

To: **All the Participants of the Bologna Conference of 1999.**

From: Viraj Fernando.

This letter concerns the report in Prof. Umberto Bartocci's website in regard to the discussion between some leading opponents of SRT that has taken place as a sequel to the 1999 Bologna Conference on the **Fundamental Problems** concerning the Special Theory of Relativity, <http://www.cartesio-episteme.net/quest.htm>

I wish to inform you that I have formulated a **dynamic theory** that explains relativistic phenomena. And this theory not only covers most of the matters raised by various participants in the above series of discussions but also it covers many more matters. What has been brought up as single isolated issues against the theory of relativity as individual pieces of a jigsaw by various participants in the above discussions, emerge as an interrelated whole, with their individual jigsaw pieces **interlocking** into one another nicely together in this theory.

And what will be of special interest to all (and to **Tom Phipps** in particular) is that this theory covers relativistic phenomena in vector fields as well as gravitational fields under one general principle and obtains results successfully. From one and the same equation we obtain results for advancement of perihelion of Mercury and bending of the ray of light. What is more, our result for the latter is very near the mark whereas Einstein's result is 20% off. What would be of great interest to all is that in the theorem I we derive the general formula for the quantity of kinetic energy that sets a body in motion as  $E = Mc^2(\Gamma - 1)$  for **all** velocities, and then we show that it tends to  $\frac{1}{2}Mv^2$  at low velocities. From there on we continue, not in an ad hoc manner as it is found to be in many a paper, but in one systematic sweep cascading from one theorem to the other, through the physical origin of the gamma-factors, physical basis of Lorentz transformation, physical basis of the constancy of the velocity of light, stellar aberration, cosmological redshift and more. The theory appears on the following sites: [www.wbabin.net](http://www.wbabin.net), and [http://blog.hasslberger.com/2006/05/tweaking\\_einstein\\_unified\\_theo.html](http://blog.hasslberger.com/2006/05/tweaking_einstein_unified_theo.html)

Here below we go through the most salient points raised in your above discussions and bring to your attention the solutions we have obtained in relation to various problems and paradoxes posed therein.

In the opening passages **Prof. Bartocci** quotes **James Paul Wesley**: "As you must surely realize, SR has been verified in an enormous number of different experimental situations. Any attempt to modify it must therefore not only demonstrate some deviation from experimental work but also must show how the large body of supporting evidence can be **reinterpreted** or shown to be incorrect. This is, I well recognize, an enormous task. But the **reinterpretation of the work** of the last century need not to be expected of minor importance".

- "first, to **find alternative explanations** for the presumed "successes" of relativity;  
- second, to propose to look at some other **phenomenology**, different from the usual one, in order to find **experimental contradictions of relativity with Nature.**"

1. We have in this dynamic theory, derived the Lorentz equation as emerging from the **general equation of motion** for a material particle at **any velocity** (high or low) as given by,

$$x' = \Gamma_u (x - vt.u/c) \text{ -----(1)}$$

(Note: The derivation of the above equation from one and the same **universal equation** common to motions of field signals, photons and electrons etc is discussed below under our response to **Theocharis'** comments on p.24 towards the of this essay)

At near light velocities when  $v \rightarrow c$   $vt.u/c \rightarrow ut$ , We get the Lorentz transformation from (1):

$$x' = \Gamma_u (x - ut) \text{ -----(2)}$$

It has been claimed by SRT that in the limiting case at low velocities when  $u^2/c^2 \rightarrow 0$ ,  $\Gamma_u \rightarrow 1$ , then (2) yields the Galilean transformation:

$$x' = x - ut \text{ -----(3)}$$

and thereby it is claimed SRT reduces to Newtonian mechanics. ('Newtonian mechanics is the limiting case of SRT'). But this is utterly incorrect. The root equation is (1). For it to become (3) the term  $vt.u/c$  must tend to  $ut$ . It can happen only when  $v \rightarrow c$ . But in the range of velocities where (3) is claimed to operate  $v \ll c$ . Therefore the above claim is unfounded. (See Appendix I pp 46-47 of my paper).

(The **dynamic factors** involved in yielding equation (1) are discussed further below).

The equation (1) is the general equation of motion of material bodies for all velocities, not only for bodies moving at near light velocities. Hence from experimental work for velocities of say about  $0.8c$ , **deviations from SRT** predictions can be established. There will be a progressive deviation in the results of experiments in comparison to predictions of SRT as the velocity drops, whereas predictions of our theory will match results for all velocities. Therefore, it may be noted that **re-interpretation proposed by Wesley becomes possible**.

2. As for "**finding alternative explanations for the presumed 'successes' of relativity**" proposed by **Wesley**

We have found alternative explanations for the 'successes' of relativity. For instance, we have found an alternative explanation for the **advancement of the perihelion of Mercury**. Not only that, with the same equation

$$\tan\alpha = \sin\theta \tan\theta \text{ -----(4) where } \sin\theta = \sqrt{(3GM/Rc^2)^{1/2}}$$

we determine the bending of a ray of light with a result of  $1.313''$  which is quite accurate compared to Einstein's  $1.74''$  which is in 20% error.

3. As for the search for “some other phenomenology, different from the usual one, in order to find experimental contradictions of relativity with Nature”, we explain the phenomena occurring in vector fields as well as gravitational fields under the same ‘Universal Formal Principle’ that **energy has inertia**, and when energy is in motion, the inertia of energy causes a resistance in the form of a drag against the background field, leading to the manifestation of various ‘relativistic phenomena’.

Now let us consider what **Prof. Umberto Bartocci** has stated:

1) There are **no mathematical contradictions in SR**, which is quite a coherent theory.  
2) In order to defeat SR, one has to look for his possible experimental failures, which is perhaps a task not so easy, since it would require measurements performed in two different (almost) inertial reference frames really moving one with respect to the other. All alleged proofs in favour of SR are in my opinion **INDIRECT** proofs, most presuming that Earth is not at rest with respect to the "aether"; one should **check** more the **validity of the principle of relativity** for electromagnetic phenomena, the "induction" that forced Einstein to propose this principle is just a very special case in Maxwell theory, which in general is not relativistic, in its "classical" interpretation. Experiments of the kind of the so called "Rowlands inverse experiment", often discussed by Stefan Marinov and **Francisco Muller**, could perhaps show at last that SR is physically wrong.

In conclusion, I completely agree with **Del Larson's and McCarthy's** opinions below:

"If we try to come up with theoretical arguments to show how special relativity is wrong, we will lose. SR has been studied and celebrated for generations now. If there was a theoretical flaw it would have been found long ago ... **from a mathematical (and therefore theoretical) sense, special relativity is completely consistent and correct.** Arguing that point merely shows a misunderstanding of the theory".

Let us take **Bartocci's** first point: 1) There are **no mathematical contradictions in SR**, which is quite a coherent theory. ("If we try to come up with theoretical arguments to show how special relativity is wrong, we will lose. SR has been studied and celebrated for generations now. If there was a theoretical flaw it would have been found long ago ... **from a mathematical (and therefore theoretical) sense, special relativity is completely consistent and correct.** Arguing that point merely shows a misunderstanding of the theory".)

Why is this?

**AL Kelly** has drawn attention to the fact that Einstein's approach has been quite different: "All the other fellows do not look from the facts to the theory, but from the theory to the facts; they cannot extricate themselves from a once accepted conceptual net, but only flop around in it in a grotesque way" –

What was Einstein's **modus operandi** in building up the theory as opposed to the “other fellows” who were trying to **find an explanation** to as why?:

a) Maxwell's equations were in contradiction with the Galilean principle of relativity, and the "other fellows" were attempting to derive a theory starting from Maxwell's equations, Einstein on the other hand as Max Born (in his book on relativity p. 224) has pointed out left out Maxwell's equations and assumed the **principle of relativity** as a postulate of the theory.

b) From Michelson's experiment it **appeared** that velocity of light would be constant in different reference frames. The 'other fellow', Lorentz attempted to explain that this is only an appearance and tried to provide a physical explanation for this in terms of length contraction. Einstein on the other hand accepted this appearance as a fact, and elevated it to an axiom of the theory. Reichenbach (*Space & Time* p 201) clearly shows that Einstein theory has not explained the result of Michelson's experiment but that he took it as an axiom.

c) Kaufmann's experiments in 1902 on the fast moving charges showed that they did not conform to Galilean transformation, and Lorentz empirically found out they approximated to what is now referred to as Lorentz transformation. Without trying to explain how this happens like the 'other fellows', Einstein incorporated it as an axiom of the theory (*Autobiographical Notes*, p.57).

The 'genius' in Einstein lie in the fact that he used the **above three 'facts'** (empirical observations) that required to be explained, **as axioms**. That was his *modus operandi* which was different to that of all 'other fellows'. And on the basis of these axioms he formulated a mathematical theory. Therefore mathematically, these facts get represented in the theory and in turn experimentally the mathematical predictions get confirmed. So how to get round such a theory forged on the basis of such an enigmatic loop?

