CONSIDERATIONS REGARDING THE RELATIVIST TIME AND THE IN TIME TRAVELING

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ABSTRACT. In this paper we examine the problem of time variation in function of the velocity which in the Theory of Relativity is also considered applicable for the case of the velocities larger then c, the velocity of the light (high light velocities). For this analyze we apply the "dual" and "bipolar" solutions, previously exposed by the authors [2]. Also, we used the analogy of the respective problem with the similar problem regarding to the (relativist) dependence of the mass in function of the velocity [1]. Automatically, the problem to "travel in time" arises, as well as the methods which could be used for this scope.

1. INTRODUCTION

In [1] we analyzed the problem of the mass relativist variation in the hyper luminous case, thers of those velocities which have values larger the c velocity of the light in the vacuum ($v > c$). For comparation, briefly it was presented also the mass variation for the case $v < c$, which represents a classical case in the modern Physics.

For the case $v > c$ it was used the unconventional mathematics developed in [2]. This method is based on the fact that we admit some "dual" and "bipolar" solutions for the equations of type $y^2 \pm \varphi = 0$ where φ is a function of some variable.

In what follows we will analyze the problem of the relativist variation of the time (in function of velocity) for the velocities (v) extremely large inclusively for $v > c$, using the method presented before for the relativist variation of the mass.

2. THE MATHEMATICAL MODEL FOR THE RELATIVIST VARIATION OF THE TIME

Many expert scientific works, for examples [3] and [4], presented the principles of the Relativity Theory (RT) as well as its development under mathematical form. In regard with the behaviour of the time in conformity with RT we have notice an unusual element in the Classical Physics and this is the so called "Time Dilatation".

In order to develop our analyze we start with the Lorenz-Einstein transformation formulas which contain concentrated the entire Limited Relativity Theory. The deduction of those formulas starts from the mathematical expression of the connection between space and time in rapport with a reference fixed system (FS – Fixed System) and respectively with a mobile system (MS – Mobile System) given FS. In order to simplify the calculations we consider the FS is represented by Ox axis and MS is represented by O_1x_1, axis which is parallel with Ox and shifting towards it with a velocity - v. Of course, all these calculations were performed based on the fundamental hypothesis that the velocity of light (c) is independent of the source velocity and has a constant value ($c = 3 \cdot 10^5 km/s$). As a result we have that for an observer from FS, the time elapsed in MS is more reduced then the tine perceived by the observer as being proper MS (measured with a clock which

belongs in (MS)) must suffer a "dilatation" process in order to be equal with the time perceived by an observer in FS in which both the observer and the clock which measure this time belong. This phenomena can be considered as a result of a delaying process of the clock in MS in rapport with clock in FS.

Based on the above discussion, the Lorenz-Einstein transformation formulas in [3] and [4] can be concentrated in the following formula:

$$\vartheta_f = \vartheta_m(1 - \sigma^2)^{1/2} \qquad (1)$$

where ϑ_f represents the time interval referring to FS (the index "f" from "fixed") and ϑ_m representing the time interval in MS (the index "m") $_f$ corresponding to the interval ϑ_f in FS. ϑ_f represented the ratio $\vartheta_f = \frac{v}{c}$.

The formula (1) can also be written under the form:

$$\vartheta_f = K \cdot \vartheta_m \qquad (2)$$

where K is known to be named "The Lorenz Factor" and thus is given by the relation

$$K = (1 - \sigma^2)^{1/2} \qquad (3)$$

Performing the ratio between ϑ_f and ϑ_m in (2) we obtain:

$$\theta = \frac{\vartheta_f}{\vartheta_m} = K. \qquad (4)$$

In order to solve the equation (4) in any situation it could appear, we use the logical method applied in [1]. With this purpose we start from the initial expression of the (relativist) dependence of the following form:

$$\theta_2 = \left(\frac{\vartheta_f}{\vartheta_m}\right)^2 = K^2. \qquad (5)$$

and is the same as we rise (4) to the second power. The same as in [1] we have the case $\sigma < 1$ and $\sigma > 1$, respectively.

