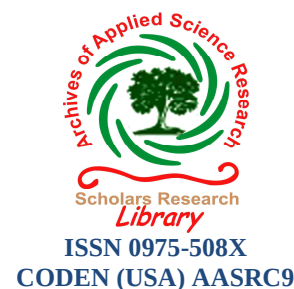




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Existence of neutrinos from SN1987A beyond the velocity of light within the frame work of special theory of relativity

B. Rajkumar Daniel

39A, Indira Nagar, ML Puram Post, Pollachi, TamilNadu, India

ABSTRACT

The mass variation equation from Special theory of relativity (STR) is an unique equation which predicts that no mass can move with the velocity equal to light 'C' and beyond it also. Because at 'C' the mass becomes 'infinity' and beyond that mass becomes 'purely imaginary' as by the equation

$$Mv/Mo = \sqrt{1 - V^2/C^2} \text{ -----} > \text{Equation (1)}$$

Where Mo –is the rest mass of a body

Mv – the mass of the body at velocity 'V'

C -Velocity of light

V - is the velocity of the moving mass

We assume that this condition arise due to light being the signal used for the transfer of information between inertial frames which are moving with a constant linear velocity 'V'.

Key words: STR, mass variation, imaginary mass, velocity of light, real mass.

INTRODUCTION

The equation '1' gives the variation of mass of a moving body. But the negative value inside the square root gives an imaginary mass when the velocity exceeds that of light and STR forbids no body to move beyond the velocity of light. But the same equation gives a real ratio between bodies moving at different velocities more than that of light.

Let us assume that a body M1 moves with a velocity C1 and M2 moves with a velocity C2 and both C1 and C2 are greater than 'C' and C1 is not equal to C2. We get two imaginary mass M1i for M1 and M2i for M2. But the ratio of M1i/M2i results in a real quantity. As the mass variation is dependent on function of "V" only on not on "C" in this case.

Assumption:

We assume that the 'observation' regarding the velocity of light in any referential frame which is moving with a constant velocity as observed by the relative stationary frame and vice versa is relative to 'V'

That is $C = f(V)$ -----> Equation (2)

That is velocity of light is a function of velocity of the moving inertial frame when the information of velocity of light is exchanged between inertial frames. When an inertial frame moves away from us with a velocity greater than that of light, it is not possible to observe anything from that frame using velocity of light as 'signal for transfer of information' from our rest frame. But if the same inertial frame moves towards us with velocity greater than that of light it is possible to get information from the inertial frame using light as 'signal for transfer of information'.

Applying this idea on transformation equations and deriving the mass variation equation we arrive at

$$\frac{Mv}{Mo} = \frac{1 + \sqrt{1 - \alpha + \alpha^2}}{1 + \sqrt{1 - \alpha + \alpha^2} - \alpha\sqrt{1 - \alpha}} \text{ -----> Equation (3)}$$

Where $\alpha = \frac{V^2}{C^2}$

Equation '3' is the new equation arrived by assuming that the matter can exist beyond the velocity of light.

