



# SOME MODIFICATIONS OF PHYSICAL THEORY AFTER THE FINDINGS THAT LORENTZ CONTRACTION AND THE RELATIVISTIC $\beta$ ARE AN ERROR

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## I. INTRODUCTION

The fact, that Fitzgerald - Lorentz contraction and the relativistic  $\beta$  is an error, has been discovered only recently. During a century it had not been noticed. And naturally it has affected certain points of physics. These points need a revision and this paper is a contribution to such a revision.

Naturally this revision needs the collaboration of many scientists, specialized in different branches, etc. I only initiate it.

But let us begin, by remembering what was the error (paragraph 2.1.).

## 2. MECHANICS

*2.1. Fitzgerald - Lorentz contraction and the relativistic  $\beta$ , basis of relativity theory, is a big error, that has passed unnoticed during a century, and has been discovered by me at the end of 1994.*

The rotation of a solid sphere, as the Earth, does not affect the distances between two points on its surface, and the times light needs to cover them. This fact has been ignored by Fitzgerald and Lorentz, in their interpretation of Michelson experiment. They sustain, that light requires more time to cover a distance in the direction WE, than the same distance in the direction EW. And on this error is based Fitzgerald - Lorentz contraction, the relativistic  $\beta$ , and relativity theory as a whole.

However whatever vehicle, projectile etc., requires the same time to cover the same distance in Earth's surface in the direction WE, EW, and whatever other direction. Earth's rotation does not increase or decrease the distance; and the same should happen, with light, reflected between two mirrors, on Earth's surface.

Universal experience has also shown, that the distance between two points in a waggon, a ship, or a plane is the same, when the waggon, ship or plane is in motion at constant velocity or stationary.

However Fitzgerald and Lorentz have based their conclusions on the assumption, that light needs more time, to cover the same distance on Earth's surface in the WE, than in EA, NS, SN, directions. The interferometer has always

shown, that the times are equal, but they insisted in their error. And this is the origin of Fitzgerald - Lorentz contraction, the relativistic  $\beta$  and relativity theory.

Curiously enough the error passed unnoticed during a century. Only at the end of 1994 I noticed it (Papadakis 1995).

Fortunately, and unfortunately, relativity theory has not practical applications. Therefore from a practical point of view the damage has not been great. The majority of physicists believe that relativity theory is right; but they apply exclusively classical physics. However this fact is also the cause, that the error has not been discovered earlier.

However relativity theory had affected physical theory and a revision of some points is needed. This paper is a contribution to this need. But the collaboration of many scientists is naturally needed. I only initiate the task.

Radars measure the duration of a going and return travel of light. But it is very easy to make radars, that measure separately the time of an AB and BA travel, and we can have a confirmation, that the times are always equal. Moreover the proofs abound.

## *2.2. Increase of Mass with Velocity, A New Approach Lasers and Nuclear Fusion*

When a force puts in motion a body a quantity of energy enters in the body; and since energy has a mass, the mass of the body increases; it is this energy that puts and maintains the body in motion, increasing its velocity and overcoming opposite forces.

So that the mass of a moving body is formed not only of matter but in addition of energy. In the case of light, etc. the mass is formed exclusively of energy.

But  $c^2$  units of energy are equivalent to 1 unit of matter; that is why the mass of light (photons), electricity, etc., is minimal compared to that of bodies formed chiefly of matter.

In the case of light (photons) the mass is formed exclusively of energy; consequently the velocity in vacuo is:  $vc^2/vc = c$ ;  $v$  is the frequency. Naturally at the moment light leaves the light source, or the mirror, its velocity is that of the light source, or mirror; but it reaches very rapidly  $c$  in vacuo.

Since  $c^2$  units of energy are equivalent to 1 unit of matter, the increase of mass with velocity is minimal, at low velocities; and only recently it has been discovered; even now it is never taken in consideration, with usual velocities.

But it seems, that such accumulation of energy in a material body creates inconvenients; we might say, that there is not much room in the body. At low velocities there is not problem. But as the velocity increases, the storage becomes difficult; and great part of the energy, instead of being stored, it is lost (transformed in heat). That depends on the size of the body; the percentage of energy that is stored decreases rapidly with the size of the body, the rest is lost

probably as heat; and when a certain storage is reached the increase of velocity ceases. While photons reach velocity  $c$  in vacuo without difficulty, big bodies cannot approach it, and the loss of energy, probably in the form of heat, is enormous.

