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What Is Consistent And False In Einstein's Special Theory of Relativity ?
Newton Principles of Mechanics and Special Theory of Relativity

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In any scientific enquiry there are no such things as final solutions. Yet, in this paper, I aim to explain the problems of the size changes of some basic measure units on inertial frames of referenc when in relative motion. It was demonstrated that a normal clock's rate of ticking duration becomes 'slower' when placed on a "faster" inertial frame of relative motion. Equally the mass of a body becomes larger with increased kinetic motion. Thus, the *same* clock runs slower when at rest on the moving Earth frame relative to the gravitational rest frame of the Sun. Similarly, the same pendulum clock runs slower when in motion (on board a moving train) and its *arm must be physically shortened* such that both clocks are synchronized to read a *universal* 'common time clock system' (*CTCS*) on both frames. The effect of shortening the arm's length compensate for the increase to the bob mass size due to gained kinetic energy of motion and the clocks' ticks durations become of the same length on both frames. An arbitray universality of a *natural cosmic time flow* rate is thus established on both frames as it is important for starting *common dating and calculating the relative total energy content of a material body.* It is irrelevant what rest reference frame (Earth?) we initially choose for the duration of the starting common time (universal time clock, *UTC*) clock system. We must destinguish between cosmic flow of time and that read by local mechanical, atomic or gravitational timing devices. Since the meter length is internationally defined by being one part (1*/299792458)* of the extension that light travels during a duration of an Earth local second, *the defined rest meter length is therefore longer in length when the reference frame is in motion. A*ccording to this definition, the meter can be longer in length on the moving frame because of the longer duration of a slower non-synchronized proper local clock. *It is also shown that a force of the same strength, accelerates a mass (the clock's pointers) a shorter distance in the same common duration when the body is in relative motion as its mass increases in size*. Therefore, the slowness (the so called time-dilation) of clocks on relatively moving inertial frames can be caused by the changes to both: mass and length parameters due to gained kinetic energy by the clocks when in motion. It, therefore, follows that universal cosmic time does not locally and relatively dilate because of a frame changed motion nor meter rods contract along the direction of their travel as claimed by Einstein's Special Theory of Relativity. It starts with changes to mass and length due to motion while *the strenght unit of the same force (dyne or newton) always remains a constant irrespective of changes to motion as the Lorentz transforms cancel each other.*

Keywords: *Special Theory of Relativity (STR); CosmicTime Flow; Definition of the meter; Newtons Laws of Motion.*

INTRODUCTION: **The relative metric changes to the basic units of measure remain enigmatic problems that continue to be mentally challenging and difficult to understand. The underlying *STR* mathematics seem to produce correct results and so is accordingly, the experimental research. However, there are many scientists still convinced that the *STR* hypotheses are**

