JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

ALTERNATIVE TO THE SPECIAL THEORY OF RELATIVITY

Seetharama Varamballi

Special Theory of Relativity (**STR**) has become most fascinating subject in the world of theoretical physics. It led to the understanding of Relativistic effects on Length, Mas & Time of bodies under motion as perceived by observer in a different frame of reference.

We know according to **STR** when a coordinate system **B(x',y',z',t')** is moving with constant velocity **v** w.r.t. another system **A(x,y,z,t)** the transformation equations are

$$x' = \gamma\cdot(x-vt)$$
$$y' = y$$
$$z' = z$$

$$t' = \gamma \cdot (t - vx/c^2)$$

where $\gamma = 1/\sqrt{(1-v^2/c^2)}$ and **c** is the velocity of light in vacuum.

Based on above results following equations are also derived

Length Contraction : $l = l_0/\gamma$

Time Dilation : $t = \gamma \cdot t_0$

Variation of Mass : $m = \gamma \cdot m_0$

Addition of Velocities : $u = (v + u')/(1 + vu'/c^2)$

where l_0, m_0, t_0 are length, mass & time of a system in moving frame and **l, m, t** are length, mass & time as measured from a rest frame.

Historic backgrounds that led to the STR

1) Failure of Michelson-Morley Experiment to detect existence of Aether.

2) Need to arrive at the term $\sqrt{(1-v^2/c^2)}$ or Lorentz Factor γ which was necessary to explain failure of Michelson-Morley experiment.

3) Inability to measure unidirectional speed of light has led to assuming it to be constant for all observers independent of their inertial speed.

Shortcomings of the Theory.

1) The unidirectional speed of light is arbitrarily assumed to be constant for all the observers independent of their inertial speed.

2) If every thing is relativistic, it fails to explain why μ-meson from upper atmosphere moving close to speed of light survives 32 microseconds while one generated in the laboratory survives only for 2 microseconds.

3) According to STR a falling μ-meson finds earth at 600 mtrs due to space contraction and reaches earth in 2 micro-seconds in its clock. Then, a) Is it not that slowing down of clock is ignored to say there is space contraction. b) If we assume a hypothetical Fitzeu's experiment is conducted in a falling μ-meson with space between the observer and mirror at 300 mtrs it

will take 2 micro-seconds for round trip. Then does it mean earth is at 300 mtrs or 600mtrs.

4) In the transformation equations

$$x' = \gamma (x - vt) \quad \text{.....(1)}$$

and $$t = \gamma (t' + vx'/c^2) \quad \text{.....(2)}$$

at some given instant **t** will be constant w.r.t. equationn (1) where as variable w.r.t. equation (2). How can it be visualized.

Same is the case with another set of equations

$$x = \gamma (x' + vt')$$

and $$t' = \gamma (t - vx/c^2)$$

5) If we examine relativistic addition formula,

$$u = (v+u') / (1+vu'/c^2)$$

a) It does not contain Lorentz Factor **γ** which has vital role in other places

b) It has two components $v / (1+vu'/c^2)$ and $u' / (1+vu'/c^2)$.

v / (1+vu'/c^2) implies that velocity of first frame is influenced by velocity of second frame. How **v** can have this duality ?

STR goes around moving observer's perception or world view. This is some what comparable to Geocentric Model of Universe.

A Thought Experiment in line with Michelson-Morley Experiment

This approach to explain the reason for failure of Michelson-Morley Experiment to detect Absolute Motion of Earth is based on assuming Lorentz Contraction & Time Dilation are a Reality which are proved by several experiments. This is purely Geometrical approach with supporting Mathematical works. Further Lorentz Contraction assumed here is not Relativistic effect but Real Phenomenon as the source of light and reflector are lying in the same platform. The length contraction is not detectable as measuring scale and measured system undergo proportionate change.