Case $\sigma < 1$. From (5) we have the following dual solutions:

$$\theta_1 = +K \qquad (6)$$

$$\vee$$

$$\theta_2 = -K. \qquad (7)$$

This symbol $\vee$ represents the operator "OR" from the Mathematical Logic. The solution, corresponds to the situation when the perceived time by an observer in fix system (FS) bears a dilatation process and thus the observer from referring mobile system MS perceive in FS the events in the future. In other words the observer in MS "travels" in a nearer or more distant future in FS in function of the value of σ.

The second solution of these dual pairs solutions θ_2 having "minus" sign shows that in the time interval ϑ_f – see relation (4) – the time flows in a reverse direction, to the direction in which the time flow in the interval ϑ_m. Thus this interval (ϑ_m) can't have another direction except for the future. For this reason it must have the sign + (plus).

Before we start to analyze the proposed subject we consider exposing briefly some results discussed in [1]. Thus, since the problem considered in this paper is a complex ones we must treat it also in correlation with the aspects of the relativist influence of the extremely large velocities (hyper luminous inclusively) over some other fundamental elements in Physics. In our case we refer to this influence on the mass of the bodies. In [1] we analyzed the function $\mu = f(\sigma)$ where $\mu = \frac{m}{m_0}$ and m is the mass of a body in a moving status with a velocity v and m_0 is the mass of that body in the repose status. As

above we denote by σ the quotient between the velocity v of the body having the initial repose mass v_0 and the velocity of light c, thus $\sigma = \frac{v}{c}$.

If we consider the relation (3) then the mathematical expression of the function $\mu = f(\sigma)$ becomes:

$$\mu = (1 - \sigma^2)^{-1/2} = K. \tag{8}$$

We see that for $\sigma < 1$, this is $\frac{v}{c} < 1$ the only admissible situation in Physics up to the present time, μ have real positive values only. These values increase between 1 (one) and ∞ (infinity) in the same time when the ratio σ increases between o (zero) and 1 (one).

For the domain $\sigma > 1$ in relation (5) we get results with imaginary values for μ. In other words, attempting to analyze the situation when $\sigma_h > 1$ will bring us in a deadlock.

The "h" index comes from the word "hyper luminous". In [1] we suggest to pass the deadlock. Therefore, we used a method developed in [2]. Thus, for $0 < \sigma < 1$ we use the "dual solutions":

$$\mu_1 = +(1 - \sigma^2)^{-1/2} \tag{9}$$
$$\vee$$
$$\mu_2 = -(1 - \sigma^2)^{-1/2}. \tag{10}$$

The sign $\vee$ represents the operator OR in the Mathematical Logic. In order to follow easier the correlation between time variation and the mass variation respectively in function of the velocity, in Figure 1 below we represented on the ordinate axis both θ_1 and θ_2 as well as μ_1 and μ_2 in function of the velocity ratio σ.

Evidently the curves θ_1 and μ_1 coincide. Also the curves θ_2 and μ_2 coincide.
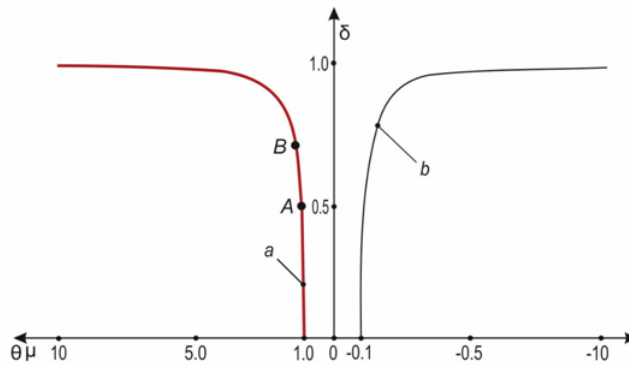

Figure 1

The solution μ_2 (with a negative value) of relation (10) indicates the fact that on entity with a velocity v constituted from matter MA having $m_0 > 0$ have as equivalent of a separate entity (having the velocity v) constituted from the antimatter (AM) characterized by $(-m_0)$. In Figure 1 the curve "a" represents the functions θ_1 and μ_1, respectively and the curve "b" represents the functions θ_2 and μ_2, respectively.