contradictory and could be falsified and are seeking alternative solutions. They question the underlying mathematics and physical hypothesis introduced by the theory. In this paper, I attempt to explain the issues relying on Newton's mechanics and classical physics to arrive at a viable solution. We know that a force basic parameters of measure change with kinetic variations in the motion of a body. Changes of momentum, acceleration and deceleration affect the mass size and the physical dimensions of a body. This cause moving clocks to run slower or faster ticking. ***However, the changes to the parametrics do not normally effect the strength size of the force driving the clocks.*** **It is also shown, that** ***even if the clocks are kept to 'common time synchronized clock system' (CTCS) on both frames*****, the** ***same rest meter rod, if still used on the moving frame, changes dimension and 'normally' become physically longer. When the clocks are synchronized, the meter rod on the on The moving frame must be physically shortened (not naturaley contracted!) to attain a universal common physical length irrespective of a frame motion*****. Thus, contrary to what I had intentionally suggested in an earliery published online paper,[*] if we keep to local metrics (Lorentz), there must be a relative** ***increase to both: the mass as well as the total energy of a particle (body)*** **when in relative motion, otherwise if the clocks were synchronized to a common duration (c*****ommon time clock system, CTCS)*****, the by** ***now longer meter*** **rod must be** ***shortened on the moving frame*** **as per 'international definition', and again the mass and the total energy of a body increases in size and the velocity of light remains the same universal constant. Obviously, my initially suggested constancy of total energy, runs against the main stream of current physics and what were discovered and interpreted by particles creation accelerators experiments and are accordingly controversial. However, the measuraments of the duration of a physical event by the regular motion of a reference timing device** ***must be*** **the same period of universal "*****cosmic" time*** **irrespective of the motion of the frames. Therefore, relative to the cosmics, for example, the duration of our life span in the universe, remains the same period wherever it is measured! Our various local clocks in motion may tick faster or slower but the overall duration of an event is the same. The overall duration of a clock's pointer movement on the rest frame is equal to duration of the clock's pointers movement when the frame is motion which moves a shorter distance. The pointers move a shorter distance during the same time. We have to destinguish between time read by mechanical, atomic nnd gravitational clocks and that of clocks referenced as in the rest state having zero momentum. Therefore, we** ***must shorten*** **our meter rod on the moving frame in order to keep the clocks synchronized to arrive at the correct** ***STR*** **energy expression. These are my reasons for ruling out** ***STR*** **controversial** ***natural contraction*** **of length and** ***time dilation*****. The shortening is necessary to counter the affect of a body's mass increase when in relative motion due to gain of extra kinetic energy.**

***-**Akil Mohammed Zaman// http://gsjournal.net/Science-Journals/Research%20Papers-Relativity%20Theory/Download/4341

1- ***The Constant Velocity Of Light.*** **The second principle of Einstein's Special Theory of Relativity (*****STR*****), states that "*****In all inertial systems, the velocity of light has the same value when measured with rods and clocks of the same kind[1]*****" It follows that relative to the rest frame, if n_o is the number of times we use the meter to measure the path l_o travelled by light in one unit of time (second) then $l_o = n_o r_o$ where r_o is the meter rod length at rest. Therefore $C=n_o r_o/t_o$ on the rest frame, however, on the moving frame the time duration of a second, t_v becomes longer and if C** ***remains a constant as stated above, therefore:***

$$C=n_o r_v / t_v$$

Since $t_v=t_o/(1-v^2/c^2)^{1/2}$ ***therefore*** $r_v = r_o /(1-v^2/c^2)^{1/2}$ ***and the meter must be longer in length when in motion.*** **Accordingly, the** ***meter length does not contract*** **but expands if velocity of light remains constant as claimed**

a principal in *STR* when the frame increases velocity in relative motion. According to *STR* mathematics, when in motion the meter contracts in length and therefore:

$$C=n_v\, r_x/t_v$$

such that we need to use the meter rod more times ($n_v = n_o /(1-v^{2}/c^2)^{1/2}$) to read a longer path. This is an obviosly false expression that is logically impermissible because the meter rod has changed size.

However, if we use synchronized (*CTCS)* clocks on both frames, the space extensions travelled by light are then the same *absolute* physical length irrespective of motion.. But since the meter becomes longer in length when in motion, the velocity of light, though still constant, becomes numerically variable such that on the moving frame the velocity of light = $n_x\, r_v / t_o$ where $n_x = n_o (1-v^{2}/c^2)^{1/2}$. This was used to support my earlier tentative suggestion that because of the metric change, the velocity of light though still constant, is numerically different when the frame is in motion and the clocks are synchronized. But, of course we have to keep to the rest frame metrics and the velocity of light, as stated in *STR*, remains a universal constant.

