Special Relativity Contradicted by Oscillation

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Abstract— *This paper deals with breakdown of Lorentz transformations before oscillatory sequence of events. Lorentz transformations are the basis of Einstein's special relativity. Till to date none has found any pitfall in the theory. Any contradiction pointed towards the theory either ended in an apparent paradox or ended in a misunderstanding of the proposer himself. But the author here shows how the Lorentz transformations wrongfully transform even the simplest oscillatory motion rendering two sides of the transformed equation not equal. Therefore the author proposes this conjecture for settling the dispute and invokes new thinking. Einstein's theory although being the theory of clock synchronization but is helpless before any kind of oscillation. In reality without oscillatory sequence of events we never can construct a clock and Lorentz transformation is expected to support this; but it is unfortunate that the matter turned really grave when Lorentz transformations want to transform an oscillation from one inertial frame to another. Perhaps Lorentz transformations are not final statement of transformation of event from one inertial frame to another*

Index Terms— *Simple harmonic oscillation, breakdown of Lorentz transformation*

1 INTRODUCTION

Special relativity is a theory of space - time in any inertial frame of reference where inertial frame is defined as the frame in which Newton's first law of motion holds. Any kind of arbitrary sequence of events taking place in an inertial frame can be observed from any other inertial frame moving uniformly with respect to the former. The observation of the corresponding sequence of events from the view point of the second frame can be theoretically obtained by the Lorentz transformation of event coordinates when the sequence of events in the first frame is known in terms of space - time coordinates. The transformation is meaningful only when the theoretically transformed sequence of events rightly matches with the actual observations. We generally believe that Lorentz transformations of event coordinates flawlessly transform event coordinates from one inertial frame to another in the sense that no anomaly so far has been observed. In case of transformation of electromagnetic oscillation Lorentz transformations rightly transform the field variables and even the frequencies. But we will see now that Lorentz transformations yield significantly to transform simple harmonic motion (SHM) meaningfully. Special relativity is basically a theory of synchronization of clocks and gave us a new insight in the world phenomena; but even this theory yields significantly to simplest clock constituting oscillatory motion.

2 MATHEMATICAL STEPS

Let us take a frame *S'* moving uniformly with velocity u towards right (along the + ve x axis) of a stationary frame S. Let us take moreover that x' axis of S' frame is superimposed always on the x axis of the frame S and at time $t = t' = 0$ the origins O and O' of both the frames were coincident. The required transformation relations for the event coordinates (x, y, z, t) and (x', y', z', t') are given by

$$x' = \frac{x - ut}{\sqrt{1-\beta^2}} \tag{1}$$

$$y' = y \tag{2}$$

$$z' = z \tag{3}$$

$$t' = \frac{t - \frac{u}{c^2}x}{\sqrt{1-\beta^2}} \tag{4}$$

$$\beta = \frac{u}{c} \quad (5)$$

a simple harmonic oscillator oscillates on the x' axis and around O' in S' frame with amplitude a' and frequency ω'. The equation of motion in S' frame is now given by

$$x' = a'\sin(\omega' t') \quad (6)$$

If we apply the transformation relations (1-6), we at once get

$$X = x - ut = \mathrm{a}\sin[(2\pi/\lambda)\{(\mathrm{c}^2/u)t - x\}] \quad (7)$$

The above relation reflects theoretically observed behavior of the moving oscillator as a progressive real coordinate wave along positive x axis in S frame. Here we have

$$a = a'\sqrt{1-\beta^2} \quad (8)$$

$$\omega' = \frac{\omega}{\sqrt{1-\beta^2}} \quad (9)$$

$$T = \frac{1}{\nu} = \frac{2\pi}{\omega} \quad (10)$$

$$\nu\lambda = \frac{c^2}{u} = phase\ velocity \quad (11)$$

$\mathrm{x}' = \mathrm{a}'\sin\omega' \mathrm{t}' (6)$ The relations (8 - 11) give the amplitude, angular frequency, time period and wave length of the progressive wave in S frame. Now we see that if we take the new space time variable as $t_1 = t + T$ and $x_1 = \lambda + x$ in the wave equation, right hand side of the above wave form repeats when $\lambda = \frac{c^2}{u}T$ and that reflects the meaning of wave length λ. Whereas for the left hand side we see $\lambda - uT$ refusing to vanish. In other words both sides do not repeat simultaneously except for $u = c$! Almost same thing happens in the relativistic wave theory of free electron given by Dirac and to Dirac it was great strain to accommodate the result in terms of language. In reality for y or z wave we will not face this trouble or for any unknown wave function Ψ the trouble does not exhibit and that is why it was neglected in theoretical works. But for X-wave the trouble is on the surface and the evil is not to be found in the SHM itself rather the trouble certainly lies with the Lorentz transformation of event coordinates.

3 CONCLUSION

Therefore it is inevitable to redefine the concept of space - time and event once more. It appears that no linear and even no kind of any nonlinear transformations may save the situation in the four dimensional structure of space - time. Newtonian relativity based upon Galilean transformation of coordinates could not account for the unstopability or nonlocalization property of electromagnetic pulses. In other words Galilean transformation of coordinates based upon Newtonian concept of universal time could not transform the sequence of events given by the propagation of electromagnetic pulse from one frame to another. But the fun is that even Einstein's relativity based upon Lorentz transformations of event coordinates fails equally before Galileo's timer. Equally important thing is that all these remained undiscussed in any scientific literature for some unknown reasons. May it be that the breakdown of Lorentz transformations before SHM is theoretical but that is not all. If we could put the simple harmonic oscillator in a fast moving inertial frame we could find easily the discrepancy between observation and theory. In this sense Galileo's pendulum gives the same blow to Einstein's relativity as that given by Michelson-Morley experiment to Newtonian relativity. Einstein built the relativistic structure assuming the clocks being miniature table clocks. Obviously the circulatory mechanism necessary for clock constitution was not considered primarily. But a real clock mechanism whenever is introduced in the form of SHM the four dimensional structure of space - time proves inadequate.

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