PHYSICS

Anti-Particle Discovered

Scientists in the U. S., Switzerland and France have discovered the anti-Xi-minus, confirming the theory of an anti-particle for every known elementary particle, Ann Ewing reports.

➤ THREE INTERNATIONAL teams of scientists, working in the United States, Switzerland and France, have discovered and identified one of the last predicted anti-particles of matter, the anti-Xi-minus.

Also known as the anti-cascade-hyperon, the tiny particle of anti-matter exists only for one ten-billionth of a second. Nevertheless, it has been observed, measured and photographed, the scientists report in Physcal Review Letters, March 15, 1962.

The discovery confirms the theory that there is an anti-particle for every known elementary particle. It was made possible by the combined efforts of scientists from Brookhaven National Laboratory and Yale University attacking the same problem with fellow scientists at CERN, the European nuclear research center in Geneva; Saclay, the French nuclear research center, and the Ecole Polytechnique a university in Paris.

"The importance of international cooperation in unlocking the secrets of nature" was shown by the joint discovery, Dr. Maurice Goldhaber, Brookhaven's director, and Dr. Victor F. Weisskopf, director-general of CERN, said. The world's most powerful atom-smashers are located at Brookhaven and Geneva.

The anti-Xi-minus is the heaviest of the predicted elementary particles to be observed. It has a positive charge. After about a ten-billionth of a second, it breaks up into a positive pi-meson and a neutral anti-lambda hyperon, or particle.

This latter particle then decays into an anti-proton and a positive pi-meson. This complicated decay pattern gives rise to the name "cascade."

The anti-Xi-zero particle is an anti-particle that has been predicted but has not yet been observed.

The anti-proton, another anti-particle, played a key role in the production of the anti-Xi-minus particle. A beam of anti-protons with energy of 3.3 billion electron volts was aimed through a 20-inch bubble chamber, and the reactions it caused photographed.

One reason the anti-particle had not been observed, until the United States and European experiments were made, was the difficulty of producing beams of high-energy anti-protons. Even at the high energies used, production of the particle is a rare event.

In alphabetical order, the Brookhaven physicists taking part in the experiment are Drs. Hugh N. Brown, B. Brian Culwick, William B. Fowler, Maurice Gailloud (on leave from Lausanne University, Switzerland), Theodore E. Kalogeropoulos, Joshua K. Kopp, Robert M. Lea, Louis I. Louttit, Thomas W. Morris, Ralph P. Shutt, Alan M. Thorndike and Medford S. Webster. From Yale University, they are Charles Baltay, and Drs. Earle C. Fowler, Jack Sandweiss, James R. Sanford and Horace D. Taft.

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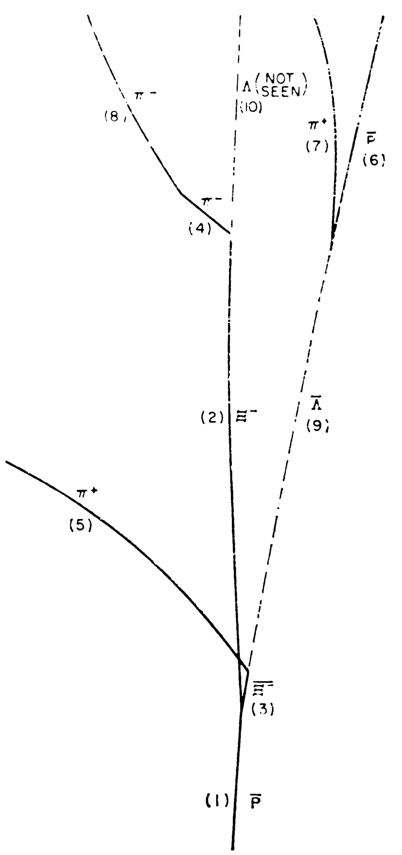

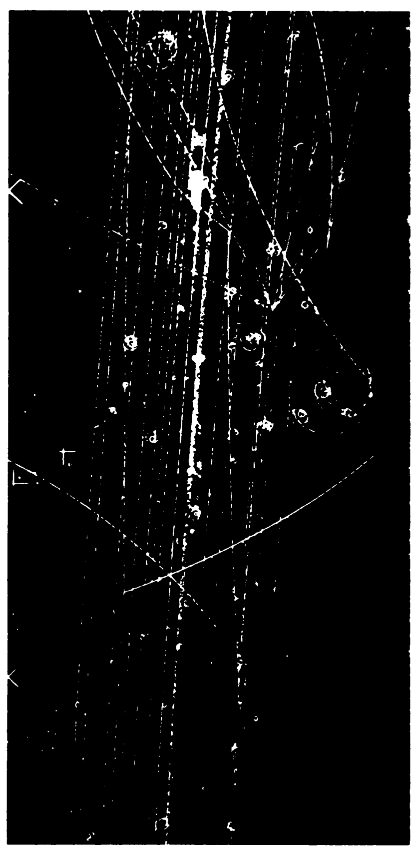

BUBBLE CHAMBER PHOTOGRAPH shows the newly discovered anti-Xi-minus particle (track 3) after it was produced by a collision of an anti-proton (track 1 at bottom) with a proton (at the vertex). The anti-cascade-hyperon decays into a positive pi-meson (track 5) and a neutral anti-lambda-hyperon (track 9) that later decays into an anti-proton (track 6) and a positive pi meson (track 7). The previously known negative cascade hyperon (track 2) travels for some distance before decaying into a negative pi meson (track 4) that is elastically scattered (track 8) and a neutral lambda hyperon (track 10) that will later decay into a nucleon and a pi-meson.

TECHNOLOGY

Special Plastics Detect Rays From Atomic Bomb

➤ LETHAL RAYS produced by a nuclear explosion, or cosmic rays from outer space, can be detected by special plastics.

These so-called scintillation plastics absorb nuclear rays and then re-emit them as readily measurable electric impulses, according to Dr. Stanley Sandler, research chemist, Borden Chemical Company, Philadelphia.

Dr. Sandler, one of the discoverers of a new compound for incorporation into these plastics, told the fourth Delaware Valley Regional meeting of the American Chemical Society that the function of the plastics in detecting radioactivity is very much like that of a Geiger counter.

Around 1950, the first scintillation plastics were developed that could be easily machined and were free of most of the undesirable characteristics of the natural crystals originally used for detecting nuclear rays, Dr. Sandler reported.

Scintillation plastics are made of polystyrene or polyvinyl toluene and contain a light-emitting compound. This gives off the energy of these rays in the form of low-intensity, almost invisible fluorescent light.

The photomultiplier tubes that pick up the rays are most sensitive to light of longer wavelengths. Thus, many scintillation plastics also contain a "converter" compound, or wavelength shifter, which absorbs the fluorescent rays and re-emits them at a longer wavelength where they can be amplified by the photomultiplier tube.

Cosmic ray radiation is now being detected by 42-inch, 200-pound discs of scintillation plastics which are incorporated in the so-called "Meson Telescope" at the Franklin Institute, he said.

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