverse waves, their oscillation is perpendicular to the direction of propagation, and only solid medium can transmit transverse waves. It also should permeate all substances transparent to light and it should not hinder any movement at all of no one corps, from the rotation of the planets around the Sun, to the trembling leaves.

After the discoveries that established the electromagnetic nature, and not elastic, of electromagnetic waves, was overcome the hypothesis of the elasticity of the ether, however, it still remains to this day as regards the gravitational waves, which were unknown in the nineteenth century.

But in old models of ether the objects were always considered foreign bodies inside the ether and then persisted the difficulty of movement because their motion would have met the ether wind.

In addition to this, the wrong interpretations of the experiment of M-M and the postulate on the relativity of motion contributed to the abandonment of the ether.

Abandoned all the old and wrong materialistic models, "the sky became free from the cobwebs" that had built its supporters with their interpretations of the mechanistic and atomistic medium.

But instead of saying that the ether does not exist, they would simply had to say that those models were wrong.

Indeed, at once legitimate doubts arose on the vacuum. Let us examine some.

Perplexity and inconsistency of "vacuum" space made of nothingness

The "empty" space made of nothingness presents immediately a long-standing philosophical doubt. In fact, propose a space made of nothingness is like claiming that exists what does not exists.

Descartes indeed argued that any extension needs a substance.

Space exists and it is measurable in extent and volume, while nothingness just does not exist, so it's impossible to identify nothingness with space.

As already written, a cubic meter, or a thousand cubic meters of space, are well defined and distinct concepts. While a cubic meter of nothingness, or a thousand cubic meters of

nothingness, don't have any logical sense.

In our day, in addition, we know also that the space contains fields and waves and the their energy. In fact, eliminated the ether, fields and waves were left in the space. So they became: the field defined as the state of nothingness, and waves without anything that swing.

Not only that, but there are also all the other physical phenomena that occur in a vacuum.

Thus we have the empty space with inside a "nothingness" a bit 'strange, because it isn't always identical to itself (in the "nothingness" there's nothing that can change, if instead, its status changes means that it is something with physical characteristics that can change).

In fact, now we have the space done with the "nothingness", but this nothingness can bend, it can polarize as the materials, it can conduct the displacement current, it can contain the fields, it can have a potential difference between two points, it can exert e forces at distance, it can store different types of energy, it can generate and absorb particles, it can have its own temperature, it can contain inside itself simultaneously hundred television news in hundred different languages. And everything in nothingness.

For the Physics all these events are interpreted with pure graphics and mathematical formalism, but always and rigorously identifying space with nothingness; and they are defined: intrinsic physical properties of vacuum space, always understood as the nothingness. We frankly think that all this is contradictory, and in this "nothingness" there are too many things.

With reference to the field in vacuum, Feynman saw literally: - The best way is to use the field abstract idea. That it is abstract it is unfortunate, but necessary -.

(The Feynman Lectures on Physics)

So the field in space now is reduced to an abstract idea, a graphical formalism, to overcome something basic of space that physics does not know.

For other authors, less famous, it's suffice it to say: - the field (like an abstract mathematical formalism) is all that is necessary to know in space - and close the argument.

To explain the forces at a distance, some people believe that it is enough to draw two vectors on a sheet of paper and exclaim: - with the field!

Instead, the fields are the most important physical subject of the universe. More of mass, because it holds together all the matter, from atoms, to planetary systems and galaxies. It fills all the space and brings us the images of faraway stars and galaxies. And the volume of objects is essentially field, because the volume of particles is very small (see related

paragraph). But if we try to look at the space where there is a field to find what's supporting this important entity, the present physic answers us: nothingness!

For this aspect of the field reminiscent of a book by Italo Calvino:

- The non-existent knight - which tells of a very valiant knight, but consisted only by the armour. Inside the armour there was nothing. The author says: - The cavalryman was pure will.

Therefore we could define the field as - the non-existent knight of classic Physics -.

Quantum vacuum

The quantum Physics began to develop the theory of quantum fields and stated that in reality each type of field fills the space of particles also act as mediator forces. They defined: photons for electromagnetic fields, gravitons for the gravitational, gluons for the strong nuclear forces, bosons for the weak.

These theories have been tested in the sense that those particles were all found, except gravitons.

However, it should be noted that to assign the exchange of interactions to other particles means simply to shift the problem to large objects to smaller objects, and does not solve the problem.

Afterwards, always with the quantum theory, the vacuum has filled with a continuous appearance and disappearance of particles called virtual, formed by particle-antiparticle pairs. But physicists say that they, like quantum field, always and only appear and disappear from "nothingness", i.e. they are generated and annihilate into nothingness.

The vacuum, seen on macroscopic scales, is quiet and calm only because the creation and annihilation of all particles occurs in very short distances. Just like a stormy ocean appears smooth and flat if it is seen from an airplane at high altitude.

The virtual particles are produced by vacuum fluctuations of energy and are called "virtual" because they exist for a very short time so you can't measure them directly. However, they produce effects well evaluable as alterations of the energy levels of atoms and the Casimir effect.

In 1948, Casimir showed that two very near and electrically neutral metal plates alter the spatial distribution of virtual particles, decreasing it inside the two plates. The result is that the

virtual particles remain outside are more numerous, and perhaps larger, and causing a "pressure" more on the external surfaces and then there is a force of attraction, very weak, between the two plates.

It should be added that there are also other interpretations of these forces between the two metal plates, such as the polarization of the atoms on the two facing surfaces.

Anyway, in the quantum theory of the vacuum there is energy constantly fluctuating and in the apparent calm of the vacuum appear and disappear pairs of particles - antiparticles.

Antiparticles have mass equal to the corresponding particles and opposite charge.

As already said, it is frequently couples electron – positron, or quark - antiquark, which immediately annihilate each other releasing in space the energy corresponding to their masses, which, in turn, immediately contributes to produces other new pairs of virtual particles.

Also for the Standard Model the space is full of energy, fields, particles, bosons of Higgs, field of Higgs, and other bosons and fields.

There is also the zero-point energy (ZPE): the lowest energy level in the vacuum.

Modern physics continues to fill the space with new and ever more numerous particles, such as the Higgs boson, so that it is legitimate to ask how we can still be able to see stars on a clear night?