Einstein knew very well that fictitious theories can produce successful results. As an example he compared two fictitious theories, Newton's theory of gravitation and his own general relativity. Einstein wrote: "The tremendous success of his (Newton's) doctrines may have prevented him and the physicists of the eighteenth and nineteenth centuries from recognising the fictitious character of the foundation of his system. .... General relativity showed that ... one could take account of a wider range of empirical facts, and that too in a more satisfactory and complete manner, on a foundation quite different from the Newtonian. But quite apart from the question of the superiority of one or the other, the **fictitious character of fundamental principles** is perfectly evident from the fact we can point to two essentially different principles, both of which correspond with experience to a large extent;...". In SRT too he has followed the same principle of using a fictitious set of axioms to get the required mathematical theory.

Although Einstein has claimed in his *Autobiographical Notes* that the contradiction between the first two axioms gets reconciled by the third axiom (p. 57), in actual fact all three axioms contradict each other. As **Galeczki** has written, "**He (Theimer) observed that the definition of light velocity in two IFR's in the SRT scenario requires:  $c = x / t = x' / t'$** , which is impossible if  $(x'; t')$  and  $(x; t)$  are related by Lorentz transformations (LT)".

In LT, when  $x' = \Gamma(x-ut)$ ,  $t' = \Gamma t(1-u/c)$ . In SRT  $x = ct$  and  $x' = ct'$ . Empirically, it is found that always  $x' < x$ . Therefore, in order to always satisfy the condition  $x' < x$ , either it should be the **case I** in which

$$x' = c't$$

where  $c' < c$  and in this case **simultaneity is absolute**

or it should be **case II** in which

$$x' = ct'$$

where  $t' < t$  In this case **simultaneity is relative**.

The fallacy of Einstein's theory lies in the following: LT gives the approximate displacement undergone by a **material particle** (moving at near a light velocity) in a moving frame as  $x'$ , compared to  $x$  a frame considered stationary to the other (which facts were evident in Kaufman's experiments), whereas Einstein's postulate construes this empirical fact of **motion of particles** at near light velocity to be **identical with that of the motion of light** *per se*. This will be valid only if motion of light and motion of material particles follow the same pattern. Our position is that in a free energy transmission (e.g. light) there occurs an exchange of (internal) spin momentum and (external) linear momentum always, mutually adjusting themselves so that the linear momentum remains constant, while the adjustment of the spin momentum manifests in the form of a red or a blue shift of the wavelength with this exchange verifiable by experiments. (This adjustment of the linear velocity is the reason for the null result of Michelson's experiment). However, in the motion of material particles, this adjustment does not take place. Therefore the pattern of motion of a particle is different to that of light. In a material particle, in the absence of internal momentum compensating the variations of linear momentum, there occurs a linear velocity transformation from  $v$  to  $v'$ .

$$v' = \Gamma v(1-u/c).$$

When particles move at near light velocities,  $v \rightarrow c$ , and therefore  $v' \rightarrow \Gamma c(1-u/c) = c'$ .

This corresponds to case I where  $x' = c't$  where **time is absolute**. Because Einstein has mixed up motion of light and motion of material particles as conforming to one and the same pattern, and upon recognizing the fact that velocity of light remains constant, he has extended the idea of 'conservation of velocity', to the motion of material particles too **implicitly**. In order to reconcile this position, he has had to substitute case II (above) in place of case I, and insist on an **adjustment of the \*time unit**, instead of change of velocity from  $v$  to  $v'$ . Although he makes a wrong physical interpretation, **mathematically**  $x' = ct'$  is **equivalent** to  $x' = c't$ . It is because of this **equivalence** that SRT becomes irrefutable for particles moving at **near light velocities**.

(“Note: However, in this case **time does not dilate**. On the contrary it in fact has to contract for it to be  $t' < t$  as **Galeczki** has pointed out quoting Theimer.. But that is besides the point we are discussing here).

Having pulled this trick of using empirical observations as axioms of the theory instead of explaining why the observed phenomena occur dynamically, Einstein has cynically summed up his methodology as follows: “Intellectuals try to solve problems while geniuses prevent them”.

And after adding the axiom of relativity of simultaneity, and forming an **equivalent mathematical system**, he could confidently declare as **AL Kelly** has reported: “The chief attraction of the theory lies in its logical completeness. If a single one of the conclusions is proven wrong, it must be given up; to modify it without destroying the whole structure appears to be impossible.” A. Einstein.

And how has this ‘genius’ avoided explanation of the various physical trends that are responsible for bringing about Lorentz transformation.? If we look at LT as arising from  $x' = c't$ , then we have to expand  $c'$  as  $\Gamma(c-u)$ . We can see this as a combination of two tendencies here. The tendency  $(c-u)$  attempts to reduce the velocity, and the tendency  $\Gamma$  attempts to restore the velocity back. The task of the day was to discern the physical reasons behind these tendencies and explain it in dynamic terms. If on the other hand as Einstein interpreted  $x' = ct'$ . Then  $t' = t\Gamma(c-u)/c$ . Einstein then can safely assert this as some inexplicable, *a priori*, rule of nature which determines changes of co-ordinates and times of events (*Autobiographical Notes*, p. 57). And who in the hell can dare to demand an explanation of this kinematic change of the time unit in dynamic terms? And consequently true to his motto: “Intellectuals try to solve problems while geniuses prevent them”, Einstein merely had to postulate his fourth axiom, which is the relativity of simultaneity and the job was done. (We on the other hand have shown how the  $(c-u)$  term and  $\Gamma$  term originate by way of physical interactions, - see below).

This brings us to the next point raised by **Prof. Bartocci**, namely “one should **check more the validity of the principle of relativity** for electromagnetic phenomena”.

Out of the 4 axioms of Einstein, a) Relativity of simultaneity is concocted for the purpose of forming the **equivalent mathematical system** around case II discussed above, and we can reject this axiom. b) Einstein has introduced the axiom of the constancy of velocity of light, specifically to circumvent the explanation of Michelson’s experiment. Whether, velocity of light is constant in all IFR or not, it is irrelevant for the motions of particles, and on this basis we can **disregard** this axiom too. Therefore out of Einstein’s 4 axioms what we are left with then are c) The principle of relativity and d) That the motion of material particles follow the Lorentz transformation (instead of Galilean transformation).

Instead of assuming the validity of the principle of relativity, if we question it, as **Bartocci** has suggested, then we would find that Lorentz transformation is merely a manifestation of a ‘flaw’ in the principle of relativity.

What is this ‘flaw’? The flaw is that whereas the basis of the principle of relativity is that there is no resistance to the motion of an object by the velocity field of the space of location (\*background field), we contend that there is such resistance. The coefficient of velocity resistance to the background field is  $1/c$  per unit of velocity. Therefore when the momentum of the object is  $Mv$  and background field velocity is  $u$ , a fraction of the object’s momentum equal to  $Mv.u/c$  gets employed to overcome this resistance. The momentum that remains available for motion of the object becomes  $Mv(1- u/c)$ . However, we contend that simultaneously with the above interaction, there is another interaction where the available momentum gets augmented by the factor  $\Gamma = (1-u^2/c^2)^{-1/2}$ . For the time being let us refer to this augmentative tendency as the ‘freefall tendency’. (This is all explained in the theorem III of the paper, also see my comments below responding to **Del Larson’s** view on gamma pp. 12-14.). This second interaction brings the total momentum available for motion of the .particle to be  $\Gamma Mv(1-u/c)$ . Thus compared to a particle which would move a distance  $x = vt$  in time  $t$ , with momentum  $Mv$  in accordance with the assumptions of the Newtonian theory, because of the above two interactions the particle moves only a distance  $x' = \Gamma v(1-u/c)t$ .

$$x' = \Gamma(x - vut/c) \text{ -----(a)}$$

and it is this equation that transforms into

$$x' = \Gamma(x - ut) \text{ -----(b)}$$

when  $v \rightarrow c$ .

Therefore the **Achilles heel** of Einstein’s theory is that it insists that high velocity particles move in accordance with equation (b). This will not strictly hold when the velocities of particles somewhat less than ‘near light velocities’ are considered, whereas equation (a) will hold for motion of particles at all velocities. **Einstein’s theory cannot provide a quantitative explanation to the discrepancies** between predictions of equation (b) and experimental results for motions of particle which move at somewhat lesser than near light velocities.

It is because the effects of the two interactions are so insignificant at very low velocities, that in classical mechanics even though it is assumed that there is no resistance to the motion of a body by the space of its location, classical theory still holds. It is in this light that we have to consider **Bartocci’s** assertion: “one should check more the validity of the principle of relativity for electromagnetic phenomena, ....”