The nature of the body is also important. The storage in certain bodies is easier than in others, it may be, because of the internal structure of the body. The acceleration, to approach velocity  $c$ , is only possible in the case of very small bodies; and the percentage of energy lost, probably in the form of heat, is enormous.

The relativistic formula of the increase of mass with velocity is due to these causes. Naturally the mass of a body cannot become infinite; as this formula pretends; the mass is material; it has a volume, a weight, and it can never become infinite. What happens is that the greater part of the energy, instead of being stored, in the body and increase its velocity, is probably converted to heat.

Much research is needed on that. The question is very important, both from a theoretical and practical point of view.

The formula of increasing mass with velocity may be (Papadakis 1994):

$$m = m_0 (1 + v^2/c^2)$$

$m$  = mass of the body at  $v$  velocity;  $m_0$  = mass at zero velocity.

But the formula is applicable only in the case of low velocities.

It is curious, that in solving the problem of using nuclear energy lasers have not been tried hitherto. I am far from being specialist in the matter; so that I cannot contribute much to the solution of the problem. Lasers might solve it.

### *2.3. Why Velocities Higher than $c$ are almost Impossible*

Velocities higher than  $c$  are almost impossible. A photon, has an energy just sufficient for a velocity  $c$  in vacuo; external forces, gravitation f.i. cannot increase this velocity because in the vicinity of big stars, gravitation is strong, but the atmosphere is dense, and this circumstance reduces considerably light velocity. At a little distance from the star gravitation practically disappears.

If, when the velocity of light began to be measured, it was known, that the energy of a photon is just sufficient, for velocity  $c$ , such velocity would not surprise scientists, and light would not have been considered as the rebel of nature. The scientific theories of an historical period are considerably influenced by the mentality of the period.

## **3. LIGHT**

### *3.1. Light Velocity*

The discovery, that light velocity is 300.000 km/sec. surprised scientists, who declared it a physical constant, and light the «rebel» of nature. Moreover the discovery, that energy has also a mass, tarded much. That is why light has been treated by science, as something exceptional, that only obeys its special laws.

But as we have explained in previous paragraphs, velocity is  $c$ , because such

is the relation between the energy of photons and their mass. And we do not know cases in which other forces can intervene and increase the velocity beyond  $c$ .

### 3.2. *Light Duality*

*The use of the term wave motion is improper in the case of light.*

The term wave motion is used improperly, in the case of light. The waves of the sea those of sound etc., are due, to external forces, wind, musical instruments, etc., the water or air serve only as occasional media for the transmission of the wave or sound. On the contrary wave length is a fundamental, inherent quality of light, on which depends its colour, and other characteristic proprieties; it is closely linked with its frequency another fundamental characteristic; we may distinguish 1024 different wave lengths to which correspond 1024 different frequencies. To identify that with wave motion has been a big misfortune of light physics, and this error conduced to light duality, which certainly does not honour physics.

Wave is the response of a medium to a certain force (wind, pressure, etc.). Light is a form of energy that can make visible, heat, etc. in a great variety of media. We might say, that the role of wave is rather passif, while that of light is actif, the characteristic of the response. The quanta of light are concentrated in groups; the proprieties of each group depend chiefly on the number of quanta concentrated; the distance between one group and the following one decreases regularly as the numbers of quanta per photon increase: It seems, that the motion of photons is not rectilinear, but sinusoidal, it may be helicoidal, etc., but it approaches more and more lineality, as the frequency and comequently the size of photons increases.

Where in all that you see a wave motion? It seems that no motion is entirely lineal, but it approaches lineality as the mass of the moving body increases.

Light duality has been a great misfortune in the history of physics, and it does not honour them.

## 4. *ELECTROMAGNETISM. GRAVITATION*

Maxwell (1831-1879) is next to Newton, one of the scientists, who more contributed to physics. His equations are still now universally used. At the beginning he was looking all space as occupied, by the ether, capable to be electrically polarized; and he died too early, to see the abandonment of his theory with Michelson experiment. However his equations are still in use, although a few of them need to be modified. That is why I invite scientists to examine carefully these equations, and revise the few ones, that need a revision.

