



Neutrinos in the Cosmos, in the Sun, and on the Earth

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January 29, 2003

Neutrinos are small elusive particles that took nearly 30 years to detect after they were first postulated to exist. Though they are the most prevalent particles in the universe and have played a central role in the origin and evolution of the universe, we know very little about them. Neutrinos were discovered 45 years ago by LANL scientists Fred Reines and Clyde Cowan (for which Reines received a Nobel Prize in 1995) and have since been observed from many sources, including the sun and exploding stars called supernovae (for which Ray Davis and Masatoshi Koshiba received Nobel Prizes in 2002). As well as playing a very important role in cosmology and in supernovae bursts, neutrinos may also explain why we exist: why there is far more matter than antimatter in the universe. Making use of neutrinos from the sun, atmosphere, supernovae, reactors, and accelerators, neutrino experiments around the world are today poised to shed light on some of these fundamental questions that have been asked since the dawn of civilization.