In this way with our method we arrived to the same results as of the very reputable American Physicist Richard Feynman who proved that "a very usual particle which moves ahead of the time is equivalent with an antiparticle which moves back in time" [5].

Of course, in this affirmation the word "particle" means a particle with a mass smaller or at least equal with the mass of an atom. For example, in our case mentioned above, the proof is done referring to the electron and the positron. It is very likely that in relativity near future this respective affirmation is also valid in the case of some material bodies (entities) which have the masses of the size category similar to those which we meet in every day's life. All of this elements of theoretical nature could not be verified even in the

laboratory conditions since at this hour, the matter and antimatter can't exist. However lately the CERN Laboratory in Geneva created and isolated for a short period of the time (a tenth of a second) 38 atom of Hydrogen [6]. With to purpose of continuation our study, this time for the case $\sigma_h > 1$, we appeal again to the method developed in [1] regarding the relativist behavior of the mass considering its established analogy with the relativist behavior of the time. Thus, in this way for the time intervals θ_{h_1} and θ_{h_2} we identify the following binary solutions:

$$\theta_{h_1} = +|K| \tag{11}$$

$$\wedge$$

$$\theta_{h_2} = -|K|. \tag{12}$$

The symbol $\wedge$ represents the operator "AND" in the Mathematical Logic. This operator $\wedge$ indicate the fact that the solutions θ_{h_1} and θ_{h_2} are indissoluble linked one from the other. This thing was suggestively represented in Figure 2 by those vertical bars "|".
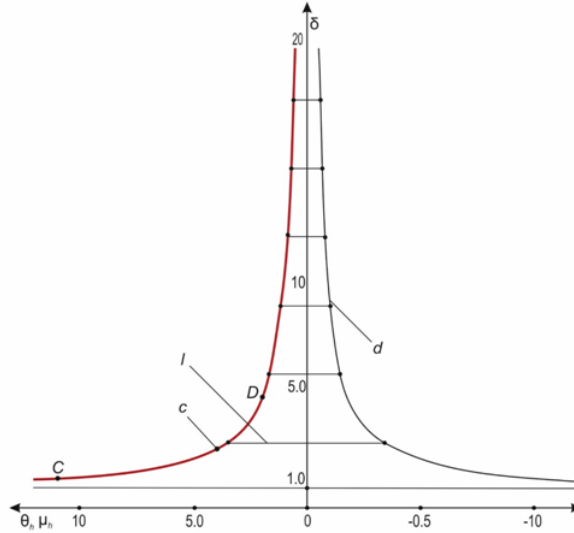

Figure 2

For the same reason as that one invoked in the case $\sigma < 1$, in Figure 2 on the ordinate axis were represented the time intervals θ_h, as well as the relation of the masses μ_h in function of σ_h. The curve "c" refers to the functions θ_h and μ_h, which are characteristic for the matter (MA). The curve "d" refers to the θ_{h_2} and μ_{h_1} respectively, which are characteristic for the antimatter (AM). We mention that in conformity with the information in [1], for the quotient μ between the m and m_0 we have valid similar relations with the relations (11) and (12) as such:

$$\mu_{h_1} = +|K| \tag{13}$$

$$\wedge$$

$$\mu_{h_2} = -|K|. \tag{14}$$

As in the case $\sigma < 1$, θ_{h_1}, is a time interval which goes in the future and it is associated with the matter (MA) and θ_{h_2} is a time which goes in the part and it is associated with the antimatter (AM). However, this time the connection between the entity from MA category does not have an alternative character (OR) but it has an indissoluble connection character between this two entities. This thing looks paradoxically now when in Science

there exists a fixed idea that MA and AM can't coexist and that a contact between them can produce a reciprocal annihilation resulting in a pure energy. Thus, at the collision and the annihilation of a pair under the form of photons and gamma rays radiation.