Ironically, the word “relativistic” now turns into its opposite. A “relativistic” condition is where the principle of relativity becomes **violated** by the resistance of the space of location to the motion of a body.

(\*By the term ‘background field’ we do not mean an ultimate background like the 3°K field, but the field of the immediate ambience).

**Bartocci** states: “In conclusion, I completely agree with Del Larson’s and McCarthy’s opinions below: ‘If we try to come up with theoretical arguments to show how special relativity is wrong, we will lose. SR has been studied and celebrated for generations now. If there was a theoretical flaw it would have been found long ago ... from a **mathematical** (and therefore theoretical) sense, special relativity is completely consistent and correct. Arguing that point merely shows a misunderstanding of the theory’.

This statement about the consistency and correctness is true in so far as the **mathematical equivalence** goes and as long as everybody assumed the validity of the principle of relativity without a question. The theoretical **flaw** of the theory of relativity lay hidden in the very **principle of relativity** that everybody has been assuming to be correct without a question. This is like the analogy **Paul Marmet** has given, where everybody was looking for all the other aspects, without ever suspecting whether the item stolen is the bicycle itself! Only **Bartocci** has suspected that it could be the ‘bicycle’ itself.

Now we turn to **INERTIA of ENERGY**: This point has been raised by **APSDEN and BERGMAN**.

**Apsden** wrote: “So my message to Professor **Bartocci** is to say that the best case against SRT is Einstein's own words, his contradicting assertions on the subject of relativistic mass and the inertia of energy which are to be found in his 1905 papers! Einstein's theory of relativity is best forgotten, but Einstein's good name looks like it can carry due weight in connection with the 'Bose-Einstein Condensate’”.

Note here **Apsden’s** comment that the concept of inertia of energy is likely to prevail, but the theory of relativity will (or rather must) fade away. The reason why Einstein’s attempt at fixing the concept of inertia of energy into SRT turns clumsy and contradictory is because Einstein comes to the **basic dynamic cause** behind all relativistic phenomena, viz. **inertia of energy**, after he has already developed his theory kinematically. Instead of adorning kinematic frills to a dynamically derived theory, he is trying to adorn dynamic frills on a kinematic theory. This is the case in regard to the link between the ‘relativistic mass increase’ and inertia of energy in relation to the whole of SRT. It is introduced in an ad hoc manner.

Let us examine **Apsden’s** quote from Einstein: ‘As the electron is to be slowly accelerated, and consequently may not give off any energy in the form of radiation, the **energy withdrawn from the electrostatic field** must be put down as equal to the **energy of motion of the electron**.’

To Einstein’s credit, he has identified that the energy  $E_1$  of motion of the electron comes from the field. This field energy  $E_1$  which enters the system from outside has inertia  $E_1/c^2$ . This inertia adds to the rest mass of the body  $E_0/c^2$  and thereby increases the inertia of the whole system, (see the theorem I in our paper for a full description). Thus his attribution of the field energy that enters the system from outside as the reason for the ‘relativistic mass increase’ is correct. But he has failed to carry this **dynamic** factor as the

primary cause of the all relativistic phenomena. There is not only the ‘relativistic mass increase’, but there is also the Lorentz transformation (LT). Once Einstein has attributed LT as an inexplicable axiom of the theory, he cannot subsequently explain this ‘axiom’ in terms of this dynamic factor, viz., a result of the action of inertia of energy. This is like trying to shove the horse back into the barn after its door has been bolted.

So far Newtonian theory views inertia as a form of resistance to the change of state of motion only. (We shall explain below in discussing the question of gamma factor raised by **Del Larson**, how a quantity of momentum  $\Gamma Mv$  becomes necessary for a body to overcome inertia in order to move with a velocity  $v$ ). We have shown in our paper that in addition to the above aspect of resistance due to inertia, there is another component of resistance a body has to overcome when set in motion. If we disregard the basic assumption behind the principle of relativity, (namely the assumption that there is no interaction between the momentum of motion of a body and that of the field of its space of location), and accept that there is such an interaction based on a velocity resistance, then we have the following situation. The momentum of motion of the body  $Mv$  is acquired from the **field**. (We have clearly demonstrated this by our theorem I). This momentum  $Mv$  has inertia  $Mv/c$ . This inertia which has appeared in the system (the system comprising of the body and the space of location) offers a resistance to the motion of the space of location. (The latter moving at velocity  $u$ ). Therefore a quantity of momentum  $(Mv/c).u$  has to be employed to overcome this resistance and in order that the body participates in the motion of the whole system (in addition to its discrete motion within the system). This shows that inertia  $Mv/c$  of momentum in fact constitutes a resistance per unit of velocity. Once the fraction of momentum  $M(v/c).u$  has been employed to overcome this velocity resistance, the momentum that remains available for motion of the body is  $Mv(1-u/c)$ . However, as we discussed before, there is the ‘freefall tendency’ also (see below – pp 12-14 for our explanation of how the gamma factor comes into being). Subsequent to the action of this tendency, the final momentum of motion of the body becomes  $\Gamma Mv(1-u/c)$  and accordingly as we have already shown the corresponding displacement becomes,

$$x' = \Gamma(x - vut/c) \text{ -----(a)}$$

and it is this equation that transforms into

$$x' = \Gamma(x - ut) \text{ -----(b)}$$

when  $v \rightarrow c$ .

Our above findings about inertia should be considered in the light of the following statement by **Dave Bergman**: “The principle result of Einstein's error has been to perpetuate confusion over the **concept of inertia**. While his theory provided a way to include the so-called "relativistic effects" of mass increase and length contraction, which were not predicted by Maxwell's theory due to errors in the Maxwell equation for magnetic induction, these results have recently been properly developed from **first principles** and the fundamental laws of electrodynamics.

**Bergman** further quotes: "A Causal Explanation of "Inertial Force" : "**Bergman** succeeded in showing that inertia is not an intrinsic property of matter in the sense of inertial mechanics and that the so-called inertial forces are real forces. His argument is not based on a conception analysis of axioms of classical mechanics but on a quasi-electrodynamic mechanism for moving charged particles which he showed to be the cause for the inertial effect. **The QUANTITY OF INERTIAL FORCE depends upon VELOCITY and acceleration. Bergman's** causal explanation of inertial forces as real, self-induced reaction forces is based on electrodynamic effects on the spinning charged ring model. According to this explanation, inertial mass is a derived concept and not a fundamental one.

### **GEORGE GALECZKI**

p.14 " stellar aberration shows clearly that the velocity of light depends on the absolute (in 1-st approximation) velocity of the observer (earth), rather than of the source -or on the relative velocity between source and observer. This undoubtedly disproves the light-velocity postulate of SRT, which claims independence on both source and detector velocities".

Our position is that a change of momentum can occur either by way of a change of magnitude or by way of a change of direction. Starlight arriving on Earth (subsequent to mutual adjustments of spin and linear momentum to compensate for the gravitational action of the stellar mass as well as its bodily motion to maintain the constancy of velocity) at velocity  $c$ . Upon, reaching the earth we contend that instead of mutual adjustment of spin and linear momenta, the light ray undergoes change of momentum by a change of direction as we have shown in our paper. And this is how stellar aberration occurs.

p.15, **Galeczki:** "There have been just a few -rather than thousands- people during the past nine decades who pointed out, or hinted at MATHEMATICAL contradictions in SRT. One among them was Walter Theimer, the author of "Die Relativitätstheorie: Lehre, Wirkung, Kritik" (A. Francke, Bern and München, 1977). He observed that the definition of light velocity in two IFR's in the SRT scenario requires:  $c = x / t = x' / t'$ , which is impossible if  $(x'; t')$  and  $(x ; t)$  are related by Lorentz transformations (LT) and **THE UNITS OF LENGTH AND TIME IN THE TWO IFR'S ARE TO BE THE SAME.**

Our position: If relativistic time dilation occurs as claimed then  $t' > t$ . But in Einstein's interpretation of LT,  $x/t = x'/t' = c$ . And from empirical observation we find always  $x' < x$ . Therefore  $x'/t'$  can never be equal to  $x/t = c$  if there is relativistic time dilation. (Here is the proof against the notion of time dilation).

p. 16 **Galeczki:** "There are many good and valid arguments disproving STR. (see my list of over 25 publications on this subject.) I mention here just the inability to define potential energy and, as a consequence, EXTENDED ( i.e. no POINT-Like) SYSTEMS, which makes "relativistic thermodynamics" -in particular- impossible! (see my paper in the Proceedings of the Cologne Workshop).

Our view is both in Newtonian mechanics and relativity, bodies are considered as **point masses** and therefore, **internal momentum** within the body gets completely disregarded. This makes it impossible to discern the relationship between momentum of the internal processes of the body and the momentum of its external motion as we show in theorem I of our paper.

p.17 **Galeczki:** (To Franco Selleri: Dear Franco), there cannot be "theories equivalent to SRT", since SRT is wrong. There is a profound, physical difference between theories with and without a preferred reference frame! Mass doesn't increase due to uniform motion with respect to a fictive, imaginary IFR.