Aristotle had said: - Nature has horror of the vacuum -. Modern science says that the vacuum contains all of Physics, in the sense that everything that exists is created and shaped in the vacuum.

In some physics journal is curious to read articles written by famous scientists that are forced to admit all these physical phenomena in the vacuum.

They start with a little embarrassed saying: - the idea that the vacuum, intended as "nothingness", can hold energy, and other physical properties, may appear contrary to intuition and logic, but .-... But, here it is that everything really happens in the vacuum space.

Of course we think that is contradictory to attribute to nothingness all these phenomena that occur in the space. Instead, they demonstrate the physical substantiality of space, different from matter and difficult to define, but that still exists, and supporting physical and logical sense at all these facts with its different states.

Forces by QED and QCD

The theory that describes the interactions between electrically charged particles is quantum electrodynamics, QED (Quantum Electro-Dynamics, acronym) founded by Feynman and his collaborators in the forties years.

QED is also the title of his famous book, subtitled: the strange theory of light and matter.

For it the electromagnetic interaction happens via exchange of photons. These particles act as mediators of the forces and interactions are graphically represented by Feynman diagrams in which shows the trajectories of the particles that combine in strange ways.

In these diagrams some photons would return back in time..???

But I think that from some years is no longer accepted the motion back in time of the particles.





Exchange of photons between the protons in the nucleus and an electron as it is shown in QED

The discovery of quantum particles as mediators of the forces is certainly a step forward

respect the field in the nothingness and made of "nothingness", proposed by classical physics; but, as we have already said, in this way it translates simply the problem by objects bigger to objects smaller and it may give a reason to repulsive forces and not to the attractive.

Also according to the QED, "vacuum" space is populated by electron-positron pairs and photons. The photon, in fact, has no charge, so its antiparticle is identical to itself. Couples electron – positron, that annihilate and continually reform, are polarized as the matter, and this can add support to the polarization of the "vacuum" space and make logical sense to the displacement current, when polarization changes.

The strong interactions, acting between the quarks and between protons in nucleus of atoms, are mediated by gluons.

Quarks have colour charge, which can be of three types, green, red and blue, and the theory that studies these interactions is called quantum chromo dynamics, QCD. It admits eight types of gluons and it also says that the vacuum is populated by virtual pairs quark- antiquark that form and annihilate in a flash.

Both QED and QCD theories do not explain how the particles are able to mediate forces, however they are framed in a mathematical model that allows to make very precise calculations, especially QED, but there is not a physical interpretation of the interactions between particles, and doubts remain legitimate.

To expose these questions more broadly we think, for example, just to protons in the nucleus. We know that between the protons there are repulsive Coulomb forces, which, for the very small distance, have very high intensity, such that the core should blow up, which instead remains united and very compact, as if on the protons also acted bigger attractive forces than repulsive forces. One might say, jokingly, that the nucleus is held together by special glue.

Well, the attractive forces are precisely attributed to the mediating particles called "gluons", that means: particles with glue. And this seems almost a joke, but it must be said that the gluons have been found with the accelerators, although there is not a physical explanation of the forces but only an abstract mathematical model. But we can always believe that really they have the glue. Or we can use the slogan: - with the field!

Anyway, we must keep in mind that we also explain the forces of Coulomb drawing two vectors on a sheet of paper and exclaiming: - with the field! (of course in the "nothingness"). And many people still consider this as a reasonable and comprehensive explanation.

But our doubts remain because we might say :- if between protons in the nucleus attractive forces are exchanged via gluons, then between gluons and gluons, how is the exchange forces? Perhaps with other particles even smaller? And among the latter particle, as interactions occur? Perhaps even more with other particles smaller still? - And so on.

To try to explain the exchange of forces at a distance through the exchange of particles, sometimes it gives the example of two players who throw a ball at each other, or playing tennis, thus exerting forces on each other at a distance. Or the example of two soldiers who shoot each other with machine guns.

But these methods are certainly dissipative, because the bump is never perfectly elastic; while the fields forces are perfectly conservative.

In addition, for the attractive forces players should throw the ball from the side opposite of the other player, so that it reaches him from the rear, and not the front. So there should be a "boomerang effect". But to have a curved trajectory the motion must take place in a medium, that instead the Physics excludes it.

For gravitational forces, argue that those forces are caused only by the action of particles, called gravitons, appears simply grotesque: try to imagine the Sun and Jupiter, the Sun and Saturn, or also the Sun and the Earth who exchange gravitational forces through (and only) by exchange of particles.

It is clear that this theory is incomplete, because there is not the main vehicle of interactions. And this may be only the physical space with its physical properties, that we can call spaceether, or new ether.

Photons are only corpuscular sign of the presence of electromagnetic fields, but actually is the space-ether that exerts the forces with its states that tend to move towards the conditions of minimum potential energy. As will be amply explained later.

It's clear that the QED and QCD don't give satisfactory answers from physical point of view, but they reduce the argument to a pure mathematical formalism, although they are very useful because they allow very precise calculations.

To explain interactions there are also other curious theories: some with parallel universes, others with space-time models having 26 dimensions. And others even more imaginative. In the second chapter we also try to give an interpretation of the interactions, re-proposing the space-ether with its physical properties, and remaining in the three spatial dimensions.

The Higgs boson

In "vacuum" space there are also some types of bosons. Among these, the Higgs boson is particularly important.

Theorized in the year 1964, the Higgs boson has been finally observed in 2012 during the experiments conducted with the LHC of Genève.

According to the theory of Higgs, it is believed that boson generates the mass of all other fundamental particles.

At this point of the theory it should only understand what is the origin of mass of the boson itself. But nor Higgs, or others, give an answer to this question, because modern physics states that all around these particles there is just the "nothingness". And, they say, in the vacuum the Boson exists because exists, and do not ask any more!

While it is more logical to think that the mass of the bosons has its origin, as an effect of energy, from the physical substantiality of space.

At boson is also associated his field, said precisely Higgs field, which is of scalar type and which would occupy all the space (of the universe), and that must be added to the other fields that are already known.

The Higgs boson complete the Standard Model and explains the difference in mass between the different types of particles. Without the introduction of the Higgs boson, for the equations of the Standard Model, which are very symmetrical, the particles appear all with the same mass. And this contrasts with the evident reality. So it was added something that differentiate the mass of different types of particles: this is the Higgs boson; depending on how the particles interact with it, for acquire their different masses.