Let not forget, as we showed in [1] that in the past, during the time comprised between when the "explosion" Big Bang (BB) was produced and about 100 seconds after that (according certain theories 43 s) the matter (MA) and the antimatter cohabited. It is not known if these two forms of substances have a "dual" or a "bipolar" character. Since the velocity of the Universe expansion at that period excited with showed (see Figure 2) we are tempted to believe that also these entities which populated the Universe had hyper luminous velocities. At the same time, we can accept the hypothesis that MA and AM were characterized by bipolar connections. In any case, at a moment situated under 100 s after BB, there was a process of a reciprocal annihilation of the MA (electrons) particles and the corresponding AM (positrons) particles. The results are the photons, and thus the Universe became "an ocean of light". From this annihilation of MA and AM resulted, it is not known how, a surplus of MA which constitutes "the material" from which the actual Universe is constructed.

3. Regarding the in time traveling

From Figure 1 with the reference to $\sigma < 1$, regarding the element "time" we observe that this ratio – see the formula (4) – increases very slowly (at least for $\sigma < 0.5$) together with the increase of σ. Thus, for example, for the increase of σ. Thus, for example, for $\sigma = 0.2$, that is $v = 0.6(10^5)km/s$, the ratio $\theta_1 = 1.021$. In this way a travel in the future in these conditions could have a result the fact that after an interval of 10 year registered by the "traveler" from the vehicle for traveling in time (In Time Traveling Vehicle – TTV), considering as a mobile reference system (MS), could know the situation existing in the fixed system after an interval of 10.21 years. Thus, in this case the "gain" in this travel can be only of 0.21 years which means, that is about 2.5 months. In other words the "efficiency" of such a traveling is very large velocity compared with our actual technical possibilities, as we will see in our further discussion. An almost the same insignificance efficiency is recorded even in case with $\sigma_A = 0.5$ (with the reference to the point A in Figure 1) thus $v_A = 1.5 \cdot 10^5 km/s$. The time gained by the traveler in TTV would be in this case of 0.5 years. For $\sigma_B = 0.7$ (with the reference to the point B in Figure 1, thus $v_B = 2.1 \cdot 10^5 km/s$, the time gained by the traveler in TTV would be of 0.4 years. Only at a velocity of $2.7 \cdot 10^5 km/s$ ($\sigma_A = 0.9$) this time gained would have a more consistent value of 13 years. In consequence, we name the velocities of the domain as being of "extreme large velocities".

We mention that everything from above is valid also in relation with the curve "a" of Figure 1, thus it is with reference to an Universe created by the matter (MA). In a hypothetical case of an Universe created by the antimatter (AM) we must consider the curve "b" of Figure 1. For such a situation the traveling in time is made in the past with similar value terms as they are considered in the curve "a" but with the negative sign. In the domain of the extreme large velocities, we have to regard the things in the entire of their complexity and not limiting to analyze the time variation of σ. Thus, we see that at $\sigma = 0.9$, the mass m of a moving body (in our case TTV) becomes to be 2.3 times larger compared with the mass m_0 of the same body in repos. Even in the case of smaller velocities then those considered to be of extreme large velocities, the increase of the mass m create big difficulties to find a propulsion system of TTV.

When the velocity increases, so when increases these mentioned difficulties will increase very much respectively. Thus, when the value σ tends to $\sigma = 1$, we could even think that a

classical propulsion system could exist and the solution of this problem must be searched in the unconventional propulsion system. Some of these will be discussed in the second part of this chapter. If we refer to the hyper luminous velocities ($\sigma > 1$) we have to appeal to the data contain in the curves "c" and "d" of Figure 2 regarding the dimension θ_h . Firstly, we observe that maximum difficulty consist to obtain an increase of the velocity higher then c, where $\sigma \geq 1$ is the same for both cases represented in Figure 1 and Figure 2 respectively. The extreme large value of the mass m (in motion) compared with the mass m_0 (in repaos) of a material body in the zone $\sigma < 1$ has a consequence that practically it is impossible to reach extremely large velocities of a TTV with our methods applied today. This situation may be possible if the reaction force of some material elements (hot gases, atomic or subatomic particles – ions, photons – particles) are used on TTV respectively.

Now, let suppose that we can exceed the value $\sigma = 1$ by making use of some unconventional methods in traveling TTV (we will discuss this case on the second part of this chapter) and then analyzing the functions θ_h respectively σ_h we can make some important findings. We will mention these finding in our following discussion, considering that, for $\sigma_h > 1$ we have $|K| = (\sigma_h^2 - 1)^{1/2}$.