Alternatively, using local and similar clocks (which may read different durations for the passge of the same event), the duration of the same clock's tick driven by the same strength force, is longer given by $t_o=(m_o\, r_o / F)^{1/2}$ or $t_v = (m_v\, r_v /F)^{1/2}$ when in mtion such that the numerical index remains constant given by $C=r_o/t_o=r_v/t_v$ irrespective of the velocity changes to the frame motion. The same applies to clocks based on gravitationally constant forces or atomic motions. Thus $m_o\, g = m_o\, r_o/t_o^2 = GM_e m_o/r_o^2$ which comes to $t_o^2 = r_o^3/GM_e\, m_o$ and for the moving clock, $t_v^2 = r_v^3/GM_e m_v$. Here M_e is the constant mass of the Earth relative to pendulum clock. Similarly, with respect to an electrostatic force, the mass of an electron increases to m_v such that $F=m_o\, r_o/t_o^2$ and $F=m_v r_v/t_v^2$ when in motion. Therefore, for an atomic clock to run slower the radius must be larger when in motion otherwise if it becomes smaller (contract) the ticks remain of the same duration and there is no time dilation as calimed by Einstein's *STR*.

2-Natural and Mechanical Timing And Dating Clocks. **Motion and displacement of matter in the Universe is the cause of the time flow phenomena. The motion is caused by forces such as nuclear, gravitational, chemical or electromagnetic attraction The daily near perfect spin and orbital motion of the planet Earth can provide us with the natural reference measure of flow of cosmic time and dating. The hours' pointer of our constructed normal mechanical clocks complete two revolution in every 24 hours to register the passage of one daily spin of the earth with the hours divided into minutes and shorter units seconds of duration. There is nothing cosmic about such measurment but we can choose this clock system at rest as the convenient s*tart of universal time system* (*UTC*) and apply it through synchronization to the entire universe. We adjust the force driving such clocks with a constant strength to achieve precise timing. The size of the force depends on the mass of the pointer, its length and the distance it moves in 12 hours duration. Even so, the variations of temperatue and kinetic motion of the clocks still affect the motion of the pointers thus clocks run slower and faster despite the constant applied force. This will be discussed in details in following sections.**

Needless to say, living creatures on another planet with a different spin and orbiting duration will arrive at a different clock and dating system. But through proper transformations the flow of time on both planets can be reconciled.

3-The Strength of The Defined Unit Of Force: **If we are to comply with the first principle of relativity, the same strength force will accelerate the same mass for the same extension of space on both the rest and the moving frame. *But, if the mass and length change in size when in motion, as discovered experimentally, the extension of space would not necessarily be the same length during the same common duration for the same applied force since the acceleration is now lower.* Thus, keeping to synchronized clocks, the same momentum (impulse) produced by the force will move the *heavier mass* a shorter distance on the moving frame. Or else, the maximum velocity achieved by the force through acceleration is less than it is on the rest frame. (thus: $m_o\, v_o = m_v\, v_v$ where v_o is the velocity reached on the rest frame and v_v is the slower maximum velocity on the moving frmae, hence preserving overall momentum).**

In the International System Of Units, ISU, the strength of a force, the Newton, is defined by the force of

one kilogram accelerated at one meter per sec/sec. This definition is restrictedly applied to the rest frame of an Earth laboratory at rest. However, on a moving frame, the pointer's mass (or electron) increases in size and the clock runs slower. Thus keeping to the same force strength:

$$m_o r_o / t_o^2 = m_v r_v / t_v^2$$

Here the increased mass $m_v = m_o /(1-v^2/c^2)^{1/2}$ and $t_v = t_o /(1-v^2/c^2)^{1/2}$ have changed on the moving frame therefore to preserve the same strength of the force, $r_v = r_o /(1-v^2/c^2)^{1/2}$. Thus the meter must be longer in length on the moving frame if we keep to Lorentz local time on the moving frame. However, the *velocity of light, $C=n_o r_o /t_o = n_o r_v / t_v$ as per definition (n_o= 299792458) remains numerically constant on both frames* of reference. This is very important when equating the energy of a particle in motion relative to its energy on the rest frame since as in *STR*:

$$m_v c^2 = m_o c^2 + m_o v^2/\underline{2}$$

Therefore in this case, both the mass and *the total energy* content of the particle are increased with motion while the meter must be longer to preserve the strength of the unit of force on the moving frrame. This is in full agreement with *STR* but time is not dilated nor the meter is contracted but ended up longer in length! It is only the metrics of the basic units that changes with motion but not the strength of the force. It follows that the increase in both mass and length takes place during the acceleration of a body. On the other hand, if we keep to synchornized time on both frames then:

