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Continuous mass variation equation-study on neutrinos from SN1987A and CERN

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ABSTRACT

As by the research paper[1] the mass variation of a body can be derived as a part real quantity beyond the velocity of light by the equation

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

Equation (1) is being called as ***"Continuous Mass Variation equation(CMVE)"*** *where*

Where $\alpha = \frac{V^2}{C^2}$
Mo – is the rest mass of a body
Mv – is the mass of the body at velocity 'V'
C - is the Velocity of light
V - is the velocity of the moving mass

In this paper the neutrinos on basis of 'continuous mass variation equation' are studied. Specific studies on neutrinos from supernova SN1987A and neutrinos from CERN[2] are done with comparison on their velocities only .

Keywords: Neutrino,SN1987A,CERN,CMVE(Continuous mass variation equation),Progenitor, Core.

INTRODUCTION

IN the year 1987, February 27th there was heavy neutrino activity at Kamikonde neutrino detector(Japan) and some other neutrino detectors. The time difference spread of all events are within about 13 minutes. Approximately about 3 hours after the neutrino burst , one automatic satellite tracking camera in Australia recorded a burst of light with magnitude 6.1 from supernova SN1987A(Progenitor star was Sandaleuk a blue giant)[3]. Next day the discovery of supernova was made public.

The Anamoly
The "neutrinos" arrived approximately 3 hours before the "light" and that fact is clear and many papers are being discussed on the anamoly . The popular idea being that the light production from the progenitor star Sandaleuk was delayed due to the shock wave produced due to core collapse which travelled inside the star and reached the light producing area at the rim of the star after 3 hours.

Another idea is that the light produced inside the star took a longer time to travel in the opaque medium and finally come out of the star surface and hence delayed.

But all the theories tried to avoid the superluminal speed of neutrinos as Special theory of relativity forbids the superluminal speeds .But in the paper [1] it is proved that matter can exist beyond the velocity of light in 'real' terms also.

Explanation

Last days of a massive star is significant but it's life starts some million year ago and follows the below path till it becomes supernova.

Hydrogen burning	-----	about 10 million years
Helium burning	-----	1 million year
Carbon burning	-----	1000 years
Neon burning	-----	10 years
Oxygen burning	-----	1 year
Silicon burning	-----	1 day

And finally builds up an inert Iron(Fe)core or (Fe-Ni)core and responsible for the supernova explosion which combine many complicated processes with in short time .

The progenitor(SK -69 202) is believed to be a red giant to become a supernova but it surprised many as it was a blue giant(Sanduleuk was it's name-The star was first listed by Nicholas (Nicolae) Sanduleak (1933-1990) as part of a deep optical survey of the Large Magellanic Cloud(LMC)). The blue giants are 15 to 20 times massive than our sun . The radius also 15 –to 20 times more than sun(695000 km radius).