In order to simplify our analysis, we accept as reference for σ the value from which $\mu_{h_1} = 0$ and $\mu_{h_2} = -1$ respectively. Thus, from the relations (13) and (14) we have for σ the value $\sigma_{h_1} = \sigma_{h_2} = \sqrt{2} = 1.41$.

We showed that in the domain $0 < \sigma < 1$ (Figure 1) the increase of σ up the values of $\sigma_h = 0.5$ have an effect of an insignificant increase of values of the values of μ_1 and μ_2 respectively, regarding the masses. In order to see which is the measure order of the variation of θ_h and μ_h in function of increase of σ_h, for example, we calculate the difference between their values for $\theta_{h_D} = 5.0$ and $\theta_{h_C} = 1.41$ respectively for which we showed that $\theta_{h_{1C}} = 1.0$; $\mu_{h_{1C}} = 1.0$; $\theta_{h_{2C}} = -1$; $\mu_{h_{2C}} = -1$. For $\theta_{h_{1D}}$ we apply the formula (11) and we obtain $\theta_{h_{1D}} = 0.2$. Performing the difference $\theta_{h_{1D}} - \theta_{h_{1C}} = -0.8$ we obtain a negative value. This means that by increasing of σ_h a time contraction was produced, inversely then it is happening in the domain $0 < \sigma < 1$. If in the difference above we introduce $\theta_{h_{1C}} = 1.0$ and apply relation (4) we obtain $\left(\frac{\vartheta_f}{\vartheta_m}\right)_{h_{1D}} = 0.2$. In other words, by increasing the velocity of the mobile reference system (MS) given the fixed reference system (FS), from $4 \cdot 23 \cdot 10^5 km/s$ ($\sigma_{h_C} = 1.41$) to $15 \cdot 10^5 km/s$ ($\sigma_{h_D} = 5$), the observer from MS sees that the elapsed time in FS is 5 times slower ($5 = \frac{1}{0.2}$). Thus the time in FS (compared to MS) is contracting. We can say something if we refer to the antimatter (AM). However, in this case it is about, traveling in the past (curved) of Figure 2 as for the case represented by curve b of Figure 1. Regard the binary solutions, for θ_h as much for μ_h in the domain $\sigma_h > 1$, we have to mention that these themselves compulsory accept the idea of simultaneous existence of MA and AM "living together". In the conditions in which in the actual Universe was not established the presence of AM and since in Physics is confirmed that MA and AM can't exist together, annihilation each other, the idea stated before can be completely situated outside of a possible reality.

Let not forget that in the "inflation" stage at the beginning of the Universe expansion (immediately after BB), as we previously showed, MA and AM coexisted together and only after their reciprocal annihilation the "luminous ocean" appeared. There is the possibility that in a "medium" in which the velocity of its component entities the velocity is larger than the velocity of the light, these identities "co-operate" even if they belong to different "states" (MA or AM). This situation can intervene anytime when there are condition for such a medium to reappear.

As short conclusion regarding the manner haw this relativist time variation could affect on eventual "traveling in time" we mention the following:

3.1. This traveling in the future can be performed with a notable efficiency if a TVV is used in domain $0 < \sigma < 1$ having an extreme high velocity ($\sigma > 0.9$). This "Efficiency" becomes larger when the value of σ become larger (Figure 1). This "traveling" (at this moment hypothetical) could be based on the phenomena called "time dilatation". Such a traveling in the future is compatible only with the form "matter" (MA) of the universal substance. Also, we can talk about of such traveling in the future in the domain $\sigma > 1$ (Figure 2) with reference to MA. In this case, the efficiency of such a traveling decreases when the value of σ increases. This time an adverse phenomenon intervenes and we named it "time contraction".