Field theory has been much influenced by the theory of ether. Just as with gravitation, attraction or repulsion are exerced at distances, but their forces are rapidly reduced with distance. According to Newton no particles are sent from one body to another; the attraction, or repulsion, is a mere consequence of the position of the two bodies; no exchange of corpuscles is needed.

In my opinion fields are only conceptual; the forces of attraction or repulsion vary from point to point, but otherwise no fields exist. They have not material existence. Matter has the propriety to attract whatever other matter; that is why it is concentrated in big bodies, the stars, separated by almost empty space.

This is probably the most important modification that is needed in electromagnetism and gravitation. And it is a consequence of the abandonment of ether theory. We should abandon the idea of material existence of field particles as we did with ether. It is a pity for physics, that Maxwell died so young. He could adapt his equations to the abandonment of ether theory.

### 5. RELATIVITY THEORY

As we have noted (paragraph 2.1), the distances on the surface of a solid sphere are not affected by the rotation of the sphere; measured from A to B, or from B to A the distances are always equal. We can even measure a distance in a train, a ship, or a plane, while it is stationary or in motion at constant velocity, and the distance is the same. As a consequence Earth's rotation, does not affect the distance between two points A and B, whatever the orientation of the line AB may be. Therefore Lorentz contraction, on which relativity theory is based, is erroneous.

On the other hand, light velocity is not a universal constant; light velocity in vacuo is  $c$ , because the energy of a photon is  $vc^2$ , its mass  $vc$  and its velocity  $vc^2/vc=c$ . Light velocity is lower in denser media (water f.i.) and it might increase, influenced by other forces, gravitation for instance. But the influence of gravitation disappears practically at a little distance from a big star, while the dense atmosphere at lower heights, reduces light velocity.

The idea that light is a rebel, and light velocity  $c$ , a universal constant, conduced to other errors. Light velocity, when it leaves the light source or mirror, is not yet  $c$ , but that of the light source or mirror; but it increases very rapidly to reach  $c$ . And this error conduced to another one.

When the velocity of a material object, a waggon, an auto, etc., increases, cinetic energy is stored in the body; and since energy also has a mass, the mass of the body increases - see paragraph 2.2. According to the relativistic formula, the mass, matter + energy, becomes  $(1 - v^2/c^2)^{-1/2} m_0$ , which differs considerably from mine (Papadakis 1994); according to the relativistic formula, the mass of the body, when it reaches velocity  $c$ , becomes infinite. And that is naturally impossible. The mass of a body has a weight, and spatial dimensions. How the weight of a body, even the bigger in the world can become infinite superating the mass of whatever star, etc? And what is the origin of this infinite mass? The energy consumed during the acceleration is small, moreover it is transformed to heat.

As the velocity of a big body increases, energy is stored in it, and its mass increases. But that cannot continue indefinitely. An increasing part of the energy

cannot be stored, and it is lost as heat. The mass of the body practically ceases to increase long before velocity  $c$  is reached; naturally in the case of minuscule bodies velocity  $c$  is approached, but seldom reached. See also paragraph 2.2.

These difficulties to increase the velocity of a body conducted relativists to formulate their formula. But the mass of whatever body can never become infinite or approach it.

## 6. SPACE AND TIME

### 6.1. General Considerations

Space and time have not material existence, they are conceptual, creations of human intellect to understand the world in which we are living; even lighter animals have a sense of space and time.

Matter and energy have material existence, and they are convertible to one another; one unit of matter is equal to  $c^2$  units of energy; and we have now industries that are doing that.

But space and time have not material existence; they are concepts, created by human mind to understand the world in which we are living; every thing has 3 dimensions and whatever process needs some time to be performed. Even higher animals have some understanding of space and time; it is indispensable to them.

Having material existence, matter and energy cannot be annihilated by continuous division; their divisibility has a limit (quanta). On the contrary the divisibility of space and time, like that of numbers, has no limit; given a number, there is always another still smaller; and the same happens with space and time. However some scientists are speaking of quanta of space and time.

Some scientists search the limits of space and time as a whole. But since space and time have not material existence, such limits do not exist. Only material things, continents, seas, historical periods have limits, moreover we cannot exclude the existence of geographical units and historical periods, that we do not know.

For analogous reasons, we cannot know the beginning of the world, or its end. Nothing is born from nothing; and nothing disappears, is a conclusion of science.

It may be we know now only a small part of the universe. And formulate opinions, concerning its form and size, is at least, premature.