However, it must be pointed out that the bosons and the Higgs field are in the "empty" space, also called – vacuum -, where there should be nothing.

Instead "vacuum" space appears more and more full of particles, fields, bosons and fundamental physical events.

Dielectric and magnetic induction of vacuum, displacement current and Maxwell equations

The electromagnetic phenomena are manifested with the following vector fields: the electric field E, the magnetic field H, the dielectric induction D, the magnetic induction B.

We have: 8) $D = \varepsilon_0 * E$, 9) $B = \mu_0 * H$

with ε_0 dielectric constant of vacuum and μ_0 magnetic permeability of vacuum.

Classical physics defines the dielectric and magnetic permeability of vacuum space without posing the slightest doubt about how the nothingness can have properties defined by physical constants.

The ε_0 and μ_0 values depend on the units of measurement system adopted; for example with the International System (SI) you have:

 $\epsilon_0 = 8.85^{*}10^{(-12)} (F/m)$ and $\mu_0 = 1.26^{*}10^{(-6)} (H/m)$.

While with the CGS Gauss system we have:

 $\epsilon_0 = 1$ $\mu_0 = 1$, both dimensionless.

But they exist because 1 is a definite value. They are not equal to zero.

With CGS, having chosen $\varepsilon_0 = 1$ and $\mu_0 = 1$, there is a third constant, usually denoted by α , equal to the speed of light. Instead in the SI system α is equal to unity.

(Reference: Elektrodinamika of Novozilov-Jappa Edition MIR Moscow)

Then with the CGS Gauss system, you have: D = E, and B = H.

Even electric and magnetic induction D and B exist (they are not null). And reading the previous two formulas from right to left, it can be said that it is precisely their existence that gives the physical sense to the fields E and H in the vacuum.

As we have already written, quantum physics has defined the "empty" space as densely populated by particles called "virtual" because they have a very short life, predominantly pairs of electrons-positrons and quarks-antiquark, of ephemeral life, which immediately annihilate, releasing energy into space, and then reform immediately afterwards. And thanks to them now we are no longer bound to an abstract concept (and also absurd) of a vacuum induction as a state polarized of nothingness, or polarized state that does not exist. But with the alignment of these particles, finally, the electromagnetic field in vacuum can acquire a concrete and true physical meaning.

Similarly, the magnetic induction will be achieved by preferential aligning of the spins of virtual particles along the lines of the inductor magnetic field.

The polarization of the vacuum via electron-positron, or quark-antiquark, pairs now is only a hypothesis. But if these virtual particles do not line up, then will be others particles, yet unknown.

Something that polarizes must be necessarily, otherwise the polarization of the vacuum would not exist.

With polarization there is associated also energy for unit volume, and the displacement current, when the induction D varies in time.

Practically with modern Physics we return to the representations that Faraday and Maxwell gave to the field as polarized state of the ether. Of course they do not know yet the quantum vacuum with particle-antiparticle pairs, but simply imagined electromagnetic dipoles created by fields in the ether.

Of fundamental importance for the description of the electromagnetic fields are the famous Maxwell equations:

10) rot H = J + $\partial D/\partial t$ 11) rot E = - $\partial B/\partial t$

12) Div B = 0 13) Div D = ρ

Here we will discuss they very briefly. Let's start with two easier.

The 12) follows from the fact that there are no magnetic monopoles. Integrating it we get that the flow of B through a closed surface will always be equal to zero.

The electric charges instead are separable, and in 13) ρ is the charge density. Integrating the equation 13) we get that the flow of the vector D through a closed surface is equal to the charge contained within it.

In the equation 10) J is the material current density, generally produced by electrons.

In the "vacuum", where the material current is zero, we have J = 0 and 10) becomes:

10bis) rot H =
$$\partial D/\partial t$$
.

In the second member of 10) and 10bis) there is $\partial D/\partial t$, the famous displacement current; to be precise its density.

It also exists in a vacuum and it is defined by the partial derivative with respect to time of induction dielectric D.

In accordance with what is written above, it can be interpreted as a variation of the

polarization of the "virtual" dipoles that are created in the space. In other words: a variable electric field will induce a variable polarization of these virtual particles, generating in the space a real movement of electric charges.



Fig Displacement current through S2 (fig.a) and through S1 (fig. b)

In fact, the displacement current has all the properties of a material current: it produces the magnetic field and gives continuity to the electron current, for example in a capacitor with vacuum between the plates, or with an antenna radio, satisfying Kirchhoff's current law.

We also remember that the displacement current can generate electrodynamic forces up the conductors that lead electronics current. And it is of fundamental importance for the propagation of electromagnetic waves. And precisely equations 10bis) and 11) allow us to understand how the propagation of electromagnetic waves occurs in space.

Indeed, the equation 10bis) means that a variable electric field is surrounded by variable magnetic field rings. While 11) indicates that a variable magnetic field, in turn, is surrounded of variable electric field rings, and so on. The two fields trail each other and form concatenated perpendicular rings of E and H (to which correspond the inductions D and B) that propagate through space.

Maxwell gave a physical meaning to all terms contained in his equations, while modern Physics reduces all this only to a pure mathematical formalism, and assert that in space there are waves, but nothing is waving !

Instead, we are convinced that all these physical facts, expressed by Maxwell's equations, have a precise physical meaning in space, and testify the existence of physical properties of space, (that also can swing).

Chapter two

Resurface of the ether

As you can see, with modern physics the concept of empty space, with the nothingness in it, loses more and more meaning and gradually emerges the physical substantiality of space. Also the study of the infinitely large "vacuum" space clearly indicates that it is not empty, because there are questions not yet resolved, as the dark matter and the dark energy of universe, and the cosmological universal constant.

And it is important to consider that there is also the temperature of "vacuum". In fact the temperature of intergalactic space is 2.73° Kelvin.

The known properties of the space are expressed by the following constants:

the dielectric constant of vacuum

the magnetic permeability of vacuum

the speed of light in vacuum

the impedance of vacuum

Newton's gravitational constant

Coulomb's constant

Probably also the Planck constant, the fine structure constant and cosmological constant depend on the physical properties of space.

Descartes, Newton, Maxwell, Lorentz and others wanted to believe in the ether even though their models were contradictory.