Our theory is based solidly on the concept of the **proper reference frame** (this is the frame attached to the space of location of a body). We shall discuss this matter in full under the matters raised by **Francisco Muller**.

p.21 **Josef Hasslberger** has raised the question of a) futility of trying to find internal contradictions within Einstein's theory and b) **intuibility and comprehensibility**.

He says in regard to a), "If you want to bring down special (or general) relativity you should not look for internal contradictions".

Sepp is quite right here. Einstein has made an equivalent system by transforming empirical observations into inexplicable axioms as we have shown above. Therefore these empirical observations automatically conform to the theory but we can never find physical explanations for these empirical observations. We cannot escape from this enigmatic loop by trying to find inconsistencies within the theory.

In regard the question of **comprehensibility and intuibility** Sepp says: You must search for external contradictions, incompatibilities with physical reality and with logics. I know that they have already taken this into account and have in some way made us believe that the theory cannot be logically understood. There is **nothing in this universe which may not be understood** by a person which a reasonably sharp mind and a minimum of preparation. All those arguments about the arcane nature of the theory have been put up only in order to prevent it's being taken apart by logical arguments.

To make it short, in order to overcome relativity, I think one must return to the basic condition of **intuibility of models**. Nothing in this universe, I believe, is outside of this parameter, regardless of what the adherents of relativity might say.

Our theory is developed ground up from **first principles** and therefore it is **completely comprehensible**. Secondly we have shown that all phenomena can be represented by the use of **Euclidean geometry**. Thereby we meet the two criteria indicated by **Hasslberger**.

**ROCCO VITTORIO MACRI:**

It is unfortunate that I do not understand Italian, therefore I have the feeling that I am missing the opportunity of reading and commenting on a very important essay written on

the matter of comprehensibility by Macri. I sense this from the following two quotes he has made, and I am certain that this essay is much in line with Hasselberg's views, and even more elaborate and deep.

Herbert Dingle: "One of the most remarkable examples of the paralysis of the intellect by which physics has been afflicted throughout the abandonment by the 'experimenters' of the use of their intelligence and their submission to the dictation of mathematicians"

Although I do not know Italian, I understand what he has quoted: "il reale è razionale" and am in full agreement with it.

p. 28 **DEL LARSON** wrote:  **$\Gamma m v$** : There was again some discussion about whether we should consider mass to increase in the momentum expression, or if the velocity should be allowed to go to greater than  $c$ . As for me, rather than forcing nature to have two terms in the momentum, mass and velocity, and arguing about which must change from the classical form, I believe we should have three terms,  $\Gamma$ ,  $m$ , and  $v$  each contributing. Clearly  $\Gamma$  is a function of  $v$ , so really what I am arguing for is simply a more complicated form for the momentum than  $p = mv$ . **I don't see why we waste all this time debating what's going on.  $p = \Gamma m v$** . That's all.  $m$  is  $m$ .  $v$  is  $v$ . And  $\Gamma$  is  $\Gamma$ . It's just that  $p$  doesn't equal  $mv$ . Why must we insist that it does?

Nobody seems to have taken notice that there are **two different gamma terms** involved in relativistic phenomena.

The  $\Gamma$ -term involved in the 'mass increase' of a body moving at velocity  $v$ , is  $p = \Gamma M v$  (here  $\Gamma = (1 - v^2/c^2)^{-1/2}$  where  $v$  is the **velocity of motion of the body**) is not the same as the  $\Gamma$ -term involved in the Lorentz transformation

In the  $\Gamma$  term involved in the Lorentz transformation,  $x' = \Gamma(x - ut)$ ,  $\Gamma = (1 - u^2/c^2)^{-1/2}$  where  $u$  is the **velocity of the reference frame**.

Therefore it is best that we identify the first  $\Gamma$ -term as  $\Gamma_v$  and the second  $\Gamma$ -term as  $\Gamma_u$ .

Now to explain how these two terms comes into being.

1. Under Newton's first two laws, we consider that a body which would have continued to be at rest relative to its 'place' or '\*proper reference frame' (PRF) due to inertia, would overcome this inertia and move, if a force is applied. Maxwell realized that this way of understanding of the **transition** from state of rest to motion to be insufficient. He wrote: "In fact the **special work** which lies before the physical inquirer in the present state of science is the determination of the quantity of energy which **enters or leaves** a material system during the **passage** (i.e. transition) of the system from its **standard state** to any other **definite state**" (*Matter and Motion* p. 74). (\*see PRF under **Francisco Muller**)

We identify the **standard state** as the state of rest relative to the PRF. And we identify 'any other definite state' as the body moving relative to the PRF at a definite velocity. We **postulate** that in the standard state a body of mass  $M$  always has its **internal energy** (otherwise referred to as 'rest energy') equal to  $Mc^2$ . This is the characteristic feature of the 'standard state'. As we have shown in the theorem I of our paper, the kinetic energy applied to set the body in motion, only **triggers** this motion, the energy required for the actual motion of the object comes from the '**total field**'.

As we already discussed (under **Apsden's** comments), Einstein had already recognized something of the above nature to happen (i.e. the energy of motion to come from a field) in the motion of a body. 'As the electron is to be slowly accelerated, and consequently may not give off any energy in the form of radiation, the **energy withdrawn from the electrostatic field** must be put down as equal to the **energy of motion of the electron.**'

Repeating what we already wrote: To Einstein's credit, he has identified that the energy  $E_1$  of motion of the electron comes from the field. (This is a great step. But this energy does not come from the local field, but from the 'total field'). This field energy  $E_1$  which enters the system from outside has inertia  $E_1/c^2$ . This inertia adds to the rest mass of the body  $E_0/c^2$  and thereby increases the inertia of the whole system, (see our theorem I for a full description). Thus his attribution of the field energy that enters the system from outside as the reason for the relativistic mass increase is correct. But he has failed to build his theory on the premise that this **dynamic** factor is the primary cause of the all relativistic phenomena. In relativity there is not only 'relativistic mass increase', but there is also the Lorentz transformation (LT). Once Einstein has attributed LT as an inexplicable axiom of the theory (as discussed above), subsequently he cannot turn round and explain this 'axiom' in terms of this dynamic factor, viz., a result of the action of inertia of energy. This is like trying to shove the horse back into the barn after its door has been bolted.

As we have proved in theorem I, in order that the body of mass  $M$  moves at velocity  $v$  it should acquire a quantity of momentum  $Mv$ , from the field. However, this quantity of field momentum itself has inertia equal to  $Mv/c$ . This is due to the fact that any given quantity of momentum  $M'v'$  has an inbuilt velocity resistance  $v' \cdot 1/c$  where  $1/c$  is the coefficient of velocity resistance.

(Please bear in mind that at the outset we have pointed out that the **standard state** is the position where the body is at rest relative to its proper reference frame, and that in this state the internal energy is equal to  $Mc^2$  and the momentum of the internal processes is  $Mc$ . There is a resistance to this internal momentum given by  $Mc \cdot 1/c = M$ . So we see here that the inertia of a body arises from the inbuilt internal resistance to the momentum of its internal processes. Inertia of a body is not due to the inert, dead mass of the body as considered in classical physics but due to the existence of internal processes within it. However classical physics is incapable of looking at inertia this way because it considers bodies as point masses without internal structure and internal momentum).

Coming back to the body acquiring momentum  $Mv$  from the field and this momentum itself having inertia  $Mv/c$ , -- this inertia therefore poses a problem to the motion of the body. In order to overcome this secondary inertia  $Mv/c$  and move at velocity  $v$ , there needs to be an additional quantity of momentum  $(Mv/c).v$ . Then because this added momentum in its turn has inertia  $Mv^2/c^2$  and it needs yet an additional fraction of momentum  $Mv^3/c^2$  and so on ...  $Mv^{n+1}/c^n$ , ..... *ad infinitum*, leading to a Zeno's paradox. This paradox is overcome by nature by the provision of a quantity of field momentum  $\Gamma_v Mv$  [where  $\Gamma_v = (1-v^2/c^2)^{-1/2}$ ] in the first instance and once and for all, instead of providing  $Mv$ , in order for the body to move at velocity  $v$  (and momentum  $Mv$ ). How the total momentum becomes  $\Gamma_v Mv$  is explained fully in theorem I, with reference to fig 3a in our paper.

$\Gamma_v$  is so to speak what cooks in the frying pan. Now let us consider the influence the **immediate ambience** has on the motion of the body. So let us now take a metaphorical jump into the fire and see how  $\Gamma_u$  gets roasted there.