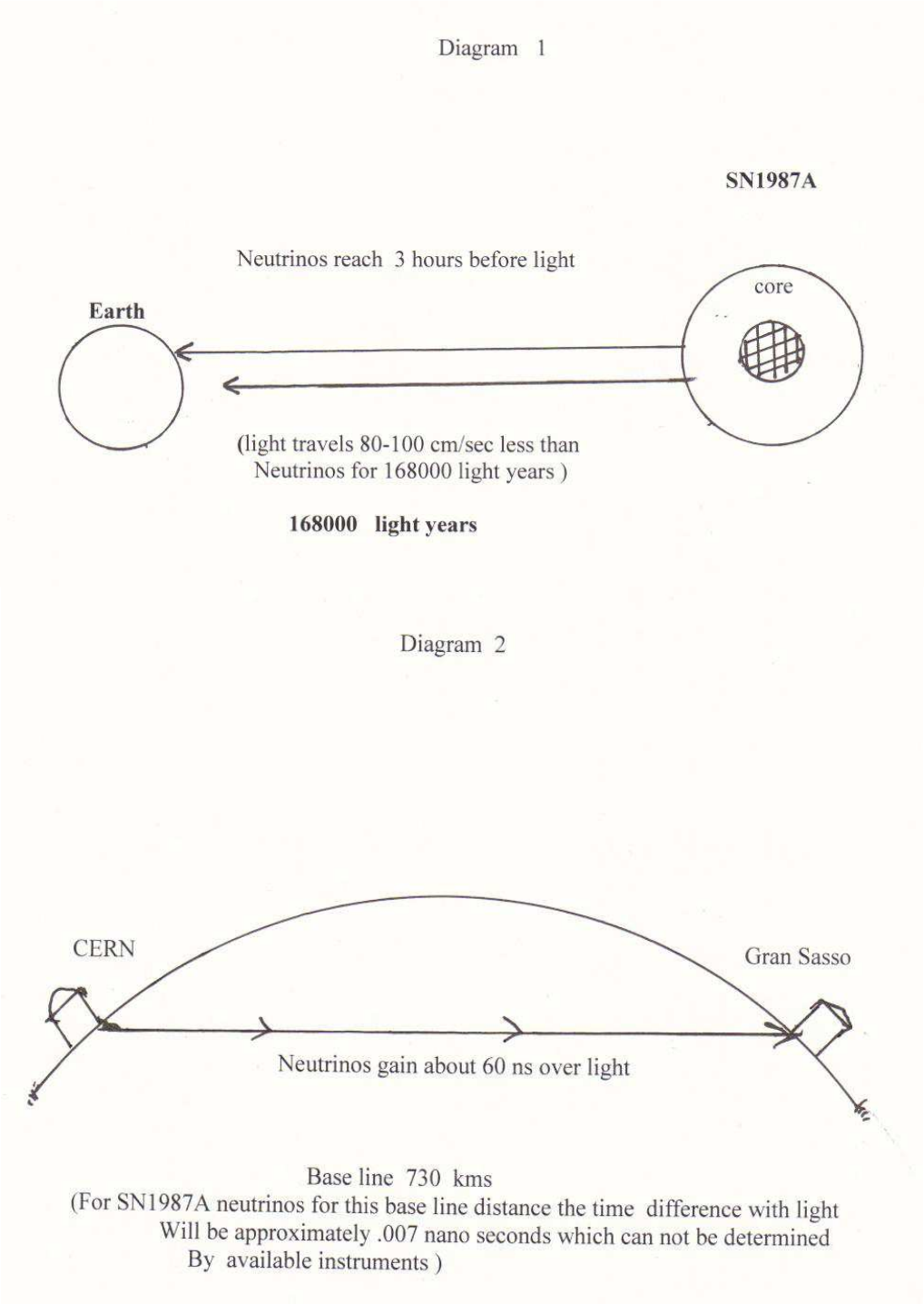
Progenitor star radius = 20*695000 = 13900000 kms (We assumed the maximum)

Only it will take 47 seconds for light to reach star edge from core(we neglected core radius as it is << than star radius) For 3 hours delay the total time is 10800 seconds. So if the neutrinos and light are produced with in the collapsed core and in same layer or area at the same time then it is not possible for the light to get slower by 10800 seconds inside star and come out of the edge after 3 hours(10800 seconds).

In another assumption that the shock wave produced outward after the collapse of core sends out lot of blast material and they hit the star material and produces light at some layer which is near to star's outer layer so that the light is observed after 3 hours .

There is wide difference in the shock wave speed as per many published papers ranges from 30000km/s to 80000 km/s. This is called post-bounce shockwave.

If 30000 km/s , the lower end is taken then the delay will be 470 seconds only and for 80000 km/sec the delay will be 180 seconds . So for the delay of approximately 10800 seconds the shock wave will be around 1000 km /second and that shock wave cannot produce light at the outer layers of the collapsing star as the energy is very less.



CERN Experiment on Neutrinos moving with velocities greater than light

According to [2] CERN initial data suggested that in CERN-SASSO experiment the neutrinos really travel with velocities more than that of light. In the base line of about 730 kms they had calculations of neutrinos coming before light about 60 nano seconds earlier. But after few months[2-revision] CERN informed that the earlier calculation was wrong and that data arose due to some loosely linked cable ,and concluded that the neutrinos did not travel beyond the velocity of light but travelled almost near to that of light.

In the case of SN1987A[3] it is confirmed that the neutrinos arrived 3 hours before light . They came from a supernova which is 168000 light years away from Earth. In that case, per second the light was lagging behind the neutrinos by approximately 80-100 cms. But if the same kind(here velocity is preferred-not flavor) of neutrinos as of SN1987A are produced in CERN then the base-line difference between neutrinos and light may be only approximately 2 mm and time delay is about .007 ns (approximate) for the base line of 730 kms. This 2mm or .007ns difference can not be observed by the latest available equipments .

And also the enormous energy produced in core collapse supernova is responsible for that much acceleration of the neutrinos which is still an unknown mechanism and yet to be found. we assume, the bombardment of protons at the graphite target at the CERN may also get that much acceleration to certain degree comparable to core collapse of a star.

CONCLUSION

The neutrinos which are moving with velocities more than that of light from extragalactic origin can be observed. It is really hard to observe the neutrino-light velocity difference on terrestrially produced neutrinos which are being created in CERN-proton collider like experiments .It is possible to deduce the difference in their velocities when the accuracy and new experimental methods evolve in near future.

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