Today, scientists do not want to believe in the space-ether even though there is a lot of evidence for the physical property of space.

The postulates of relativity

Let us return to Einstein's theory of restrict relativity.

In 1905 he enunciated what is considered the first postulate of relativity theory and that says:

- It 'impossible to define a privileged, or absolute, reference frame, with respect to space - (looking only inside the laboratory).

However, this claim was already enunciated by Lorentz, some years earlier in "Principle of corresponding states".

It can also be said in other words: all inertial reference systems (also called Galilean) are equivalent.

Statement made about three centuries before, precisely by Galileo, with famous examples of conceptual experiments made in the hold of the ship, showing that the observer does not notice any effect of its speed on the experiments that he performs, and that the laws of mechanics are the same in all reference systems in rectilinear and uniform motion.

Of course, we repeat, the first postulate is true only looking at the effects of the experiments inside the laboratories. In fact, the Michelson-Morley experiment and all the following ones are made looking exclusively at what goes on inside the laboratory.

If instead the observer can look out, then it is applicable what we wrote in the section -Aberration of Light of stars, Doppler effect and background radiation - and the moving observer can evaluate the effects of his motion very well.

Also the observer of Galileo, looking out of the ship's hold, can see the water flowing along the sides of the ship, or the mainland, or another ship stopped at anchor, and he can immediately assess his speed, not absolute, but relative to the mainland.

The modern observer, as we have already said, looking out of the laboratory, with the observation of the background radiation, the aberration of the star light and the Doppler effect, effects very well evaluate the of his motion compared space. can to For example, if the observer makes measurements of a star's light frequency, this measurement will also depend on his speed; and a second observer with a different speed from the previous one will measure a different frequency of the light of the same star. In addition, for several years the observation of background radiation has allowed us to affirm that the reference system for which this radiation is isotropic is privileged over all the others.

Returning to the ether, always understood as a - physical space with its physical properties-, because it is still not observable, it is perfectly clear that it is impossible to define a reference system bound to it. So its existence does not contradict the first postulate of relativity theory. Instead this is often used to deny its existence. While it is the first postulate that comes from the fact that the motion respect space is not observable (looking inside the laboratory).

Einstein changed his idea about the ether after the General Relativity, and from 1916 onwards proposed three models of space-ether to which you can't bind a reference system, so they are called ultra-referential. In his last model, material particles are imagined as an energy effect in the space-ether itself.

Also in 1920 at the University of Leiden, and in 1935 to a physics conference in Vienna, Einstein clearly proposed a return to consider valid the existence of the ether, identified precisely with the physical space with physical property.

In the our file - The new ether of Einstein -, or in the already mentioned book - Einstein and the ether -, Kostro author, with Einstein's original writings, stands the above written.

The second postulate of Einstein says: the speed of light in vacuum is a constant independent from the motion of the source and the observer, and it can't be exceeded.

And this is another physical property of the space.

Speed of light and ether

It is important to recognize that also the speed of light is a property of the of physical quality of space, as it is clearly evidenced by the following equation:

 $c = \alpha / \sqrt{(\epsilon o^* \mu o)}$ (c speed of light)

in the SI (International System) we have: $\alpha = 1$ and for $\varepsilon o = \mu o$ the already written values,

while in the CGS Gauss we have: $\alpha = c$ and $\epsilon_0 = 1$ $\mu_0 = 1$

Currently the value of c is measured with such high precision (more than ten significant digits) that it is considered an exact value.

Also the second postulate of RR, however, seems favourable to the ether, for analogy with the sound. In fact, the sound is a perturbation of the medium, for example, air or water, which

propagates in it with a typical speed depending on its physical characteristics, with constant velocity and independent from the speed of the source that produced sound waves.

So the light would seem an electromagnetic perturbation that propagates in the physical space, and also its speeds is independent of the motion of the source that generated it.

Also the fact that the speed of light can't be exceed by anybody seems favourable to existence of a medium in which the movement takes place.

In fact, if the movement happens in nothingness, a particle with nothing around it, appropriately accelerated, could reach a speed tending to infinite, or multiple of c. Since it does not interact with anything, there is nothing that could put an upper limit to its speed.

(And to do a somewhat joking analogy one could say that the photons seem like poor swimmers who can't overcome a certain speed).

Regarding the independence of the speed of light by the motion of the observer, it should be noted that the observer in motion has a meters shorter and a clock that runs slower than the observer in rest (at rest with respect to the "fixed stars or to background radiation") according to the phenomena enunciated by Fitzgerald and Lorentz. The sum of the speed must be made by the method of Lorentz formulas containing non-linear terms and gamma factor, so the relative velocity from light and the observer in motion remains the same.

Other consideration to support the space-ether

Let us now expose other concepts in support for the physical property of space, which we can express with the word ether.

We now consider the Lorentz law, which expresses the increase in mass in function of speed: 2) $m = mo^* \gamma$ (or the equation $p = \gamma^* m^* v$ which always contains the product $\gamma^* m$)

As we wrote, if we consider the particles as effects produced by the energy in the spaceether, then it is easy to justify the increase in mass, because increasing the speed increases the kinetic energy and therefore increases also the mass that corresponds to the energy and which is generated by the energy.

Instead, if we consider the motion through vacuum space, and the particle as autonomous foreign object, how can we justify the increase in mass if there is nothing around it that might give the matter to the particle?

The same argument can be extended to the famous equation $E = mc^2$.

Indeed increasing the energy in the first member, in the second member increases the mass which, for the energy effect, is formed in the space-ether.

We know that virtual particles, but also photons, electrons and other particles appear from nothingness and in nothingness is annihilated, in other words disappear and then reappear at another point. If this happened in the space-ether, would be logical to imagine this particular substance that generates and reabsorbs the particles. While considering that they generate and annihilate into nothingness is much less rational and seems to belong more to the field of magic than to physics.

By contrast, as mentioned before, the motion of a foreign body through the ether should meet the objective difficulty of viscous friction resulting in dissipation of kinetic energy, while the movements of the planets and all the bodies show that doesn't occurs.

In other words, for the object in motion should be the "wind ether ", but it just does not exist.

The old models of ether considered objects as foreign bodies, so they were unsatisfactory and even contradictory. While the models proposed after 1916 by Einstein fully overcome these contradictions.

New ether of Einstein

We review the models proposed by Einstein from 1916 onwards and we see now to reconcile them with modern knowledge of physics.