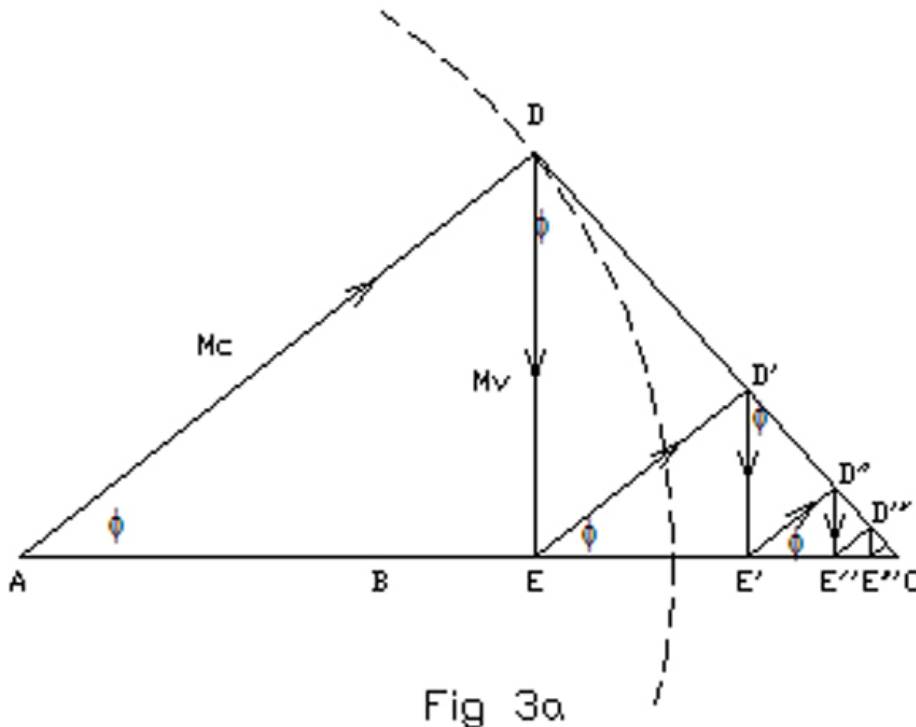
As we discussed, in considering of the points raised by **Apsden** and **Bergman** on the question of inertia of energy, the body has to overcome the velocity resistance of the space of location (to which the proper reference frame is attached). Without overcoming this resistance, the body cannot **co-move** with the space of its location. This makes the body to employ a fraction of momentum equal to  $Mv.(1/c).u$ , for this co-movement to occur. The momentum that is left remaining available for the motion of the body, thereafter is equal to  $Mv(1-u/c)$ .

Now we come to the composition of  $\Gamma_u$ . We contend that the formation of this gamma-factor arises from a free fall process analogous to gravitational action. In a gravitational field the potential at a point at a distance  $R$  from the centre is  $GM/R$ . The velocity of a body that is in a free orbit at this point is  $v = \sqrt{GM/R}$ . (We note that  $v$  is the square root of the gravitational potential). Let the ratio  $v/R = \tan\theta$ . Then the freefall that acts on the body is  $(M)v.\tan\theta$ . So the freefall is given by the product of the square root of the gravitational potential times the ratio of the same square root and the distance from the centre (times the mass). If the rule of addition of velocities were to apply, the action of freefall of  $v.\tan\theta$ , on the body already moving at velocity  $v$  should increase its velocity to  $v.\sec\theta$ . Thus if the action of freefall is to cause a change in the magnitude, body should spiral inwards progressively and fall on to the primary. However, in the case of a gravitational orbit, action of free fall causes only a change of direction of motion, without a change of magnitude and due to this reason the body does not fall on to the primary. In the case of a freefalling body, depending on its position  $R'$ , (even though it is not in orbit at velocity  $v'$ ) the freefall is  $v'\tan\theta'$ . However, unlike in the case of the free orbit, in this case due to the action of free fall, there is a change of magnitude of momentum (without a change of direction).

From this analogy the points we note are a) when the momentum of motion of the body is  $Mv$ , the freefall that acts on it is  $Mv.\tan\theta$ . That is the field adds a "tangent complement" to the momentum of a body. b) The "tangent complement" or the freefall either causes a

change in the magnitude of momentum or a change in the direction of momentum, but **never** both. (We call this the “principle of partial action” – see our theorem IV).

What we contend here is that analogous to what happens in a gravitational field, when motion of a body occurs in any field, irrespective of whether it is a vector field or a scalar (gravitational) field, the momentum  $Mv$  of motion of the body is complemented by the ‘total field’ by an amount  $Mv.\tan\theta$  where  $\theta = \sin^{-1}u/c$  and  $u$  the intensity of the ambient field. Why this action occurs, we suppose is to overcome the following difficulty. As we pointed out when a body of mass  $M$  acquires a momentum  $Mv$  from the total field, in order to move in an ambient field of velocity  $u$ , (due to velocity resistance), a fraction of momentum equal to  $Mv.(1/c).u$  has to be employed to overcome this resistance and co-move with the ambient space. We contend that, the ‘total field’ attempts to compensate back to the moving body the momentum that the latter sets apart for co-movement with the ambient space. However, since this latter fraction of momentum  $Mv.u/c$  too comes entirely from outside the system, and therefore it too confronts the resistance of the ambient space, this warrants it to part with a fraction  $(Mv.u/c).(1/c).u$ . This leads to a similar story as in the other case with  $\Gamma_v$ . In this case the ‘total field’ showers fractions of momenta successively in order to compensate for what the ambient field ‘robs off’ successively to overcome velocity resistance, and this process goes *ad infinitum*, leading to a Zeno paradox. If we consider  $u/c$  as  $\sin\theta$ , we would find that the series  $Mv.\sin\theta + Mv.\sin^2\theta + Mv.\sin^3\theta + \dots + Mv.\sin^n\theta + \dots$  converges in as the sum total of pairs (such as  $ED' + D'E'$ ) to  $Mv.\tan\theta$  as we demonstrated in fig. 3a.



Thus the ‘total field’ overcomes the Zeno paradox by releasing a quantity of momentum  $Mv \cdot \tan\theta$  once and for all. And this  $Mv \cdot \tan\theta$  adds to the momentum  $Mv$  of the body geometrically making up the total momentum to be  $Mv(1 + \tan^2\theta) = Mv \cdot \sec\theta$ . Now  $\sec\theta = \Gamma_u = (1 - u^2/c^2)^{-1/2}$ . As we have shown in Theorem III (fig. 7) when we consider the resistance this total momentum  $\Gamma_u Mv$  confronts from the ambient field, a fraction of momentum  $\Gamma_u Mv \cdot (1/c) \cdot u$  has to be employed to overcome it. Thus the momentum left available for the motion of the body is  $\Gamma_u Mv(1 - u/c)$ . If the expected displacement of the body for a quantity of momentum of  $Mv$  is  $x$ , (where  $vt = x$ ) then for a quantity of momentum  $\Gamma_u Mv(1 - u/c)$  the displacement  $x'$  is given by:

$$x' = \Gamma_u(x - vt \cdot u/c)$$

When  $v \rightarrow c$ ,

$$x' \rightarrow \Gamma_u(x - ut)$$

(Note: by the principle of partial action, (Theorem IV) the addition of the ‘tangent complement’ results only in a change in the magnitude of momentum without a change in direction)..

Thus we have proved the Lorentz transformation from **first principles** by discerning that there is a second interaction with the ‘total field’ (i.e. free fall action). It must be noted that the proposition of the existence of this second interaction, is not a mere whim or a fancy of ours. This is something that is to be anticipated, because a process that corresponds to the existence of such a freefall action has been **mathematically proved** in the works of Hermann Weyl of 1921. According to Max Jammer, “Weyl has proved that the affine and metric structures of space-time can be derived on the basis of the **propagation of light** and the motion of **freefalling** bodies. .... Subsequently, in 1972 Ehlers, Pirani and Schild have succeeded in deriving the conformal, projective and metric structures of space-time solely from the phenomena of **light propagation** and **freefall**, thereby demoting the status of measurements of **spatial lengths** and **temporal intervals** to that of **derived** operations”. (Jammer: *Concepts of Space*. p. 228) According to Jammer, the procedure of Pirani et al. is essentially a **constructive** realisation of the above theorem proved by Hermann Weyl. We point out that while Weyl uses the two external elements: propagation of light and freefall of bodies, for the development of the theorem, we have used elements intrinsic to the system, and developed our theorem from **first principles**.

p.40 **PAUL MARMET**: It is this difference between a) developing mathematical theories through arbitrary assumptions and attempting to connect these theories subsequently to physics, and b) development of physical theories from first principles by discerning mathematical relationships between the physical elements involved that **Paul Marmet** has tried to emphasise as follows.

