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virtual speed of neutrino

abstract: Recently opera researchers found neutrino is travelling faster

than light thus violating special theory of relativity.Here I have tried to show

that it can also be explained without violating special theory of relativity.

keywords: special theory of relativity,neutrino,antineutrino, infinitesimally

small.

Theory

The Oscillation Project with Emulsion-tRacking Apparatus (OPERA) is a

Scientific experiment for detecting tau neutrinos from muon neutrino

Ossications. In September 2011, OPERA researchers observed muon

neutrinos traveling apparently at faster than the speed of light. The

neutrinos   were calculated to have arrived 60 ns sooner than light would

have if traversing the same distance in a vacuum.

Now, from special theory of relativity we know that m = $m_0 / \sqrt{1 - \frac{v^2}{c^2}}$ where

m0 is the rest mass of the particle,m is the moving mass of the

particle,v is the velocity of the particle,c is the speed of light.Now as we

can see if v > c then the denominator becomes imaginary.Therefore it is

impossble to travel or get velocity faster than light.

In everyday usage, vacuum is a volume of space that is essentially empty

of matter.But we can also think it as a space where neutrino and antineutrino

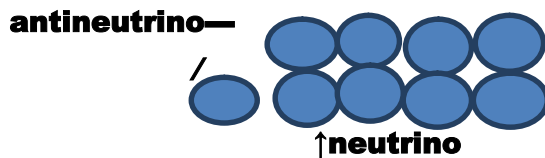constantly annihilating each other at almost timt(t)→0.Now let us consider

this diagram

Fig:1

In the Fig:1 I have assumed neutrino and antineutrino are aligned with

each other constantly poping in and out of existence in vacuum.Now if we

insert a extra neutrino in vaccum as in Fig:1 the antineutrino will immediately

try to annihilate the neutrino diagonally in order to maintain the system

at lowest energy level.In this way all the antineutrino will diagonally
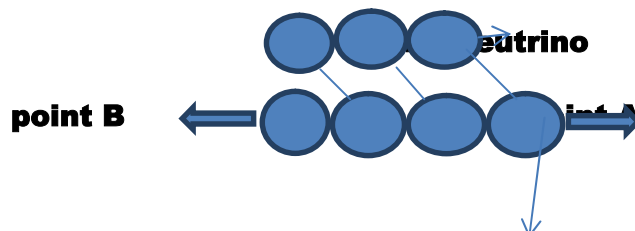
annihilate the neutrinos as shown in Fig:2.

Fig:2

neutrino

Thus from Fig:2 we can see that if we insert a neutrino at point A it may seem

that it has travel to point B.Now if an antineutrino takes timt(t)→o

(infinitesimally   small) to annihilate a neutrino,then for n number of neutrinos

it will take time(t1)=n*t.But as t→0,infinitesimally small,so even for

large values of n, t1 will also be tends to 0(infinitesimally small).Thus in

this way we can the problem of speed of neutrino without violating

the special theory of realativity.It may virtually seem that neutrino has

exceed the speed of light but actually not since the neutrino at point B

is always at point B,though it might seem that neutrino at point A has

travelled   to point B.But actually the   neutrino at pointA has got annihilated

and neutrino at point B remains unannihalated.Though we will get

time(t1) slightly greater than 0 and not 0 since from heisenberg

uncertainty   principle $\Delta E \Delta T \geq h$ where ΔE=change in energy and ΔT =change

in time,h=planck's constant.

Conclusion: Thus I have shown that the anomaly in the speed of

neutrino can also be solved without violating special theory of relativity.

References:

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