Let us always remember that Einstein identifies the ether with physical space and its physical properties.

Einstein proposed this new idea: the matter is produced by energy in the space- ether, and is no longer a foreign body.

In this way we no longer have the wind of ether and pass all other contradictions of previous models.

Einstein combined the concepts of electromagnetic field and the photon like a quantum of energy produced by the electromagnetic field in space, to get the third concept: the quantum field, as a continuous medium that forms particles with its states.

Writes A. Einstein - The particles are condensations of the local field, concentrations of

energy produced by the quantum field. We consider the matter as a region of space-time where the field is extremely intense, which a very large amount of energy is concentrated in a very small portion of space-time. This node of energy, that is quite distinct from the rest of the field, propagates in it. This theory forces us to abandon the classical distinction between matter and "vacuum" ---.

Let us proceed with these ideas of Einstein.

We think about a particle in motion and the equivalence of mass and energy: according to the above ideas you can think the particle as a particular effect of energy in space.

In the space-ether, in some way (that we do not know yet), the particles are formed for an energy effect, perhaps as very small vibrations. They do not have an own motion with respect to space, but moves only the energy and the point where its concentration produces the particular physical state of space that creates the particle.

Around this particular local state, which constitutes the particle, it also produces the curvature of space. If the particle also has the charge, we will have also the polarization of the spaceether. The curvature and the polarization are the states of ether to which are respectively associated the gravitational field and the electromagnetic field, with their respective energies.

Particles as effects of energy in the ether

We are accustomed to regard the mass and charge of objects as autonomous and independent from the space that surrounds them. In these pages instead they are defined as "effects" or "events" in the space, produced by the corresponding energies.

In other words, the primary cause is precisely the energy that created the particles.

The space-ether, as well as giving the logical meaning to extension spatial, as claimed by Descartes, now acquires the important property of - Mother Substance - inside which, for the energy effect, takes form each particle, each charge, each atom and all macroscopic objects, including ourselves.

Mass and energy are two states of the space-ether that fully correspond the one with the other, in the sense that energy can create the mass and the mass can annihilate itself giving back energy to space.

The particular status of the space, which constitutes the particle, moves typically with

translational and rotary motions. It takes form where the energy density is such to create the particle (that is where it has formed a "waves packet" of energy that exceeds a certain level) and it annihilates where energy falls below this level, with release of a quantity equivalent of energy in the surrounding space.

So the motion of the particles relative to the ether is only apparent. And for this reason the "wind of ether" does not exist.

Each particle acquires mass, charge, shape and existence in function of the energy that created it.

But even the macroscopic objects, formed by a multitude of atoms, are no longer foreign bodies, but they are integral parts of space-ether and they are defined by its multiple states in a dynamic equilibrium between them.

Now let us try to find a logical explanation to the three formulas Lorentz trying to reconcile with this theory.

First examine the increase of the mass and the length contraction of objects as a function of speed.

They appear fully interpretable with previous assumptions. In fact, considering the body part of the space and defined by the local energy state, it is evident that by changing the speed also changes the kinetic energy and consequently the overall energy state that generates the mass and gives shape to the body. (This is taken up in Chapter 3).

And, as a result of the movement, the energy and spatial distribution of the field will be "squashed" or compressed, because energy can't translate with infinite speed, but only at speeds equal to c.

As a result of these changes of energy in the space will also change the shape and mass of the object.

Also the time dilation with the speed now acquires a logical sense: increasing the translation speed, the particles of the objects will find a new dynamic equilibrium in the space with lower relative speed. For example, the electrons will move around their nucleons more slowly and, in general, the movements of all the particles will be slower.

At this point it is necessary to try to give some indication of how is the creation of particles in the substantiality of space. Although in reality it is not known yet; it is possible only propose some hypotheses. On the web there are several: for example are proposed swirling motion around the points where the particles are formed, or local vibrations. They are all dissipative phenomena, but the dissipated energy is again absorbed by the space-ether.

In particular, the hypothesis of particles as a local vibratory states of the space-ether is contained in the famous article by Olinto De Pretto of 1903, in which he argues that the ether have local vibrations at the speed of light. The corresponding kinetic energy is: $Ec = 1/2mc^2$. But in order to have this vibration, besides the kinetic energy there must be also the potential elastic energy of equal value. And the total energy, equal to the sum of the kinetic energy and the potential energy, is: $E = mc^2$. Just as proposed by Einstein two years later. Therefore this hypothesis is suggestive, as well as for its simplicity.

Analogy of the motion of a drop of water in the ice mass and others examples.

The following examples are useful to describe how it could be the motion of a particle within the substantiality of the space, and to highlight the corpuscular and wavelike nature of the particles.

Imagine a mass of ice that contains within it a drop of water and we make an analogy between ice and ether, and between drop and particle.

In the volume where there is the drop, thermal energy is higher than that of the surrounding ice. Greater is the amount of energy and greater will be the drop of water, just as happens between mass and energy.

Now we move this energy through the ice with a purely conceptual experiment .

Imagine that with an ideal heat pump we subtract heat from the drop and transfer it in another point of the ice. Will happen that where there was water, it forms progressively compact ice and, at the same time, the drop of water forms gradually in the place where the heat is transferred. The drop has not travel through the ice, but it is generated where the energy has moved and disappear from the place where it was before. Thus this is an apparent motion of our drop of water through the mass of ice, without the slightest obstacle to the motion.

In the space-ether the energy travels very well, also at the speed of light. As a result there is the motion of material particles: according to the fluctuations energy and taking shape at the points where the energy density exceeds a certain levels, without meeting resistance from ether, and also jumping by one point to another without passing through those intermediate, just like our drop did.

As the waves packet of energy moves in ether with swinging motion, the particles that are

generated by this energy, have the dual wave and corpuscular nature.

Taking another example of how can be the energy to move and produce effects at different points: imagine a concentrated beam of light, produced by a laser or a spotlight powerful enough; in the darkness through the air illuminating the water steam molecules encountered along its path and making themselves visible as a bright, straight trace. When the beam light moves in the space, it illuminates other steam molecules, while those earlier have remained where they were and are no longer visible. Only the light energy has moved and now manifests itself in another place of space.

Similarly, the particles are "energy effects" or "events", probably simply local vibrations generated by energy in the space-ether, which move following the movements of energy.

