

A particle that travels faster than the speed of light?

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A neutrino is a very fascinating particle. It is a charge-less electron that is able to pass through materials because it is mass-less. It has a fraction of the weight of the electron, which is $1/1836$ amu.

They are only affected by a weak subatomic force. This force is the only force that slows the neutrino down. There are three different types of neutrinos, ν_e , ν_μ , and ν_τ . There have been recent studies done that have shown neutrinos can travel faster than the rate of light. If this is true, then they could be used as a commodity to the energy industry and a new innovative way of producing waste-less energy. Neutrinos are emitted by everybody that contains mass and matter.

As a result, these Neutrinos can be analyzed and lead us to a conclusion. Neutrinos could be a big commodity of the future and are very helpful to scientists currently. There are neutrinos categorized as Solar Neutrinos. Neutrinos are given off by every body of mass. The sun gives off billions of neutrinos every second. Neutrinos can never get destroyed or it takes billions, if not trillions years for them to get destroyed.

They are present since the creation of the earth or the body of mass emitting them. This enables scientists to determine the date of the body of mass. It is known in a technique called neutrino dating. Neutrinos may also be a future source of energy. If it were possible for them to travel faster than the speed of light, it could become an energy commodity.

It would provide more output energy than input energy because they would be naturally occurring at that speed. It would be a pollution free source of energy. Using heavy metals in the Lanthanides and Actinides series would
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aid the process of trapping these neutrinos and using them for energy.

Neutrinos cannot travel faster than the speed of light because the experiments that reached this conclusion were false and it defies all current laws of physics. (Casper par 7) The neutrino has a rich history behind its discovery and advances. It was theorized in 1931 by Wolfgang Pauli.

He was observing energy and momentum and came to a conclusion that the two were not conserved during radioactive decay. He hypothesized there were particles of energy that were escaping. These particles came to be known as neutrinos. Enricho Fermi developed a comprehensive theory about Pauli's principle in 1934 and proved it with testing with an advanced instrument. Enricho Fermi gave it the Italian word for " little neutral one", neutrino. He named it this because it had a neutral charge and it was almost weightless.

In 1962 they discovered a new type of neutrino. In a joint study by the Brookhaven National Laboratory, CERN, and the European Laboratory for Nuclear Physics they discovered a new neutrino and gave it the name, the muon neutrino. They found neutrinos produced in association with muons do not behave the same as those produced in association with electrons. In 1968, the first experiment was done to detect neutrinos produced by the Sun's burning reported that less than half of the expected neutrinos were observed. It was the origin of the long standing solar neutrino problem.

They used a liquid chlorine target set deep underground to collect the neutrinos. This created a problem when they were using neutrinos to estimate the solar system's date of origin and its possible life span. In 1985 a

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Russian team reported a non zero neutrino mass. It found the mass was extremely small and close to 10, 000 times less than that of the mass of an electron. In 1995, a Nobel Prize winner discovered the Neutrino was a family member of the electron.

The neutrino was discovered in a chemistry setting. They found not all the energy was released in the beta decay of electrons. Only a partial amount of energy was released and it led to curiosity. That led to the discovery of the neutrino (Knapp par 3) : $e^- \rightarrow e^- + \nu_e$ (A beta electron decays to a positron with a double betatron.) There have been various recent experiments that have further questioned the capabilities of neutrinos.

These experiments conducted generated neutrinos by accelerating protons to very, very high speeds and then slamming them into a stationary target. Using their instruments, they got multiple readings of it traveling faster than the speed of light. Ramanath Cowsik, the lead author of the paper said, "We've shown in this paper that if the neutrino that comes out pion decay were going faster than the speed of light, the pion lifetime would get longer, and the neutrino would carry a smaller fraction of the energy shared by the neutrino and the muon." The most recent experiment at CERN showed neutrinos traveled faster than the speed of light. The first team that was collaborating on the OPERA experiment at Gran Sasso underground laboratory south of Rome, said they recorded neutrinos beamed to them from the CERN research center in Switzerland as arriving 60 nanoseconds before light would have done. There are many errors to their claims.