$$m_o r_o / t_o^2 = m_v r_x / t_o^2$$

and we must shorten, the by now longer meter rod, by the Lorentz gamma factor $(1-v^2/c^2)^{1/2}$ such that :

$$m_o r_o / t_o^2 = m_v r_v (1-v^2/c^2)^{1/2} / t_o^2$$

thus the velocity of light remains a universal constant and the *STR* energy expression is therefore valid only if the *clocks remain sychronized. In this case, the longer meter on the moving frame must be shortened.* To my mind, this is the reason for the confused contraction hypothesis in *STR. We have to remove the myth of time dilation and contraction from STR* which falsley remained seriously unchallenged for over a century.

<u>4- The Physics Of Simple Pendulum Clocks:</u> **We owe both great scientific pioneers, Galilio and the Dutch scientist Christian Huygens for the invention and development of this classical clock. The semi-constant Earth's gravitational force regulates the timing movement of such clocks. Thus if m_o is the mass of the bob and the pendulum arm is of length r_o then the acting force, F_o is given by:**

$$F_o = m_o g = m_o v^2/r = m_o 4\pi^2 r_o / t_o^2 \qquad 2$$

where g is the acceleration due to gravitational pull of the Earth and t_o is the period of a complete swing tick's duration.

Therefore when the clock is considered at rest:

$$t_o = 2\pi (r_o /g)^{1'2}$$

But when the clock is in motion relative to the rest frame:

$$t_v = 2\pi (r_v /g)^{1/2}$$

Clearly, for synchronizing the moving clock to that of the rest frame, the arm r_v must be shortened. Since $r_v = r_o (1-v^2/c^2)^{-1/2}$ and $m_v = m_o (1-v^2/c^2)^{-1/2}$ and *F* is constant, we end up with: $t_v = t_o (1-v^2/c^2)^{-1/2}$ *which is the correct answer.* Having the same strength force turning the clock's dial when in motion leads to reduced acceleration because of the change in the size value of the pointer moving mass. This emerges from the following expression for force:

$$F==m_o r_o/t_o^2 = m_v r_v/t_v^2$$

when opting for clocks that run slower as in *STR* "time dilation". Obviously, in this case, the length unit must increase and not contract as claimed by *STR*. This is a basic contradiction that cannot be ignored. The arm or the meter rod, becomes longer with increased kinetic motion and must be shortened in order to keep to the same common duration for the synchronized ticking of both clocks.

***In the second case,* if we keep the clocks commonly synchronized, we arrive at the common time t_o from the following:**

$$F=m_o r_o/t_o^2 = m_v r_x/t_o^2$$

$$=(m_o/(1-v^{2/}c^2)^{1/2})(r_o(1-v^{2/}c^2)^{1/2})/t_o^2 = m_o r_o/t_o^2$$

Here r_x, the length of the meter rod, is shortened if the the force remains of the same strength because the mass of a body increases when in motion. This is, probably, the reason for the hypotheses of the confused *contraction of the meter rod in STR. In the common time clock system, CTCS, the meter rod has to be physically shortened or transformed.* Obviously, *the strength of a force remains the same size (Newton) irrespective of the changes to the neasuring units. Thus $F=m_o r_o/t_o^2 = m_v r_v/t_v^2$.*