Forces at distance or interactions

The fields that produce forces at distance are: the gravitational, the electromagnetic, and those associated with strong and weak nuclear forces. By many years the physicists are trying (unsuccessfully) to unify the forces produced by these fields.

Physic has always been in difficulties in explaining forces at distance, although many people believe that it is enough to exclaim: with the field. And draw two vectors on a sheet.

On some books sometimes it happens to read this beautiful explanation: the field gravitational exists because there is a gravitational force, and (on another page) the force of gravity exists because there is a gravitational field It is obvious that is a turn of words, but it is proposed and accepted often like a true explanation.

While we need to understand what is the field in space and how it exerts forces on objects. And these answers can't be found in the abstract concept of the field in the vacuum, because in the nothingness, nothing can act as physical support to the field.

There is also the well-known Newton's law: $F = G M1 M2/d^2$.

This formula was a wonderful and important step forward for the science, however, it is only the mathematical formalism that allows us to assess the intensity of force, but it is not the physical explanation of forces.

Newton, in this regard, was very clear and prudent and wrote that the formula is only used to quantify the value of the force of gravity, but it is not the explanation of the force, and it

doesn't give to the masses the property to exert forces at a distance.

That capacity, according to Newton, is in the ether with its different density.

Three centuries later the theory of General Relativity has introduced the curvature of spacetime.

Sure, but then how can we consider the space like the nothingness if it assumes different curvatures in function of the masses in the nearby?

In other words, the curvature of nothingness proposed by current physics, is just an abstract concept, just a mathematic formalism.

And in which way this curved nothingness can interacts with the masses?

Returning to Newton, the Earth and Moon are average 400,000 kilometres away, and between them there is mutual gravitational attraction which is easy to calculate with the Newton's formula. The result is: $F = 20*10^{19}$ N, i.e. a force of 20 million of billion tons, approximately.

And also for this question many people believe that it is enough to exclaim: with the field! In other words they justify a huge force with the exclamation of an abstract concept as the field in the nothingness.

The question is: how the field is able to convey this force in the vacuum between the two bodies? But you can't find the answer in vacuum, because in the nothingness there aren't answers.

While the field in vacuum is just an abstract idea made of nothingness, the force of gravity, instead, is very real and concrete and it requires a physical interpretation, not just a mathematical formalism. It is clear that something is missing.

As we said, Newton had taken up the concept of the ether by the ancient Greek and argued that the forces were transmitted through this medium, although, very concretely, in a first time he wrote that he did not have the knowledge to explain how this happened, and wrote:- I don't pretend hypotheses-. While in a second time, in the Optical Queries, he wrote that the forces are generated by the different density of the medium, and respecting the will of God.

With Newton also all the other greats of science, including Maxwell, Michelson and Lorentz, considered the ether the vehicle of the forces at a distance, some of them call into question the divine will, while others, like Laplace, claiming that he didn't need this hypothesis.

After 1916 Einstein declared that General Relativity wouldn't have logical sense without a space-ether.

Forces like tendency of the ether to assume the status of minimum potential energy.

The GR no longer considers the gravitational forces and states that the bodies spontaneously follow the curvature of the space.

But we try to make a simpler reasoning connecting Newton's physics, that considers the gravitational forces, to the different states of space-ether and to expose an explanation for the forces.

- All particles and all charges are effects produced by the energy in the space-ether with consequent perturbed local status in the space around them. When there are two (or more) bodies, the two states perturbed overlap, and then the space-ether tends to evolve towards the state of minimum potential energy varying its total condition.

This trend is the cause of all the forces at a distance. --

We try to explain in more detail by examining first the gravitational forces.

We think to a macroscopic object in space, far enough from all other bodies. As we have already written, we consider the particles of its mass like effect of energy in the space.

For generate the particles the space-ether loses its uniformity. The overall result of the numerous particles of a body is a curvature of the space, which is defined by the metric gravitational tensor, accentuated around the object, which extends to infinity attenuating with distance.

Now we give to the curvature of space the real meaning of distortion of the physical substantiality of space, which corresponds to a definite energetic state.

The ether tends to return to the state of rest, or minimum energy changing its status, just like a compressed spring has the tendency to return to his extension of rest.

If we have just one body far away from other masses (strictly speaking: infinitely away) and at rest, the status disturbed of ether tends to remain stable at the same place, in fact, even if it moves it remains identical to itself. Then the particles, that are generated by energy, tend to form in the same place and on the body does not act any forces.

Now we place another mass near the first. We have that the two curvatures of space overlap with local variation of the total curvature and the energy distribution.

In this new situation, the space-ether can take a less disturbed status corresponding to a lower potential energy level. And if the two objects are initially at rest relative to each other, the two states curved tend to move along the axis joining the two centres of mass, toward the inside. Of consequently, also shifts the energy associated with they.

But now we know that the two bodies are not foreign objects to the space, but their particles are local effects of energy. So if the energy tends to move, then the particles will tend to form in the new place where the energy tends to go.

All this occurs at a macroscopic level as the tendency to move bodies, i.e. as an external force, called gravity, which acts on them.

Of course, we know that to have appreciable gravitational forces at least one of the two masses must be enormous.

An equivalent argument can be made with the Coulomb forces acting on charged bodies. In fact, an electric charge produces around him electric polarization, which we consider as a real polarization of substantiality of space, which may be the polarization of the already known virtual particles of "vacuum", or other yet unknown pairs of particles.

We still have a spatial distribution of energy associated with the polarization of the space and consequently the tendency to assume a less perturbed configuration. With only one charged object, far away from others, even if it moves, its polarization will move too keeping the exact same spatial distribution and the same total energy value. Then its tendency to displacement is zero and on the object does not act any force.

Placing another charged object near the first, the two polarizations are overlap and change the total polarization and its energy. In this new configuration, the space may tend to assume a less perturbed condition. Then the two polarizations tend to move along the axis of conjunction, to the inside if the charges have opposite signs, and to the outside if they have equal sign. The charged particles tend to form in the new points occupied by the two polarizations. This tendency of the charge particles to take shape at different points from the previous, manifests itself with the Coulomb's forces.

We can extend the same reasoning to magnetic fields and electromagnetic forces.