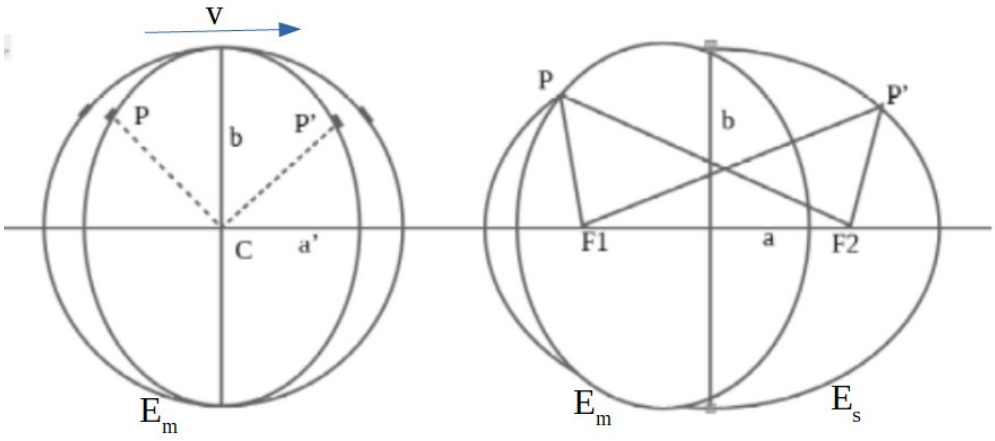

Fig: A

Refer the diagram above. Let **C** be an observer at the centre of a circular ring shaped mirror of radius **b** at rest. Let the ring start moving with a uniform velocity v along Horizontal axis. The ring takes the shape of an ellipse $\mathbf{E_m}$ (Moving Ellipse) – due to Lorentz's Contraction- with the horizontal radius becoming **a'** such that $\mathbf{a'^2 = b^2(1-e^2)}$, where e is the eccentricity of the ellipse, **e = v/c**. **a'** can also be written as **a' = b/γ**, where $\mathbf{\gamma = 1/\sqrt{(1-e^2)}}$. Let us consider an imaginary ellipse E_s (Stationary Ellipse) of vertical radius = **b** & horizontal radius a such that $\mathbf{a^2 = b^2/\sqrt{(1- e^2)}}$ or $\mathbf{a = \gamma \cdot b}$, where $\mathbf{\gamma = 1/\sqrt{(1-e^2)}}$. Let **F1, F2** be the foci of this ellipse.

Now, let us say at **t=0**, **C** of $\mathbf{E_m}$ coincides with $\mathbf{E_s}$ and a flash of light emanates at **F1**. The flash of light grows into a circular ring(Globe) with point

of origin **F1** as the centre and grows at speed **c**. It so happens that every ray of light meets surface of $\mathbf{E_s}$ exactly when **Em** meets **Es** at that point. Due to motion of $\mathbf{E_m}$ it so happens that the light ray gets reflected from Em in such a way that as though it got reflected from **Es** and traverses path $\mathbf{PF_2}$. It meets **F2** at such a point of time when **C** meets **F2**. This is true for all the rays emanated from **F1** due to the basic property of Ellipse i.e., **PF1 + PF2 = 2a**. This holds good for all points on $\mathbf{E_s}$. For observer at **C** it appears as though the sphere of light emanated from his source is reflected from the circular mirror and comes back to him at once OR he feels that he & the ring around him are stationary.

By the above experiment it is clear that only one spherical wavelet emerges with a flash & it is centred around **F1** only. All the rays of the wavelet gets reflected by **Em** at the point of coincidence of **Es** and converges at **F2** into a converging spherical wavelet at the same instance. What observer at **C** feels is as though he is stationary, the wavelet emerges, traverses & reflected back by the circular mirror to converge at

C. Further, due to inherent velocity in the system and the associated aberration the Collimator, Reflector at the periphery and the receiving telescope of the observer will be collinear and tilted with respect to emerging and reflected ray.

Mathematical proofs are worked-out for all the above phenomenon

Following conclusions can be drawn from the experiment. Viz :-

1) For a stationary observer at $\mathbf{F_1}$ with a reflector on the periphery of the circle the round trip time for light is $\mathbf{t_0 = 2b/c}$

2) As the speed of moving frame increases length **F1F2** increases viz $\mathbf{2av/c = 2ae}$. So also $\mathbf{PF1+PF2 = 2a}$

3) Time taken for light to travel from $\mathbf{F1 \rightarrow P \rightarrow F2}$ is $\mathbf{2a/c = 2\gamma\cdot(b/c) = \gamma\cdot t_0}$. It implies that
the round trip time for light is increased. But this is not sensed by the observer at **C** because the

observer's clock goes slow proportionately. i.e., $\mathbf{t = t_0/\gamma}$.

Relevance to Michelson-Morley Experiment : It is evident that when M-M equipment is moving in a horizontal plane with reference to it's orbital motion it's arms get shortened due to Lorentz Contraction in such a way that the reflecting mirrors always lie on the periphery of **Em** irrespective of angular position, because $\mathbf{l = l_0\sqrt{(1-v^2/c^2)} = l_0\sqrt{(1-e^2)}}$. Semi-silvered mirror is at the centre of **Em**(like **P** & **P'** in the diagram).

The condition holds good for all inclinations of the equipment with reference to Orbital Plane because the above explanation holds good for all the points on the spheroids obtained by rotating $\mathbf{E_s}$ & $\mathbf{E_m}$ around the common axis.

If $\mathbf{E_m}$ is stationary in space(hypothetical) there will be no contraction in any direction, therefore $\mathbf{E_m}$ remains circular. There will be no case for imaginary ellipse $\mathbf{E_s}$. There will be no path difference between two

paths of light and there will be no change in the interference pattern if the apparatus is rotated.

This new theory is worked-out assuming Lorentz contraction or length contraction as a reality. This theory is in a way comparable to Helio-centric Model.

I have worked out explanation for several phenomenon like KennedyThorndike experiment, Fitzeu's experiment with flowing liquid, Celestial aberration unambiguously with this theory.

Comments, Questions and Suggestions are welcome

Pl write to : ***seeva.works@gmail.com***