Since the meter is defined internationally by the path that light takes to travel in $1/\partial$ second where ∂ = *299792458.* Therefore on the rest frame :

$$C_o=r_o\partial/t_o$$

While on the moving frame because the rest meter, r_v, is now physically longer in dimension:

$$C_v=r_v\,\partial/t_o = r_v\,(1-v^{2/}c^2)^{1/2}\,\partial/t_o = C_o$$

Therefore, the velocity of light remains constant. This is very important when equating the energy of a particle in motion relative to its energy on the rest frame since as in *STR*:

$$m_v c^2 = m_o c^2 + m_o v^2/\underline{2}$$

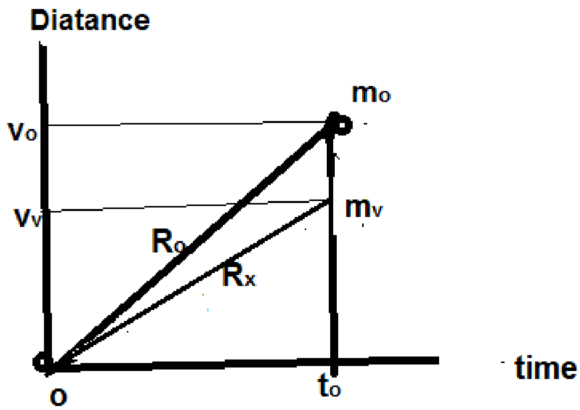
Therefore in this case, both the mass and *the total energy* content of the particle are increased with motion while the meter must be longer to preserve the strength of the unit of force on the moving frrame.

It follows that the definition is only valid if both clocks are synchronized where the meter retains its absolute physical length by virtue of defintion and the stated numerical constancy of the velocity of light.

But if we keep to the international definition of the meter on both frames and synchronize the moving clock to the rest frame, the travelled light length per unit common time remains the same extension on both frames such that the length of the meter rod and the duration of the second become common constants. Thus the velocity of light becomes equally a universal constant on both frames. To illustrate this let the common time =t_o and l_o extension of travelled light in one second and r_o the length of the meter on the rest frame. Therefore, $C=l_o/t_o = r_o\partial/t_o$ on both the rest and the moving frames by definition. The only change in size is that of the mass parameter. It increases such that the unit of force on the moving frame = $m_v r_o/t_o^2$ while the mass rest converstion energy = $m_v c^2$. Hence, in this case, it is therefore correct to accept the *STR* expression:

$$E_v = m_v c^2 = m_o c^2 + m_o v^2/2$$

We have reached this results through the adjustment of units instead of mathematical transformations. nnd have shown that time itself dose not dilate nor meter rods contract with motion. Unfortunately, there emerged a trend since Maxwell's time to find solutions of some complex physical problems through the application of mathematics ignoring the physical issues.



(fig -1)

Thus, we have to consider two alternative time durations, either accept a reference common time device or that of a slowed duration of a local clock system.

Case-A when keeping both clocks synchronized-- the graph at fig-1. Comparing both cases of motion on the two frames, R_x on the moving frame is of shorter length than R_o. ($m_o r_o/t_o^2 = m_v r_x/t_o^2$) since $m_v = m_o/(1-v^2/c^2)^{1/2}$ therefore, $R_x = R_o (1-v^2/c^2)^{1/2}$. Thus the length in this case must be adjusted -or transformed-shorter (but not contracted as claimed in *STR* !), because the force accelerate the larger mass a shorter distance on the moving frame during the same synchronized interval t_o. Nevertheless, momentum is still preserved for the same strength of the force when the clocks durations are synchronized on both frames. Thus, while velocity reaches v_o on the rest frame it is maximum at v_x on the moving frame. ($v_x = v_o (1-v^2/c^2)^{1/2}$) and therefore momentum remains constant though the mass has changed size. It follows the meter must be shortened (not contracted) on the moving frame, only if we keep to synchronized clocks. Thus the hypothesis of contraction is falsified in Einstein's *STR since we must keep to local Lorentz time* $t_v = t_o (1-v^2/c^2)^{-1/2}$ on the moving frame.