You mean that because the mathematics can give a correct "relationship" (I agree with this) between the physical elements that have been "assumed", this proves that the

"assumed" physical elements are correct!

That conclusion is clearly wrong. It is the basic error in physics. Mathematics is not physics. As long as physicists will accept such errors, they will spend time showing that their calculation is correct, while the correctness of the calculation is irrelevant. It is useless to demonstrate how "logical" the calculation between possibly unphysical (wrong) hypotheses are. Any discussion becomes then irrelevant. If the mathematics is correct, the physics is correct! (what a non sense!). Most people do not see the seriousness of the problem in physics because they see the logic BETWEEN the relationships, but they do not understand why the conclusion is physically wrong.

We agree fully with **Paul Marmet**. There is a great difference between, a) **discerning** the physical elements involved in a phenomenon and the establishment of mathematical relationships between them from first principles from a dynamic point of view and b) By free **invention of concepts** as Einstein has proposed and starting off with an arbitrary mathematical theory kinematically and trying to fit in physical elements into it.

As an example, of what **Paul Marmet** has stated, let us consider how we arrive at Lorentz transformation in the previous page, a) a simple straightforward explanation by discerning the mathematical relationships between physical elements in the real world, as against this there is b) a complex and convoluted discussion between Wesley and Bartocci, where in the imaginary, make believe world of mathematical theory, Lorentz group is a subgroup of the Poincare group, and in the Lorentz group there are "special Lorentz transformations" and "general Lorentz transformation" and so on and so forth as we can surmise from what is stated below.

**Wesley** sent to me the indication that, in his opinion: "The Lorentz transformation do not even form a group in 3 space and 1 time dimension" (4.Aug.99), which is really unbelievable, since one introduces "by definition" a "Lorentz group", as a (big) subgroup of Poincare's group! To this objection I answered in my mail of 13.Aug.99, saying that "Lorentz transformations are "by definition" the so-called homogeneous isometries [time-orientation preserving], and **Wesley** perhaps simply confuses the special Lorentz transformations with the general Lorentz transformations. It is obvious that when you take the simplest case of Lor. transf., the ones which are in all textbooks, with  $y'=y$  and  $z'=z$ , you are simply considering a subgroup of the whole Lorentz group, and when you take for instance  $x'=x$  and  $z'=z$  then you get another subgroup, which is different from the first one! - so, when you multiply one transf. which is in one subgroup with a transf. which is in the other subgroup, then you obviously get a transf. which is not in both subgroups! This is simple group theory, that one learns in the 1st year of the university, and it cannot be a matter of opinion!".

This is as if matter goes through the whole mathematical process of phases starting off with Poincare group and moves to the Lorentz group and then finally decides to move according to the particular subgroup, every time a change of state of motion becomes imminent. **Paul Marmet's** point is it does not happen that way. His point is physics concerns primarily physical relationships, that are expressible mathematically. We may

add that physical relationships occur according to the law of proportions and it is due to this that the mathematical expressibility of physical relations become possible. Physical relationships between physical elements can be understood qualitatively and we can form hypotheses without quantitative expressions. However, because the law of proportions underlies all physical relationships, these relationships become quantitatively expressible and this makes it possible to verify our qualitatively formed hypotheses in terms of quantitative predictions.

**FRANCISCO MULLER** and **GEORGE GALECZKI** on the Uniqueness and Importance of the **Proper Reference Frame**:

p.17 Galeczki: (To Franco Selleri: Dear Franco), there cannot be "theories equivalent to SRT", since SRT is wrong. There is a profound, **physical difference** between theories with and without a **preferred reference frame!** Mass doesn't increase due to uniform motion with respect to a fictive, imaginary IFR.

**Muller** points to an inconsistency in SRT when it comes to its explanation of stellar aberration and he anchors this argument on the concept of the '**Proper Reference Frame**'. We fully agree with his position that a phenomenon has to be observed with respect to its proper reference frame to make meaningful observations and to come to proper conclusions.

**Muller** wrote: Concerning "mathematical elegance" and "logical consistency" I do have a comment to make inspired by the criticism that O'Rahilly made on the way that SRT "explains" the Doppler effect, (which can be also extended to a criticism about aberration in SRT). The criticism is this, and it bears upon the logical consistency of SRT, or, better, upon its "methodological consistency".

The usual relativistic methodology is this: Two observers, each in its own frame of reference, moving at relative velocity  $V$ , observe a "common" phenomenon, (event, force, speed, time interval, etc). Now, it is crucial for SRT to distinguish between the PROPER frame and the NON-PROPER one. The Lorentz transformation is simply a recipe to go from some given PROPER values to the NON-PROPER values in the other frame. Or viceversa, given the NON-PROPER values, to get the PROPER ones. In such a method the WHOLE PHENOMENON to be measured, observed, studied, etc, must be contained in the PROPER FRAME. For example, the force between TWO static charges. They only show a Coulomb force in the PROPER FRAME. Then, when "seen" from the NON-PROPER frame at velocity  $V$ , a new Lorentz transformation term arises which SRT interprets as the "magnetic field  $B$ ".

Another example: the PROPER observer measures a time or a length interval in his frame. Then the NON-PROPER observer applies the Lorentz equations and gets the NON-PROPER values, which happen to be dilated, or contracted respect the PROPER values. But the interval is COMPLETED in the PROPER FRAME. Its beginning and its end are both, PROPER events in THAT frame. Likewise, the beginning and end are, both, non-proper events in the other frame.

Well, if we agree that the previous description is the orthodox METHOD to be used by SRT, then it happens that, the way Einstein applied SRT to the Doppler (and aberration)

phenomena in Section 7 of his paper, CONTRADICTS the previous methodology he himself started. Why?

Because in this case the beginning of the event, (emission of light) and the end, (reception of light) are placed in DIFFERENT frames of reference, moving at relative speed  $V$ . So there is no way to apply the crucial concepts of PROPER and NON-PROPER frames. In reality, Einstein MIXED-UP the two frames. He allowed the phenomenon of light propagation to CROSS OVER from one frame to the other.

I know that most authors and popularizers of SRT do the same thing. They even allow "information" to be exchanged from one frame to the other; or a third observer to "jump" from one to the other. That is absurd. The only communication possible between the two frames is, precisely, the LORENTZ equations. That is why all experiments designed to "test" SRT and which rely on light signals to be exchanged between "moving" and "non-moving" frames, is a futile endeavor.

### **Our commentary on the subject of Proper Reference Frames:**

Newtonian theory developed over two hundred years, without involving the concept of reference frames. The concept of reference frames is a 'child born in grief' on account of the inability of the Newtonian theory to find a solution as to why electrodynamic phenomena were not in accord with the Galilean transformation. Inertial system was invented by Ludwig Lange in 1885 in order to re-interpret Newtonian system of relative spaces with the aim of eliminating the necessity of the concept of absolute space. However the end result of this methodology has been the banishment of the **importance** of the space of location in which a body moves. And therefore the **special relationship** between the motion of a body and its space of location has been lost. By considering all IFR to be equivalent by disregarding this **special relationship**, it amounts to a scheme that approximates to bodies moving relative to "a nothing" and observations of the motion of the body being made from various IFR which move relative to one another.

But bodies cannot move relative to 'a nothing'. This 'nothing' has to be a something. And that something will eventually turn out to be a newer version of Newton's absolute space, the very same thing that Lange attempted to eliminate in the first place. Ironically, the scheme has ended up only in eliminating the **special relationship** between a moving body has with its space of location. And this is why it has been hitherto impossible to understand the physical basis of Lorentz transformations.

From Aristotle to Newton, the immediate space relative to which a body moves had a special name to distinguish its importance. It was called the '**place**'. The **special relationship** between the motion of a body and its place was laid down by Newton in the following premise, for the motion of an object which is already situated in a '**place**' (or relative space of location): "That if a place is moved, whatever is placed therein moves along with it; and therefore a **body**, which is moved from a place in motion **partakes** also of the **motion of the place**" (*Principia*, p.9).

The special relationship is: “**a BODY, which is moved from a place in motion PARTAKES also of the MOTION OF THE PLACE**”.

Therefore the IFR attached to the **place** (or the space of location) which is the **proper frame of reference** (or PRF) can in no way be equivalent to any other arbitrary IFR. This is because a body will never **partake** and move in sync with the motion of any arbitrary reference frame but only with its PRF.

In the case Newton considers above, the object is a part of the ‘place’ from the very beginning, where the object’s inertia contributes to the total inertia of the system formed by the object and the ‘place’. The object, even when at rest in the place possesses a quantity of momentum which is a fraction of the total momentum of the system consisting of the object and the ‘place’. When the object is set in motion relative to the ‘place’, it **co-moves** with the place by virtue of the above mentioned fraction of momentum it possesses, and moves also independently of it, within the space.