3.2. The traveling in the past, for the domain $0 < \sigma < 1$ could be performed in a similar value in the future case. This thing is illustrated by the curve "b" in Figure 1. Such traveling remains in a pure theoretical status since it could be realized in a world compared with the antimatter (AM) only. For the domain $\sigma_h > 1$ the traveling in the past could be performed if the data contained in the curve "d" of Figure 2 are respected and in the conditions of the "bipolarity" with the symmetric traveling (in conformity with the curve "c", as we showed above.

Following our discussion above in 3.1. and 3.2. we consider usefully to mention some other opinions regarding the travel in the future and in the past, also. Thus, Professor Brian Cox of Manchester University, Great Britain, considers that "the travel in time is possible only in one direction, in the future and not in the past".

In regard with the traveling in the past, the opinions with scientific character are less outlined and they are referring to the possibilities which could be offered by physical systems which will aim to the Universe structure itself. For example,in [5] it is shown that "The same as any other possible form to a more rapid displacement than the light, worm holes could permit to travel in the past". Regarding to the relativist variation of the mass, of the quotient $\mu = \frac{m}{m_0}$ respectively, with the reference to Figure 1 and Figure 2 we establish the following:

3.3. For $0 < \sigma < 1$ in Figure 1 the increase in σ have an effect of an increase in μ, slower at the beginning and after that more accentuated. This shows that, especially at extremely large values of the velocity v and thus σ, in order to overcome the mass inertia of a mass which becomes m now (compared with initial m) TTV should have a very large power. At the limit, to pass the value of $\sigma = 1$ it would be necessary a power with an infinite value. Because of this reason, to overtake this velocity threshold, it is not possible to be made by material entities (mass possessors) with the technical methods available at this time.

3.4. Let suppose that this "threshold" $\sigma = 1$ was overtaken, for $\sigma_h > 1$ the increased value of this dimension, thus of the velocity v, have as effect to decrease μ_2 at the beginning very abruptly (up to σ_h approximatively $= 10$) and continues to decrease slowly. In consequence, the necessary power to accelerate a material entity(with a moving mass m), in the respective velocity domain, should be more and more smaller. From the philosophical point of view, this looks like a compensation (award) given for a realization of a "performance" exceeding the velocity of the light c. The increase of σ_h to very large values, at the limit σ_h goes to infinity, have an effect a very drastic decrease of μ_h at the limit μ_h goes to 0. This is an equivalent with a total "dematerialization" of that considered entity.

From the previous results in this chapter, we see that a possible traveling in time is when a vehicle (TTV) with a velocity very closed to the velocity of light (extremely large)

or larger than this (hyper-luminous) is involved. Logically, we can ask many questions regarding what propulsion systems could obtain velocities with such values. With this in our mind let discuss shortly some of these systems. Their presentation in detail requires a very lengthy and tedious discussion and is on entire subject itself. Evidently, in order to obtain such large velocity values for TTV, first time, we must dispose superior order energy which can offer the burning process as could be a rocket for example. This energy source was proved to be the atomic energy. In the beginning it was used having as a base a process of an uncontrolled nuclear fission for the two atomic bombs lunched in Japan case in 1945. Based on the research to achieve the atomic bomb more attention was given to study systems to produce energy with civic applications using nuclear controlled fission. Short time after 1945, on the 1950 and 1960 of the past century, the "nuclear powers" (in possession of the atomic bombs) realized the first nuclear-electric plants (Nuclear Power Plants – NPP), with the title of industrial prototype. Thus, in USA and Great Britain were built NPP at Shippingport (Pennsylvania) and Calder Hall respectively [7]. In the same period of time it was realized such a NPP in the former Soviet Union. Also, in the respective period of time given the large consume of the classical fuels (hydrocarbons) in transportation, especially naval and aerial, the research for application of the atomic energy started aggressively. Another domain in which on energy source with a very high potential was needed is in the development of the rocket technology. Given the advantages in using nuclear energy, many research activities were also organized in some countries which did not belong to the group of the nuclear power countries. One of these is Romania, too. Some of these research results regarding the application of nuclear energy for the rocket propulsion are given in [8] and [9] and more in the specialized journals of that period of time. In any case, the conclusion from this research results in this domain at the world level, showed that the velocity values obtained by equipping some vehicle with rockets functioning with hot gases (which result from the nuclear or burning reaction) ore very far away from the necessary values for a traveling in time. The same will happen if we try to use some ionic rockets. In this case, the reaction force created by plasma jet formed by the resulting ions in the dissociation at the very high temperatures of some superior chemical combustibles. Also, in this case, we can't obtain velocity values for the rocket witch can be taken in consideration for a traveling in time. Surely, to bring about (movement, shifting) of a TTV we can't take in consideration classical propulsion systems presently known, but we have to use a nonconventional system. We continue to present shortly three of such systems.