Euclidean geometry has always admitted, in addition to parallelism, that two lines may converge or diverge. That is why I do not consider necessary non-Euclidean geometries. The importance given by Euclidean geometry to parallelism is justified, both in science and art.

Universal experience shows, that simultaneity exists, the doubts of relativists are not serious in my opinion; clocks are not perfect but they approach satisfactorily perfection. And the same may be said for the instruments and methods used to measure space.

The concepts of space and time are probably the most needed concepts

created by human mind; even higher animals have some sense of them. Doubt is useful in science. But we should not exaggerate; or admit on the other hand obvious errors as truths.

### *6.2. Time Measurement*

Physical practice, etc. shows, that measuring time is easy, and satisfactory. And all processes need a relatively easy instrument to measure time. To put in doubt, that the division of time is satisfactory, is not justified. All elementary processes, need a quantity of time, that is relatively easy to determine.

That is why it seems to me, that to put in doubt simultaneity and sequence is not justified.

### *6.3. Representation of Time Cinema may be the Best Solution*

While the graphic representation of space can be considered as satisfactory, that of time is obviously unsatisfactory. We may say, that time is a repetition of space in time. And I do not see another solution of the problem, but the cinema.

Instead of giving one or few graphics giving, the spatial description of the events, we should give a complete series of spatial graphics, showing the spatial evolution of events at a series of important moments. And each graphic should continue projected sufficient time to permit a satisfactory commentary by the commentator. Therefore the commentators, not the machine, should decide, how much each graphic will remain projected. The films instead of being a series of photos will be a series of spatial graphics.

That will be a big progress both in science and teaching.

Naturally a cinematographic film can complete the film.

### *6.4. Is time Curved?*

As we have said, time is a repetition of spatial events in time. What imports is how the different factors, to which the whole effect is due are acting. Not having material existence, time cannot have a form.

## ***7. MONODETERMINISM (IMPLACABLE DESTINY) VERSUS POLYDETERMINISM (SEVERAL SCENARIOS EACH ONE WITH ITS OWN PROBABILITY)***

Any event is the result of a previous situation; and it is usually one of the causes of other events. Supposing that a cause cannot have but one effect, one arrives to the conclusion, that everything that happens, is predetermined, the

history of the world is a cinematographic film, that has been prepared millions of years ago, and is now projected without any possibility to modify it. Destiny is implacable.

However Mendel has shown, that in heredity a cause may have two or more different effects; wedding of two men, animals, or plants, differing in one or more genes, may produce a variety of children; what of them will be born, is a question of chance. That conduced me, to formulatae poly-determinism; the same cause may have several different effects, each one with its own probability (Papadakis 1990). The world, instead of being ruled by destiny, is ruled by chance. That justifies my professor in Gembloux (Belgium) Marchal, who was saying: «le monde c' est le hasard». Naturally there are also monodeterministic events, but they are rare.

Determinism exists also; But implacable monodeterminism, is replaced by poly-determinism, which conduces to diversification, several scenarios, each one with its own probability.

Long ago we know, that one effect can be due to different causes; Mendel has shown, that the same cause can have different effects, each one with its own probability. What is happening in heredity, happens also in the majority of other causes. The future is not a film, written millions years previously, and projected at its moment; it is decided by chance, like the characteristics of the children of a couple, are determined by chance.

As professor Marchal was saying «le monde c' est le hasard». A situation has not one only possible solution, but various. Which of them takes place is decided by chance. Instead of predicting one result, we should predict various scenarios, each one with its own probability. The problem is not naturally easy. But it is the only possible way.

Mendel with its laws of heredity has advanced not only the solution of the problems of heredity, but also that of the prediction of the future. A situation has not one only solution, but several scenarios, each one with its own probability. Papadakis J. (1990). Proceedings of the Academy of Athens.

## 8. CONCLUSIONS

The findings, that Lorentz contraction and the relativistic  $\beta$ , were an error, have still more fortified the con fiance in classical physics. Hitherto physicists were admitting relativity theory, but applying exclusively classical physics. All advances in physics had been incorporated in classical physics without difficulties; it has been as if Newton had anticipated them.

The preceding pages show, that the incorporation of theoretical advances in classical physics is also very easy; it is again, as if Newton had anticipated them. And we may hope now a period of important advances, not only practical but also theoretical, basis of practical advances.

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