In modern physics, reference frame attached to **the** relative space in which an object actually moves or the ‘place’ as Newton called it, is sometimes termed the ‘preferred reference frame’ as Galezcki has done. But others use this very same term to a frame attached to absolute space; and as against this static frame, those frames attached to all other relative spaces in general are called ‘inertial reference frames’. (Note: All relative spaces are considered to be in uniform motion and therefore the reference frames attached to them are IFR). Since all reference frames are considered equivalent, the ‘proper reference frame’ has lost its special significance in modern physics. Furthermore, unlike a relative space, a reference frame attached to a space is considered to be devoid of mass or momentum, but considered to possess only velocity. That also, in relative motion in relation to another. Owing to this, (as we discussed above on the physical basis of Lorentz transformation) the process of setting apart of a fraction of field momentum acquired by an object, (which field momentum has been introduced **physically** from outside into the **domain** of a reference frame attached to the relative space), on account of **co-movement** with it, gets disregarded in modern physics. It is precisely by this act of negligence that the concept of the ‘proper reference frame’ or Newton’s ‘place’ loses its **dynamic** significance, and thereby all reference frames come to be considered as equivalent. However, the fact that all reference frames are kinematically equivalent is nothing new. Kinematic equivalence does not mean that they are dynamically equivalent as well.

In fact kinematic equivalence and dynamic difference was Newton’s starting point. According to Newton, relative motion of an object relative to its ‘place’ (i.e. its proper reference frame) is a **‘true motion’** and the relative motion of the same object relative to any other reference frame is an **‘apparent motion’**. (Note: Also by the example of a sailor walking on a deck of a ship, Newton made clear the difference between his concepts of ‘true motion’ and ‘absolute motion’. A ‘true motion’ is a part of ‘absolute motion’. The motion of a body relative to its ‘place’ is ‘true motion’ but this ‘true motion’ is only a constituent component of ‘absolute motion’). According to Newton, his whole programme was based for the purpose of distinguishing between true and apparent

motions. He says in fact that he wrote his treatise – the *Principia* – for this purpose, as it is evident from the opening pages of *Principia*: “It is indeed a matter of great difficulty to discover, and effectively distinguish, the **true motions** of particular bodies from the **apparent**; because the parts of that immovable space, in which those motions are performed, do by no means come under the observation of our senses. . . . . But how are we to obtain the **true motions** from their causes, effects, and apparent differences, and the converse, shall be explained more at large in the **following treatise** (i.e., the *Principia*). For **this end** it was that I composed it”.

It must be noted that whereas Newton’s programme was to make a clear demarcation between true and apparent motions, in Einstein’s programme this demarcation is obliterated – the theory is constructed on the basis that everything depends on the observer’s view point. However, one must take note that when it comes to the nitty gritty, as in the case of the solution of the twin paradox, **Einstein had to turn exactly to Newton’s concept of true motion**. If there is no privileged position for the proper reference frame relative to which a thing really moves, and if it is only the relative motion that matters, as it appears to an observer, then since one twin moves relative to the other, we have the paradox that each twin should age less relative to the other. Einstein resolves this paradox by invoking **true motion**. For it is claimed that it is the twin who ‘truly moves’ that ages less!

It is this same point **Theocharis** makes (kinematic equivalence does not amount to dynamic reality) in the following statement: “The actual best argument that I have been using in my 22-year sad experience from my struggle is (as I explained in my "Problems With Galileo" Letter published in Nature in May 1993, and also in the enclosed paper "A Physicist Experiments With Physical Studies") this: Einstein rejected heliocentrism and adopted a position which is very close to the position of the Vatican Inquisition that condemned Galileo”.

As both **Del Larson and Francisco Muller** have pointed out, the importance and utility of the Lorentz transformation is the possibility it affords for the prediction of the results of an experiment carried out in the domain of a proper reference frame moving with velocity  $u'$ , from the results observed from an experiment carried out in the domain of a proper reference frame moving with velocity  $u$ . This translation of results from one case to the other becomes possible in the final analysis by virtue of **implicit assumption** of Maxwell’s “**standard state**” (*Matter and Motion* p. 74) as the state in which a **body is at rest** relative to its proper reference frame. We also recognize that in this state, the **internal energy** of the body (the so-called ‘rest energy’) is  $Mc^2$  no matter whatever the velocity of the proper reference frame is. This fact of the internal energy of a body being equal to the same **constant** quantity  $Mc^2$ , when at **rest** relative to a proper reference frame A moving at velocity  $u$  or when the body is at **rest** relative to a proper reference frame B moving at velocity  $u'$  makes the two cases **dynamically equivalent**. And this is the reason why it can be justifiably called the ‘**standard state**’. The point that both **Larson and Muller** make is the following. When we conduct an experiment on the proper reference frame A, we will get the result of this experiment as

$$x' = \Gamma_u(x - ut).$$

And from this we can find out the value of  $x$ . From that we can predict the displacement  $x''$  an identical body will undergo in its proper reference frame B moving at velocity  $u'$ .

$$x'' = \Gamma_{u'}(x - u't)$$

From the fact that the results predicted in the above manner turn out to be true, it confirms that  $t$  is not a variable and that simultaneity is absolute. There is no time dilation!

**Wesley** wrote: "In your second paper entitled "About Roemer observations" you insist that "special relativity" with its mystical, never confirmed "time dilation" be considered seriously".

Our comment: Actually the test for time dilation lies in the second equation above. If the results conform to this equation as it is, (i.e. with  $t$  considered invariant), then there is no time dilation. If the correct results are obtained by means of modification of the equation to  $x'' = \Gamma_{u'}(x - u't')$ , then this will prove that there is time dilation.

This will also show that the standard state does not depend on the existence or non-existence of an ether. This is why Einstein was able to develop his mathematical theory without factoring ether into it, when everybody else thought the 'standard state' is inextricably linked to the existence of an ether pervading all space.

**Wesley** wrote: Generally ether theories are simply preposterous fantasies. The vacuum is supposed to be filled with all sort of real or imaginary particles, fluids, solids, or fields with all sort of real or imaginary properties governed by all sort of real or imaginary laws. No two believers in an ether ever believe in the same ether.

The theory presented by us is a revision and a rectification of Newtonian dynamics. Just like the original dynamic theory could be built without reference to ether, whether or not such an entity physically existed, our theory too can stand without using ether as a crutch.

### Why the Principle of Relativity is Erroneous:

**Bartocci**: "one should check more the validity of the principle of relativity for electromagnetic phenomena"

Newton stated the principle of relativity in the *Corollary V* of *Principia* as follows: "The motions of bodies included in a **given space** are the same among themselves, whether that space is at rest or moves uniformly forwards in a right line without any circular motion" (*Principia*, p. 20).

This gives the impression that the velocities  $v_A$  and  $v_B$  of two particles A and B moving with respect to the same proper reference frame ('given space') will not alter whether the PRF moves at velocity  $u$  or  $u'$ . If this condition is correct, then the equivalence of all IFR

will hold true and the principle of relativity will remain valid as it appears above in Newton's statement. But this is incorrect.

Let the masses of A and B be  $M_A$  and  $M_B$ . When the PRF moves at velocity  $u$ , A and B have to set apart fractions of momentum  $M_A u$  and  $M_B u$  so that they **partake** in the motion of the PRF. The total momentum of A is  $M_A V_A$  and that of B is  $M_B V_B$ .

$$M_A V_A = M_A V_{A'} + M_A u$$

$$M_B V_B = M_B V_{B'} + M_B u$$

As discussed above (how the gamma factor comes into being in response to **Larson's** position on gamma), due to the restoring action of the total field there occur velocity transformations (We eliminate  $M_A$  and  $M_B$  from the above two equations). We get

$$V_{A'} = \Gamma_u (V_A - u)$$

$$V_{B'} = \Gamma_u (V_B - u)$$

From this we get the velocity of B relative to A as

$$V_{A'} - V_{B'} = \Gamma_u (V_A - V_B)$$

Similarly when the PRF moves at velocity  $u'$

$$V_{A''} - V_{B''} = \Gamma_{u'} (V_A - V_B)$$

This shows that not only that the absolute velocities of A and B will change when their common PRF changes velocity from  $u$  to  $u'$ , even their relative velocities would change. Thus Newton's principle of relativity that "The motions of bodies included in a **given space** are the same among themselves, whether that space is at rest or moves uniformly forwards in a right line without any circular motion", is **incorrect**. **Bartocci** is quite right in his proposition to check whether the principle of relativity holds.