This theory of interaction is not inconsistent with the theory of exchange of the mediating particles, gravitons for gravitational forces and photons for electromagnetic, but only completes it. Indeed, together electromagnetic fields we found the photons as their quanta.

The same argument can be extended to two nuclear forces and their quanta.

Corpuscular and undulatory nature of particles

The energy is associated with a perturbed state of space-ether compared to its quiet state. Since space tends to return in the quiet state, it does not remain fixed in one point, but it participates in a dynamic equilibrium that is realized, typically, with rotational, translational and oscillator motions.

This state of general equilibrium in which many oscillations of energy are involved and overlap, also with different frequencies, producing interference, non-stationary, but constantly moving. In the places where the constructive interference forms a wave packet whose density of energy exceeds a certain level, particles are formed, in some way not yet known, may be as local vibrations of substantially of space.

These wave packets are constantly moving, each particle also moves and when the energy falls below the quantum level they annihilates in the ether, with the resulting release of their residual energy. Immediately after the particle is reformed and appears again at another point, always to the energy effect.

The proximity of two particles produces the superposition of oscillations, hence the interference.

This is also a reasonable interpretation of the wave and corpuscular nature of all subatomic particles, as evidenced by the phenomena of Interference of electrons and photons and expressed very well for photons by the famous phrase of De Broglie: - To condense the light on matter and vanish the matter on light -.

This strange aspect of particle was really a surprising discovery and it is explained only with mathematical formalism. In fact, it is not possible to give a rational physical explanation considering the particles as foreign bodies in motion through empty space.

The particles, once formed, are always composite objects, each type with its own structure and physical properties, and the concept of indivisible particle is absolutely wrong.

In fact, those who were considered indivisible years ago, now it is no longer. The lasts are quarks. Now we know that within them there are "strings" or something vibrating, while for forty years they had been considered indivisible.

Chapter 3°

Volume of objects and volume of particles

The mass of macroscopic bodies, composed of an extremely large number of "atoms", is a complex form of various types of energy, in continuous fluctuation in their dynamic balance, but on a macroscopic scale, on average constant and stable state, so to give the usual appearance to objects of our everyday experience.

The visible matter is therefore an invisible organization of energy.

To think about the matter, such as an energetic effect that occurs in the space, may seem puzzling. But we must consider that the matter is predominantly field and energy, in the sense that the overall volume of the particles "elementary": protons, neutrons and electrons, that make up an object, is about a million of billion times smaller than the volume of the object itself. In fact, the ratio between the diameter of an atom and the diameter of its core is approximately 10^5. Then the ratio between the volumes is 10^15. We know that the matter is almost entirely concentrated in the nucleus and the mass of the electrons is often overlooked compared to the mass of protons and neutrons.

Now, doing simple calculations we find that for a man all its particles actually occupy about a volume of a millionth part of a cubic millimetre!

But we also know that protons and neutrons are decomposable in quarks, which have a volume of about a million times smaller. Actually even the quarks are certainly divisible, but we can stop here.

It's possible that a millionth of a millionth of a cubic millimetre of matter moving in a vacuum to form a solid and (fairly) stable structure of approximately 100 litres of volume? It seems that something is missing that can do in some way as a support to this structure to its full extent.

At this point it make more sense the concept of matter as an energy effect in the physical substantiality of space, that thinking this low volume of particles scattered in a hundred litres of empty space to form a solid structure.

Principle of inertia

The principle of inertia states: if a body is moving and there are not external force in acts, then it will continue to travel at speeds constant in a straight line.

We don't know the why, but it is so (from Feynman's lectures).

The previous concepts, however, allow us to make some considerations on inertial properties of mass, considering the effect of speed on its gravitational field.

The gravitational field of an object at rest has spherical symmetry, this, at least enough away from the object, in close proximity it depends by the shape of the object. The field of the object in motion loses the spherical symmetry and it is "compressed" in a function of speed. But the field contains energy and, varying its spatial distribution, then this energy varies in function of the speed of the object.

Mass and field are not separable, so considering the principle of inertia we must consider the relationship between mass and space surroundings, as the place of the field and its associated energy.

In this logic, the inertia is no longer refers to an isolated object in motion in a stranger space, but it is referred to an object which is closely related to space, his field and the energy associated with the mass and field.

It also appears a link between inertial and gravitational property of the mass, since inertia can be seen as dependent on the spatial variation of the energy of gravitational field in function of speed.

We also know that if speed of objects is not negligible compared to c, then occur the three phenomena expressed by formulas 1), 2), 3) of Lorentz, of which we have already written.

Mutual connection between mass and energy

The law that relates the mass with energy is the famous:

 $\mathsf{E}=\mathsf{m}\;\mathsf{c}^{\mathsf{A}}\mathsf{2} \ .$

This formula expresses the "mass energy", i.e. a mass has energy for the simple fact that it exists, but also states that energy corresponds to mass.

With simple calculations we find that the complete conversion into energy of a single gram of matter is equivalent to the energy produced by the combustion of about 2000 tons of gasoline, so a ratio of one part in two billion.

It is clear that such a small fraction of the mass could not be detected at Lavoisier's time, and is negligible under normal energy transformations, but not in nuclear reactions.

Einstein fused the law of conservation of mass and that of conservation of energy and obtained a single law of transformation of mass-energy.

In modern physics the mass is far from than immutable, but it appears in connection with changes that involve energy and, through the his field, even with the surrounding space.

Einstein wrote in 1921: - The body of mass m must be considered a lump of energy of quantity mc^2-.

The variations of the mass, as well as with the speed, also occurs in other cases, for example by heating an object, even if in this case the increase in mass is really small.

Variation of mass more large occurs normally in reactors fission, in which fissionable fuel, releasing enormous amounts of energy annihilating its mass of few units per cent of the total mass.

With nuclear fusion, as occurs in stars, hydrogen is transformed into helium, and there is a loss of mass in greater proportions and development energy even more abundant.

Practical demonstrations of the conversion of mass into energy took place, unfortunately, also by nuclear explosions.

When there is a collision between the positron and electron, the two particles annihilate and produce a gamma ray that has energy exactly equal to the mass of the two particles. It can happen the opposite phenomenon: a gamma ray can disappear and create a pair positron – electron couple.

In accelerator it happens that some particles travelling at speeds approaching the speed of light can be transformed into other particles of greater mass.



