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First evidence found of tiny particle neutrino

By Associated Press, 7/21/2000

After a two-decade search, scientists have found the first direct evidence of one of the most elusive and ghostly subatomic particles in nature - the tau neutrino.

The breakthrough, announced yesterday, was achieved by four physics researchers at Tufts University, working with the Department of Energy's Fermi National Accelerator Laboratory outside Chicago.

The tau is one of the fundamental building blocks of all matter. It is the last of the impossibly tiny particles described in the Standard Model of Particle Physics to be confirmed in experiments.

"It's a tremendous milestone," said Stanford University physicist and Nobel laureate Martin Perl, who theorized the existence of the tau neutrino in 1978. "Now it has been seen, and it behaves in the way we expected."

Neutrinos are hurtling everywhere and all the time at the speed of light. Trillions pass through all of us every second. They carry no electrical charge and virtually no mass - perhaps one-millionth that of an electron.

Fifty-four scientists from the United States, Japan, Korea, and Greece collaborated on tracking down tau neutrinos since 1997 at the Fermilab.

"We finally have direct evidence that the tau neutrino is one of the building blocks of nature," said Byron Lundberg, a physicist and spokesman for the international team. "It is one thing to think there are tau neutrinos out there. But it is a hard experiment to do."

The tau neutrino is the third and perhaps final type of neutrino to be found. The first two types - electron neutrinos and muon neutrinos - were discovered in 1956 and 1962.

In 1978, tests by Perl and others at Stanford discovered the existence of another class of subatomic particle, the tau lepton. This suggested there would be a tau neutrino, too, because neutrinos are precursors to leptons.

The findings are being prepared for publication in a scientific journal.

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