See Appendix I of the paper (pp. 44- 47) where we amend Newton's principle of relativity, and give it a Leibnizian relational interpretation to it:

"The **ratios of relative motions** of bodies included in a **given space** are the same among themselves, whether that space is at rest or moves uniformly forwards in a right line without any circular motion"

p.59 **GIANFRANCO SPAVIERI**

We contend that why SRT has survived for one hundred years is because of its **utility value**. Although, prior to Aristotle, the heliocentric view was popular with Pythagoreans in particular, the **utility** of the concept of the celestial sphere together with the adaptation of Eudoxus' idea of spheres attached to planets, the Sun and the Moon, by Callippus and Aristotle, led some centuries later to the development of the Ptolemaic system with its epicycles. While the epicycles are no more now, still the calculations of astronomy are made relative to the celestial sphere which is a remnant of the Ptolemaic conception. As Spavieri indicates there is a **utility value in SRT**. There is also a parallelism between the

Ptolemaic system and SRT, (**Tom Phipps** refers to this). Although nobody understood the physical meaning of the epicycles, the system perfected with epicycle upon epicycle worked and provided results to a fair degree of accuracy. Similarly by an intuitive, parallelistic association with the physical elements and the concepts of SRT, it is possible I believe for one to grope around and obtain results. And with experience this can be made into an art. This is what **Spaveri** must be meaning when he says: “If the SR postulates are accepted, I and many other more specialized physicists believe that SR is understandable, at least within the limits of rationality. I myself have solved many difficult "paradoxes." However, I know that there are still paradoxes that have not been solved. Thus, **Josef's** argument, for much that one can share his view, is not sufficient to be accepted by the scientific community as disproving SR.”.

**Spaveri**: “I agree almost completely with your and **Josef's** position: special relativity (SR) can be doomed only by experiments”.

Has **Aspects' experiment** made any difference to the **utility value of SRT**? In spite of experiments, SRT still survives because of its utilitarian value. Not only experiments, in order to topple SRT, there has to be another **circumspectual** theory to provide proper explanations to all relativistic phenomena on a **physical basis**, similar to what the Copernican theory did with the Ptolemaic system. Ptolemy knew full well that his system was not real, and similarly Einstein knew his constructive theory was only tentative.

After Copernicus and Kepler, it would now be possible to analyze and indicate the actual motions that warranted each of the epicycles or a group of epicycles in the Ptolemaic theory. Similarly, once finding a proper physical theory, SRT will undergo a transformation when real physical elements are identified and related to the seemingly irrational concepts that underlie SRT presently. Just like the celestial sphere has survived the physical reality the helio-centric system, SRT's mathematical foundation may survive or get adapted into the new theory.

**Spaveri's** position in regard to the mathematical coherence of SRT testifies to our above view: Although mathematical internal coherence is generally accepted, as well known, one of the weak physical and intuitive points of SR is the difficulty to describe the same physical reality in different moving frames (paradoxes). Thus, I believe that what seems to be irrational, unacceptable or even not understandable to many people is the physical world described by SR rather than the internal coherence of SR itself.

p.62 **THEO THEOCHARIS**

”Regarding your debate with **Wesley**, I am inclined to agree with **Wesley**. A proper scientific theory must start by assuming a one and only nature for light, electrons, etc. Then from this starting assumption derive formulas for, say, the Doppler and aberration effects. Relativity never does this, therefore it is not a proper scientific theory”.

This requirement is fulfilled by the theorem X of our paper. In this theorem we derive first the **universal equation of motion** (equation 9 in the paper) for matter particles and Energy transmissions.

$$\text{Momentum of motion } p \text{ relative to PRF} = \Gamma_u \cdot Mv/c(c \cdot \cos\alpha - u \cos\chi) \text{ -----(A)}$$

**Equation (A) as Applicable to the Motion of Matter Particles:**

We show that the condition, under which motion of matter particles operate is that: irrespective of the obliquity  $\chi$  between the motion of the particle and that of the PRF,  $\alpha$  and  $\chi$  in equation (A) assume zero values. We get the general equation of motion (B) of matter particles for all velocities (both high and low). We also offer an **experiment** to verify the above condition. (The experiment is the following: Conduct a particle accelerator experiment having the direction of motion of the particle aligned to the direction of orbital motion of the Earth. Then  $\chi = 0$ . Six hours later conduct the same experiment, then although  $\chi = 90^\circ$  the result will be found to be the same. This shows that in equation A, for matter particles, irrespective of what the obliquity  $\chi$  between the PRF and the direction of motion of the particle,  $\chi$  and  $\alpha$  assume zero values in the equation).

.Hence the displacement in time t is given by:

$$x' = \Gamma_u (x - vt \cdot u/c) \text{ -----(B)}$$

For particles moving at near light velocities,

Where  $v \rightarrow c$   $vt \cdot u/c \rightarrow ut$  we get the Lorentz transformation.

$$x' = \Gamma_u (x - ut) \text{ -----(C)}$$

It has been claimed in SRT that in the ‘limiting case’, where at low velocities where  $u^2/c^2 \rightarrow 0$ ,  $\Gamma_u \rightarrow 1$ , we get the Galilean transformation and thereby SRT reduces to Newtonian Mechanics.

$x' = x - ut$  -----(D) . This notion is utterly wrong. Refer Appendix I (pp. 46-47) of my paper.

**The Equation (A) as Applicable to Energy Transmissions within fields:**

For energy transmissions within a field (between two charges) in a moving field  $v = c$ , and the obliquity  $\chi$  remains in effect unlike for matter particles. Therefore the general equation

$$p = \Gamma_u \cdot Mv/c(c \cdot \cos\alpha - u \cos\chi) \text{ -----(A) since } v = c \text{ reduces to,}$$

$$p = \Gamma_u \cdot M(c \cdot \cos\alpha - u \cos\chi) \text{ -----(E)}$$

This equation (E) is verified by Lorentz’ experiment on moving charges as recorded by Max Born in his book on Relativity (p. 221). In the direction of motion of the centre of the system, the obliquity  $\chi$  of signals to this direction is zero. Then  $\alpha = 0$ . The distance between the charges contract from  $x$  to  $x'$ .

$$x' = \Gamma_u(x - ut) \dots \dots \dots (C)$$

There is therefore a contraction in the distance between the charges in the direction of motion.

When the obliquity  $\chi = 90^\circ$   $\alpha = \theta$  (where  $\sec\theta = \Gamma_u$ )

Equation (E) becomes

$$p = \Gamma_u M(c \cdot \cos\theta) = Mc.$$

Therefore (since  $\Gamma_u = \sec \theta$ ) the displacement becomes

$$x' = x$$

That is no contraction of the distance between charges in the direction perpendicular to the direction of motion.

**The Equation (A) as Applicable to Free Energy Transmission:**

We show that this same equation (E) holds for free energy transmission (such as propagation of light) in the penultimate **phase** of motion. However, as we show in theorem XI, by adjustment of spin and linear momentum, the linear velocity attains the constant value  $c$ . Thus we provide a physical explanation for why the velocity of light under certain conditions is constant irrespective of the velocity of motion of the PRF. We provide an experiment to verify the adjustment between spin and linear momentum of an energy transmission.

Then with this theory we provide explanations for stellar aberration, gravitational redshift and cosmological redshift. This way we satisfy the requirements set by **Wesley and Theocharis.**

p.64 **JAMES PAUL WESLEY**

**IS THERE AN ETHER?**

Generally ether theories are simply preposterous fantasies. The vacuum is supposed to be filled with all sort of real or imaginary particles, fluids, solids, or fields with all sort of real or imaginary properties governed by all sort of real or imaginary laws. **No two believers in an ether ever believe in the same ether.**

The theory presented by us is a revision and a rectification of Newtonian dynamics. Just like the original dynamic theory could be built without reference to ether, whether or not such an entity physically existed, our theory too can stand without using ether as a crutch as we already stated.

**Wesley** wrote: Contrary to your apparent belief, "special relativity" presents obvious horrendous mathematical contradictions and errors, as pointed out by thousands of individuals since 1905 onward. But even worse, correct mathematical manipulations of false physical premises, that contradict empirical fact (such as the claimed constancy of the velocity of light independent of the velocity of the observer) does not mean that the correct mathematical conclusions are correct physical conclusions. [...]

As discussed above we have shown in theorem XII of our paper how an energy transmission makes physical adjustments to maintain the constancy of the velocity of a free energy transmission (therefore also of light). It is not a matter of linear momentum magically remaining constant in the face of various constraints as claimed by SRT. In our theory, while linear momentum attains constancy in the face of constraints, changes of spin momentum (hence wavelength) manifest the tell-tale signs (verifiable by experiments) of how this adjustment has been achieved.

I hope this discourse would have generated sufficient interest within the Bologna group and others towards my paper "Unified Theory of Relativity". I appeal to all the scientists concerned, who have been genuinely interested to find a way to overcome the enigma of SRT to give some time to read my paper and reflect upon it. I appeal to all concerned to embark on a **collective effort**, to develop theory to the fullest as a viable challenge towards ultimate replacement of SRT. We need a collective effort and a common platform without which my effort will remain just a lone voice, and it is most likely to drown within the chorus of the establishment.