

PHYSICS

Neutrino Now Detected

Great tank of chemicals was used to trap, for the first time, the elusive neutrino, subatomic particle with no electric charge and near zero mass.

► THE ATOMIC ghost particle has been trapped and proved to exist. The strange neutrino, needed for years to preserve subatomic balance, has at last been detected.

Physical authentication of this strange sort of particle was reported to the American Physical Society meeting in New York by Drs. F. Reines and C. L. Cowan Jr. of the AEC's Los Alamos Scientific Laboratory.

It was one of the most difficult searches for atomic particles ever undertaken. To find evidence for the neutrino, a particle so small as to have practically no mass and no electrical charge, the physicists used a scintillation counter that contained 75 gallons of liquid. It was thousands of times more sensitive than any other device to reactions caused by neutrinos. It was exposed to the intense bombardment of radiation from one of the AEC giant atomic reactors.

The chase of the neutrino began about 20 years ago when there was worked out what would happen when a neutron changed into a proton and an electron.

(These three particles are the most important of the fundamental particles of matter. They are in the matter of atoms. Atoms are the fundamental stuff of everything. Neutrons are particles without electrical charge and are famous for triggering the atomic bomb. Protons are the nuclei of hydrogen atoms, the simplest known. Electrons can be thought of as particles of electricity.)

In addition to mass and charge, these particles also have what is known as spin, or angular momentum, which arises out of complex but fruitful theory. The spin has to be conserved and that brought in the neutrino, which is Italian for small neutral one. Almost all this little particle has is spin. It balances out this atomic act, so-called beta disintegration, so important in so many atomic transformations.

The neutrino is so very small that scientists have often despaired of ever catching it free and away from its point of origin.

Calculations show that if a neutrino got started at the beginning of the universe, billions of years ago, it might still be going. It is that small.

It took a very large trap and a very large number of neutrinos to give any chance of detection. The trap was a great tank with chemical liquids, including cadmium compounds, that would promote the reaction in which neutrinos play such a small but balancing part. Only when things happened in just the way to affect properly three counters did the trap record a score.

The test consisted of taking score when the reactor was producing an immense radi-

ation blast and when it was shut down. Because the score was significantly higher when the reactor was running and neutrinos abounded, the physicists are confident that in this way they have "seen" the elusive neutrino.

Project Poltergeist, as Drs. Reines and Cowan nicknamed it, is to attempt to get still more evidence of the neutrino in the next year, with new and better apparatus. Meanwhile the textbooks that now say that the neutrino has never been detected will have to be revised. The noisy spirit among subatomic particles, the poltergeist of modern physics, has been caught.

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AERONAUTICS

"Sub-Killing" Airplane Reinforces Navy's Might

► A NEW version of the Navy's submarine-chasing P2V Neptune has gone into full production after only two years of redesign by Lockheed engineers at Burbank, Calif.

The P2V-7, as it is called, is said to be the fastest and deadliest submarine-killer in history. The plane will carry the latest electronic gear designed to find and track submarines. It will have depth charges and bombs handy when a "fish" is spotted.

The land-based plane has been modified by two wing-mounted jet pod engines that supplement the two regular turbo-compound power plants. These jet engines give added speed to the craft.

Weight was slashed through redesign of wing-tip fuel tanks, rearrangement of certain secret interior components and other changes. This permits the plane to take off faster.

Hall L. Hibbard, engineering vice-president of Lockheed Aircraft Corporation, said the plane is more elusive than any of its earlier models. Should the 36-ton craft get in trouble, however, a single man can fly the plane on either its turbo-compound engines, jet engines or both types combined.

Major design changes include an enlarged work area for the pilot and co-pilot. This has a double-bubble canopy that enables them to see all four engines, the tail and the sky and sea around them.

The P2V series of airplanes has been improved since first deliveries to the Navy in 1945. Now various models of the rugged craft are serving defense duty in four different countries.

Science News Letter, February 13, 1954

Atomic radiation may replace conventional methods of beer *pasteurization*.



NEWEST "SUB-KILLER"—This is the first picture of the U. S. Navy's latest sub-killer, the Lockheed P2V-7. Identifying features are the double-bubble pilot canopy for increased visibility, jet pod engines supplementing its giant turbo-compound powerplants and elongated tail housing electronic sub-hunting equipment.