In the "Philadelphia Experiment" it is very likely that such an experiment was used. This experiment is part of the serial experiments "Rainbow", realized by USA Military Marine during the year of 1943. It consists in provoking the "disappearance" from the visual field and the radar screens of the US destroyer Eldridge (DE-173) anchored at Philadelphia port. This ship appeared for short time at Norfolk port (situated at $600 Km$ distant from Philadelphia) and after that appeared again in Philadelphia ([10]). Many information sources sustain that this ship may performed and a "jump" in time of 40 years and arrived in Montauk, New York. The leader of the above experiment was the physicist Franklin Reno and there exist information that during the year of 1942 also the scholar Nicola Tesla was involved in its realization. In any case, Tesla was interested in traveling in time and supported that "time and space can be influenced by using the rotary magnetic fields of a great power" ([11]).

Analyzing the manner in which the Philadelphia Experiment developed, we can affirm with big probability that in this case, it was applied the solution of the successive sequence: De-materialization – Teleportation (in space and time) – Re-materialization. It appears

that Einstein had a contribution in this experiment, also. In any case, it is to mention that regarding our subject, Einstein made the affirmation that "the time is a succession of events which looks for a successive order of reason-and-effects". This order represented by the time, in fact, is an inclination to give a meaning of an unordered way in which the phenomena exist in the Universe ([12]). Returning to the Philadelphia Experiment it is to mention that its truthfulness is not yet established, so long as this "legendary" idea regarding this subject exists. This can be done by official clarifications only.

The following two physical systems which could realize the traveling in time endorse the Universe structure itself.

Thus, in 1994 the Mexican physicist Miquel Alcubierreinspired from the "Warp System" appeared in SF Literature proposed a "motor" ([13]) to be used as a possible tool to perform traveling in Cosmos. It is about a stationary space ship comprised in a spatial "bulla" which could be entirely displaced as a result of the deformation of the "space-time Net" which "fills" the entire Universe. In the front of this bulla the respective space could compress and in its bock it could expand.

Another possibility to travel in the space-time net for a travel in the past is the realization of o "wormhole" ([1]). This would constitute in a narrow tube of space-time, which can make the connection of two near flat regions (in relation with the space curve) found at a big distance one from the other. Everything discussed above regarding those nonconventional methods to realize extremely large or hyper luminous velocities and consequently, traveling in time and space (at the cosmic distances) look to be of the fantastical domain. With all of this it would be a big mistake to believe that all the phenomena in the Universe and everything which could be realized is limited to everything what was discovered up to the present.

4. Conclusion

The analysis of the problems mentioned in the title of this paper is based on the following elements:

4.1. The acceptance of the hypothesis that the equations of the Relativity Theory ore valid for velocities larger than the velocity of the light also as we see in [1].

4.2. The application of the Mathematical Model presented in the paper [2].

From the previous chapters in which we performed this analysis we can make the following important conclusions:

a) From the correlation of the problem of time variation with the mass variation in function of the velocity (see [1]) we have that for the velocities smaller than the velocity of the light (c), thus for $\sigma = \frac{v}{c} < 1$ the time have a "dual" behavior such:

a.1. In the case when we refer to (MA), the curve "a" of Figure 1, the perceived time by on observer from a mobile reference system (OMS-onlooker from a Mobile System) in report with one from a fixed reference system (OFS) "expands". In other words, OMS "travels" in the future, and it is characterized by this $\vee$ operator (OR).

a.2. Regarding to the antimatter (AM), the curve "b" of Figure 1, the perceived time by an OMS would "flow" reversibly with that one perceived by the one in OFS. In other words, OMS would travel in the past, in a medium constructed from AM, if this would exist.

b) For velocities larger than "c" (hyper luminous velocities), thus for the time have a "bipolar" behavior characterized by the operator (AND). Thus, the solutions referring to MA and AM respectively, result to be indestructibly bound together (as represented by the bars "|" of Figure 2). The time flow conform the curve "c" corresponds to a medium mode of MA.