The relativistic mass increase with speed, the energies indicated for elementary particles are the kinetic energies. Currently speed of particles reach 0.999999991* c that correspond to a gamma factor equal to 7400.

The experimental data agree perfectly with the graph of the theoretical formula $m = \gamma^* mo$.

Energy, particle and field

We have already seen that the field is associated with energy, but also to the mass corresponding energy. Field and mass thus have a "common matrix" which is the energy.

Einstein and Infeld in "The evolution of physics" in this regard have written a very nice page that is summarized here. The authors say: - The theory of relativity teaches us that the matter has large reserves of energy and that energy is also matter. But also the field contains energy. We can't therefore find a qualitative distinction between matter and field, because the distinction between mass and energy is not qualitative. The vast majority of energy is concentrated in the matter, but the field surrounding the particle is also energy, though in incomparably lower level. Hence, we can say: we have matter where the concentration of energy is great, we have field where the concentration of energy is weak. But if it is so, then the difference between matter and field is of quantitative rather than qualitative order. The same difficulty has in respect of electric charge and its field. It does not seem therefore possible to establish a simple qualitative criterion to distinguish both between matter and field, and between charge and field --.

We also know the three phenomena that accompanying the increase of particle velocity. In addition, the particle "elementary" have the interference phenomenon that demonstrates their dual nature corpuscular and wavelike.

We therefore affirm that even the smallest particle known is a complex object and inexhaustible. In fact, the particles that were considered indivisible yesterday, today we know they are composed objects (also the quarks).

And that the existence of an object, its motion in space, and the link between field and object, show that all this belongs to a much richer and complicated picture than the simplistic and reductive description of today's physics, (as written by Russian Ovcinnikov)

Even to try to explain the principle of inertia, we must imagine the nature of body based on the relationship between mass, field and energy associated with the field in space and its change with the speed.

And various aspects of nature: energy, mass, inertia, gravity, charge, magnetism, temperature, pressure, etc. with their countless quality transformations, show clearly that in the great diversity of nature there is a fundamental unity within which all these qualities can change.

In particular, the mutual correspondence between mass and energy indicates that must exist a medium, or a substance which, with its state, it can express both the mass and energy, and in it they can be transformed into each other.

And the early twentieth century concept of space, intended only as a pure algid vacuum, was completely overcome by modern physics, re-evaluating Aristotle when he said that the nature abhors vacuum.

In fact today, the space appears as a plenum in which there is the physics more violent, with energy, fields, waves, and the creation of particles where there is enough energy. So today the old adage of Aristotle can be replaced with:

-The space "vacuum" contains all the physics - (from the book: The cosmic code. Of H. Pagels)

Energy and Religions

The energy, which gives origin to matter, reminiscent the concept of Pneuma - of the ancient philosophers, that is the vital breath (or spirit) that penetrates and forms the matter in the universe; or Prana of Hinduism: the universal energy present in every object and every organism. Other Eastern religions express similar concepts in the world, as the Tao and Chi. Yoga also has a base religion of this kind.

Modern physics, with the theory of relativity and quantum mechanics (although in some points contrast each other), has revealed similar aspects of nature.

Fritjof Capra in his famous book "The Tao of Physics" writes:

- The most important characteristic of the Eastern world, we might almost say - its essence is the awareness of unity in mutual interrelation of all things and all events, the recognition that all phenomena in the world are manifestations of a fundamental uniqueness. All things are seen as interdependent and inseparable parts of this cosmic whole, as different manifestations of the same ultimate reality.

The Eastern traditions constantly refer to this reality, which manifests itself in all things and that all things are part of it.

It is called Brahman in Hinduism, Dharmakaya in Buddhism, Tao in Taoism.

As it transcends all concepts and categories; Buddhists also call it Tathata or absolute

essence, the great all-embracing.--

In addition, returning to modern physics, F. Capra writes:-

In recent decades, with high-energy experiments we have found the most extraordinary nature of the dynamic and ever-changing world of particles; matter has proved capable of total transformation. All particles can be transformed into other particles, can be created by energy and can disappear into energy. In this context, concepts classics such as "elementary particle", "material substance", or "isolated object" have lost their meaning: the whole universe appears as a dynamic network of energy configurations non separable --.

All the modern science claims to exclude every transcendental aspect of reality. Physic of particles, however, says that they are formed by nothingness for the effect of energy, and in nothingness they are annihilating, i.e. vanish or disappear. And this is not at all a rational analysis of their behaviours, and rather seems to belong more to the field of magic that the field of science.

Reconsidering the physical substantiality of space, instead, we return to a rational argument with the formation of the particle due to energy in the space-ether.

Moreover, in this way, recognizing the existence of energy as a principle of all matter, including living organisms, and considering they no longer isolated objects independent of space, but events generated by energy and belonging to the space-ether, we overcome the purely materialism of classical physics, and we can perceive the transcendent aspect of the world.

From this point forward everyone can goes according to his own personal beliefs.

Concluding Remarks

The substantial physicality of space is not directly observable, but the proofs of its existence are numerous and very clear. While conceptual inconsistencies of abstract empty space, with nothingness inside, increases clearly with modern Physics.

In particular, attempts to explain the interactions without an intermediate medium are only pure mathematical formalism, and they are without physical sense.

Instead, considering the objects as energy effects in space-ether, we can give a rational sense at all phenomena of Physics and, for who wish, it also offers the opportunity to see transcend aspect of life.

In fact, today the object is seen for its purely materialistic property, that exists because exists, full stop. While its existence is function of the energy that created its particles and that is always present in the object. And the object is the expression of this energy and is not an autonomous body, alien to the space, but rather is integral part of the space, like all other bodies.

Definitively, it is more and more evident that space is not a - vacuum - but rather a - plenum - with extraordinary properties, even difficult to imagine.

Still remain fundamental questions, such as:

- What physical substantiality of space is made?
- How particles and charges are formed?
- How began the energy?

We hope that Physics can soon find answers to these questions, or at least to one of them.

---- Many thanks for the reading ----

This text belongs to the website <u>www.ricercaetereperduto.it</u>

For more information and examples you can see, on the same site, the files :

The New Ether of Einstein

New Ether New Physics

The concept of gravity and space of Newton and Einstein

and other writings, all free reading, which are the summary of years of study and comparison in various discussions.

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Many Thanks Again