There could have been other neutrinos present and the neutrino that they received would not have been the neutrino that they beamed. Einstein's theory of relativity refuted these claims. His theory states that nothing can travel faster than the speed of light, in normal behavior. Normal behavior would constitute normal conditions, as likely the ones that preexist on Earth. Einstein based his claims off the conclusions Newton reached.

A physicist who works at the lab even disagreed with the claims made. Physicist Tomasso Dorigo, who works at CERN as well as Fermilab near Chicago, said in a post on the website Scientific Blogging that the ICARUS paper was "very simple and definitive." He said the paper asserted "that the difference between the speed of neutrinos and the speed of light cannot be as large as that seen by OPERA, and is certainly smaller than that by three orders of magnitude, and compatible with zero." The OPERA researchers said a new experiment with shorter neutrino beams from CERN and much larger gaps between them had produced the same result. Independent scientist said, however, this was not conclusive.

They do not believe in these claims because they were not able to reproduce them multiple times. Other scientists who tried to replicate those claims were not able to as well. Other experiments at Fermilab and at KEK laboratory in Japan tried to replicate OPERA's findings. The findings at these labs were not able to replicate these claims (Narlikar par 5). Particles traveling faster than the speed of life are impossible.

The conclusion drawn from a study is that it is impossible for superluminal particles to exist that travel faster than the speed of light is impossible.

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These claims go against all the laws of physics and the tests were not successfully replicated. All the testing done and the procedures that were followed were based off fundamental principles, procedures, and assumptions that nothing can travel faster than the speed of light. So it is impossible to come to a conclusion stating the opposite. The basis of the procedure in the experiment and the foundation was based off nothing can travel faster than the speed of light.

There is a contradiction in the procedure because there is a logical fallacy. It goes against the basic rules of quantum mechanics and physics. Einstein came to a conclusion: $E = mc^2 = E + e$, $0 = P + p$ (energy = mass times the speed of light squared, then this is substituted for different variables which are equivalent in quantum mechanics) Based off these theories he proved it impossible for any objects to travel faster than the speed of light. There are weak subatomic particles that act on these weightless particles. A requirement of traveling faster than the speed of light would be to nullify all the acting forces on the object.

Since there is an acting force on the object, it would slow the object down, therefore not allowing it to travel faster than the speed of light (Steinberg par 12). It is impossible for Neutrinos to travel faster than the speed of light. Neutrinos are beneficial, but it is impossible for them to travel faster than the speed of life. There have been recent experiments that have shown neutrinos travel faster than the speed of light. The experiment done at CERN which says neutrinos travel faster than the speed of light was not accurate.

It is impossible for neutrinos to travel faster than the speed of light because it breaks all the concepts and theories in physics. Even if they claims are true, it could become a commodity for energy sectors. Solar neutrinos also help determine the age of the solar system. Works Cited " Are neutrinos faster than light?." Sydney Morning Herald - Business & World News Australia | smh. com. au. N. p., n.

d. Web. 8 Feb. 2012.

smh. com. au/technology/sci-tech/are-neutrinos-faster-than-light-20120116-1q2me. htmlCasper, Dave . " What's a neutrino?." The neutrino and its friends.

Dave Casper, n. d. Web. 8 Feb. 2012.

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" Electron Neutrinos and Antineutrinos." Electron Neutrinos and Antineutrinos. N. p., n.

d. Web. 8 Feb. 2012.

phy-astr. gsu. edu/hbase/particles/neutrino. html>. I can use this source because it gives a good overview of what neutrinos are and how they can be used. " New Evidence Casts Doubt On Faster-Than-Light Neutrinos - Forbes.

" Information for the World's Business Leaders - Forbes. com. N. p., n. d.

Web. 8 Feb. 2012. .

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