Opposite to the case when $\sigma < 1$ which is characterized by a "time dilatation", where $\sigma_h < 1$ the corresponding process is characterized by a "time contraction". On the contrary, the time flow conform the curve "d" is performed in the past and corresponds to a medium created from AM. The operator (AND) force the existence of a unique medium in which, in fact, MA and AM to coexist. Up to this time such a medium was not identified. Contrary, it is known the fact that MA and AM reciprocally annihilate themselves when they get in touch. It is not known yet if their coexistence could be possible in the conditions in which the hyper luminous velocities would predominate. It is very possible that such a situation existed at the beginning of the Universe formation, in an immediate period following when the Bing Bang "explosion" was produced, namely100 s after its striking.

c) In order to obtain some necessary velocities to propel of a "Time Travel Vehicle"(TTV) it is found that the classical rocket (with combustion, nuclear propulsion or ionic propulsion) can'treach the necessary technical parameters. With the purpose to solve this problem we can have in our view some unconventional systems and we mention the following ones:

c.1. Systems which will assure this process of De-materialization, Teleportationand Re-materialization. It is possible that such a system was applied in the very famous and controversial "Philadelphia Experiment".

c.2. Systems which act on deep seated structure of the Universe (space-time net). Such kind of the systems could be the Alcubierre Motor or the Wormhole.

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From the previous chapters in which we performed this analysis we can make the following important conclusions:

a) From the correlation of the problem of time variation with the mass variation in function of the velocity (see [1]) we have that for the velocities smaller than the velocity of the light (c), thus for $\sigma = \frac{v}{c} < 1$ the time have a "dual" behavior such:

a.1. In the case when we refer to (MA), the curve "a" of figure 1, the perceived time by on observer from a mobile reference system (OMS-onlooker from a Mobile System) in report with one from a fixed reference system (OFS) "expands". In other words, OMS "travels" in the future, and it is characterized by this operator (OR).

a.2. Regarding to the antimatter (AM), the curve "b" of figure 1, the perceived time by an OMS would "flow" reversibly with that one perceived by the one in OFS. In other words, OMS would travel in the past, in a medium constructed from AM, if this would exist.

For velocities larger than "c" (hyper luminous velocities), thus for the time have a "bipolar" behavior characterized by the operator (AND). Thus, the solutions referring to MA and AM respectively, result to be indestructibly bound together (as represented by the bars "|" of Figure 2). The time flow conform the curve "c" corresponds to a medium mode of MA.

Opposite to the case when $\sigma < 1$ which is characterized by a "time dilatation", where the corresponding process is characterized by a "time contraction". On the contrary, the time flow conform the curve "d" is performed in the past and corresponds to a medium created from AM. The operator $\wedge$ (AND) force the existence of a unique medium in which, in fact, MA and AM to coexist. Up to this time such a medium was not identified.

Contrary, it is known the fact that MA and AM reciprocally annihilate themselves when they get in touch. It is not known yet if their coexistence could be possible in the conditions in which the hyper luminous velocities would predominate. It is very possible that such a situation existed at the beginning of the Universe formation, in an immediate period following when the Bing Bang "explosion" was produced, namely 100 s after its striking.

c) In order to obtain some necessary velocities to propel of a "Time Travel Vehicle" (TTV) it is found that the classical rocket (with combustion, nuclear propulsion or ionic propulsion) can't reach the necessary technical parameters. With the purpose to solve this problem we can have in our view some unconventional systems and we mention the following ones:

c.1. Systems which will assure this process of De-materialization, Teleportation and Re-materialization. It is possible that such a system was applied in the very famous and controversial "Philadelphia Experiment".

c.2. Systems which act on deep seated structure of the Universe (space-time net). Such kind of the systems could be the Alcubierre Motor or the Wormhole.

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