Equations (1) and (3) are tabulated as below

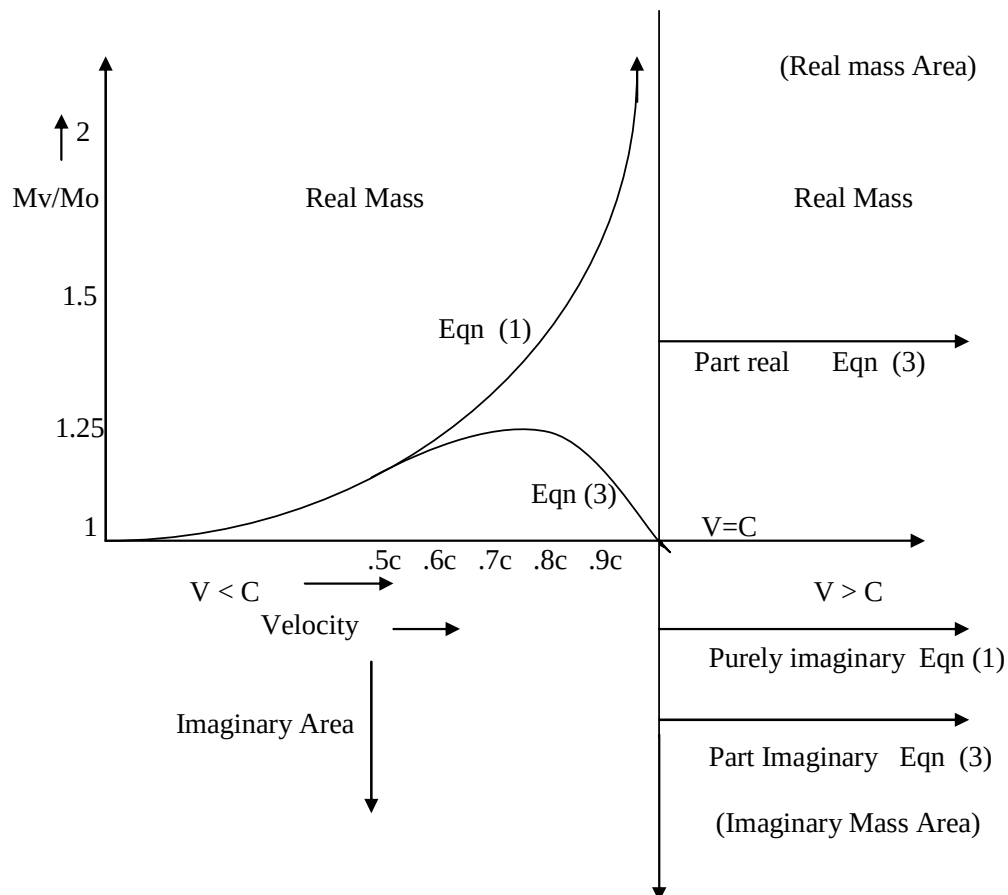
Table 1

Velocity %C	Equation A	Equation C	Difference
.1	1.005038	1.005012	.000026
.2	1.020621	1.020187	.006023
.3	1.048285	1.045855	.00243
.4	1.091089	1.082211	.008878
.5	1.154701	1.128500	.026201
.6	1.250000	1.181216	.068784
.65	1.315903	1.207355	.108548
.70	1.400280	1.230801	.169479
.75	1.511858	1.248666	.263192
.80	1.666667	1.257154	.409513
.85	1.898316	1.251462	.646854
.90	2.294157	1.225350	1.068807
.91	2.411916	1.216923	1.194993
.92	2.551551	1.207193	1.344358
.93	2.720648	1.196011	1.524637
.94	2.931051	1.183180	1.747871
.95	3.202563	1.168425	2.034138
.96	3.571430	1.151335	2.420095
.97	4.113448	1.131227	2.982221
.98	5.025191	1.106788	3.918403
.99	7.088794	1.074657	6.014137
.999	22.36575	1.022832	21.342918
1.00	Infinity	1.000000	Infinity

From the table(1)it is found that the mass increase up to .6C is same for both equations as the difference is not observable in the experiments so far conducted using fast electrons. But equation '3' implies that above .8c the mass increase stops between .807C and .809C begins to decrease and at V= C the mass Mo = Mv. Above 'C' the mass exists in a the form of Mc+ = Real + imaginary

Where Mc+ is the mass of the body moving beyond the velocity of light. Graphically we can represent the table as figure(1), which indicates the existence of mass beyond the velocities greater than the velocity of light.

Figure - I



CONCLUSION

From the equation '3' it is possible for neutrinos from SN1987A to exceed the velocity of light. In supernova SN1987A also the neutrinos[1] are accelerated to a velocity greater than that of light due to the core collapse. The neutrinos of SN1987A need only 80 to 100 cm ahead of light per second to reach earth about 3 hours ahead of light.

We conclude that it is possible for neutrinos to exist beyond the velocity of light .

Acknowledgement

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