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FRIDAY • July 21, 2000

Last basic particle rounded up

 Alexandra Witze - Dallas Morning News
 Friday, July 21, 2000

Dallas --- After decades of searching, physicists have found the last of the fundamental particles of matter known to exist in nature.

Scientists at the Fermi National Accelerator Laboratory in Batavia, Ill., plan to announce today that they have discovered the tau neutrino, one of the 12 basic particles that make up ordinary matter. The other 11 had already been found.

"It's a great day," said Martin Perl, a physicist at Stanford University who won a Nobel Prize for discovering a related particle. "It's very important to know that this neutrino really exists."

Researchers had indirect evidence of the tau neutrino's existence and were awaiting confirmation of this final constituent of matter.

Neutrinos are nearly weightless particles that zip through the universe while barely interacting with other matter. The tau neutrino is the long-sought cousin of the electron neutrino and the muon neutrino.

The three neutrinos each have counterparts in the electron, muon and tau particles. Those six particles, when combined with the six types of quarks, make up the 12 fundamental matter particles in physicists' working model of the universe.

The Fermilab-led team discovered four tau neutrinos after three years of careful work. In 1997, the scientists fired an intense beam of neutrinos --- which, they hoped, included tau neutrinos --- at iron plates sandwiched between layers of photographic emulsion.

A tau neutrino hitting the iron plate produced an ordinary tau particle that decayed and left its mark in the emulsion like a light particle leaving a track on photographic film. By studying the tau-particle marks, the researchers deduced that a tau neutrino existed at some point.

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