Clearly, what is physically relevant and important which we discovered from reliable experiments, is that the mass of the electron increases in size after being accelerated since the ratio of its (presumably constant) charge to mass changes with motion. This, therefore, must be the important criterion evidence on which our subsequent analysis has to be based upon while bearing in mind that we keep the time parameter either a common duration as previously explained or just to let the clock run freely non-synchronized. In the first case, we have exposed why the *meter rod must be shortened on the moving frame* such that the constant size of the force (one Newton) is expressed correctly by the three parameters of mass, length and time. Thus, on the moving frame, we *accept* and *trust the belief* that the *mass physically* increases in size and since our timing duration is kept a common standard interval through precise synchronization, only the length of our meter rod, according to our force equation, must change its size such that the same defined driving force remains the same strength on both frames. Thus the force can be defined on the rest frame RF_o from the express $F_o = m_o a = m_o l_o/t_o^2$ where *a* is the acceleration and l_o is the length of the meter rod. Hence the Impetus of force applied in duration t_o:

$$Impetus = F_o t_o = m_o\ l_o/t_o$$

If the force F_o = one Newton, the rest mass in this case m=1 kg while t_o is the one second unit duration of time and $l_o = R_o$ =1 meter length rod. While on the moving frame, the applied force is

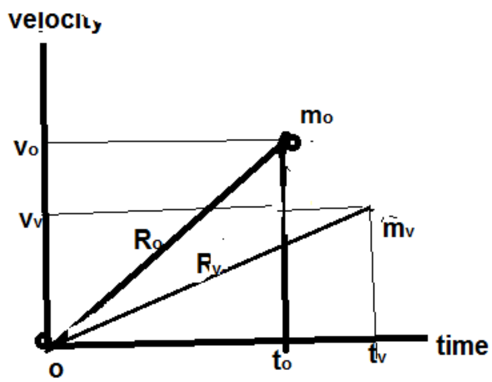
still of the same strength but the size of mass has increased and therefore $R_x = l_x$ is shorter since t_o is kept a "common" constant duration.

$$Impetus = F_v t_o = m_v R_x / t_o = m_o \, l_o / t_o$$

hence $$R_x = R_o \, (1 - v^2/c^2)^{1/2}$$

Thus, the same force moves the heavier mass a shorter distance, l_x, on the moving frame if the clocks ticks remain *synchronized* on both frames.

Case B- **The alternative way of expressing this same impulse of a force on a moving frame RF_v. Is using proper (Lorentz) time in Einstein's relativistic theory. In fig-2:**



(fig-2)

we plot time against the length of the variable meter rod when the mass, m_o assumed at rest and when in motion, m_v. Here $t_o = 1$ when the frame at rest but t_v is longer when the frame is moving. Therefore the size of the unit has changed. The body travels a longer distance but in a longer duration though the rate of acceleration by the force is less while the maximum velocity achieved by acceleration is lower. Thus, on the rest frame, F_o the acceleration $a_o = r_o/t_o^2$ but on the moving frame F_v, $a_v = r_v/t_v^2$. However, the force remains the same strength on both frames due to the increased change in the mass of the body when in motion. Therefore:

$$m_o \, r_o/t_o^2 = m_v \, r_v/t_v^2$$

where $m_v = m_o/(1-v^2/c^2)^{1/2}$ on the moving frame.

5-Final Comment; **We have shown that a 'light clock box' slows down because the length of the clock enclosure increases when in motion (but photons are massless) while other mechanical clocks slow down because of both, the mass and length of bodies increasing with motion. Therefore, with a light clock at rest $t_o = l_o / C$ but when in motion, $t_v = l_v / C = l_o/(1-v^2/c^2)^{1/2} C$ However, for a mechanical clock at rest: $t_o = (m_o \, l_o/F)^{1/2}$ and $t_v = (m_v l_v / F)^{1/2} = t_o/ (1-v^2/c^2)^{1/2}$ when in motion. Thus in both cases the clocks run slower on the moving frame assuming a constant driving force in the second case. I have avoided the classical contrversial *STR* geometrics and**

mathematics model in favour of a physical explanation for the reason of the slowness of clocks and expansion of matter with increased gained kinetic motion. I hope this wil be an acceptable alternative solution.

1 -Max Born, “Einstein's Theory of Relativity”, Dover Edition 1965, page 232.