PHYSICS

List 21 Atom Particles

Scientists have found many elusive particles including two new ones: K pi-two and K mu-two, in the nuclei of atoms. Some exist for only billionths of a second.

➤ LOOKING INTO the crowded cores of atoms, scientists are beginning to recognize some familiar faces.

Dr. J. Robert Oppenheimer, director of the Institute for Advanced Study, Princeton, N. J., said 21 inhabitants of the core or nucleus, some of which exist only for fleeting bits of seconds, are listed now in the scientific census.

Some, such as the neutron which triggers the A-bomb, have long been known. Two new ones, the K mu-two and the K pi-two, received their birth certificates at a nuclear physics conference in Rochester, N. Y., said Dr. Bruno Rossi of Massachusetts Institute of Technology.

So elusive are these new particles that ten laboratories had to pool their information to pin them down. They have been glimpsed only 21 times.

Summing up advances in physics during the past year, Dr. Oppenheimer said it was "very striking" that physicists are not asking the same questions now as a year ago about the inner cores of atoms. Observations and calculations have settled a few of the questions.

But exactly what is going on in the nucleus is still a puzzle. Strange particles, not predicted by any theory, come whizzing forth, are seen for billionths of a second, then change their faces.

To pool their knowledge of these odd events, over 100 top nuclear physicists from the United States and abroad met at the University of Rochester. Reported at this meeting, the Fifth Annual Conference on High Energy Nuclear Physics, was a definite value for the effective size of the proton, the heart of the hydrogen atom.

It is seven times ten to the minus 14 centimeters. This is scientific shorthand for saying that a proton is 300 million millionths of an inch. High energy electrons were used by Stanford University physicists, led by Dr. R. Hofstadter, to probe the proton structure for this measurement.

Dr. Oppenheimer said that discovery of "clusters of masses"—"faces" in the nucleus with some features alike and others different—was one of the most important reports.

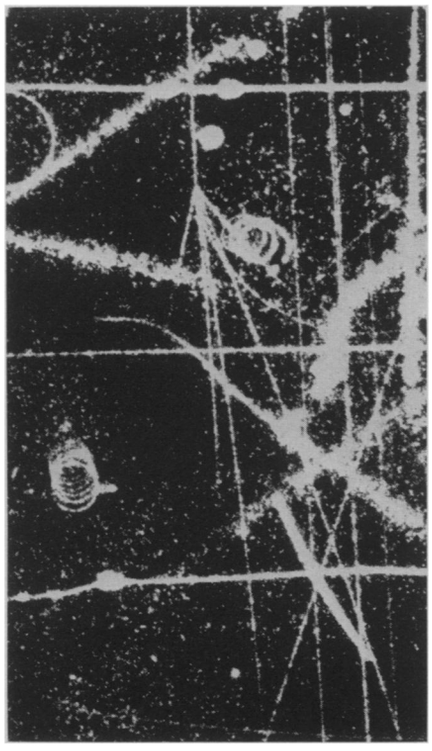
The "hot brother" theory, associated production of particles in pairs, seems to be confirmed in cosmic ray experiments. The associated production was predicted by theorists before it was actually discovered, Dr. Oppenheimer said.

Dr. Robert Bacher of California Institute of Technology and Dr. Robert E. Marshak of the University of Rochester joined Drs. Oppenheimer and Rossi in describing the present state of nuclear physics.

The 21 particles listed by Dr. Oppenheimer as currently accepted are electron, positron and neutrino; proton and neutron; mu mesons, found either positively or negatively charged; pi mesons, seen with neutral, positive and negative charges; theta zero; kappa mu and kappa e; lambda zero; sigmas, positively and negatively charged; negative chi, and the new particles, K mu-two and K pi-two, the latter found either positively or negatively charged.

K particles are mesons of mass intermediate between electrons and protons.

Science News Letter, February 19, 1955



FOUR MESONS CREATED—This unique picture shows a four-billion-volt meson smashing into a proton to create four pi mesons. The thin, vertical track entering from the top center of the photograph is that of the four Bev negative pi meson, and six tracks are seen from its collision with a proton. The path curving to the right is an electron. Of the other five tracks, mesons caused four and a positron the other. The positron and electron result from the decay of a neutral meson.

• RADIO

Saturday, February 26, 1955, 5:00-5:15 P.M. EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Morris Tepper, chief, severe local storms research unit, scientific services division, U. S. Weather Bureau, Washington, D. C., will discuss "Tornadoes."

PHYSICS

Matter From Energy At Four Billion Volts

➤ THE MOST powerful atom smasher in the world, the University of California's bevatron, is transforming energy into matter at the highest man-made energies ever produced.

Hurling protons at nearly the speed of light, physicists reproduced in the bevatron the disintegration of atomic particles previously known only from cosmic rays bombarding the earth from space. The tremendously high energy reported to the Fifth Annual Conference on High Energy Nuclear Physics in Rochester, N. Y., by Dr. H. M. Powell and co-workers was that of a four billion-electron-volt pi meson smashing directly into a proton. Four chunks of mesic matter and a proton resulted. Some of the energy of the bombarding nuclear particle was transformed into mesons.

Scientists are reaching higher and higher energies in atom smashing experiments. Their aim is to understand the forces which keep an atomic nucleus from flying apart. Mesons carry the nuclear force fields.

Another tool for investigating these forces was reported by Dr. Emilio Segre and his associates, also of the University of California. They have passed proton beams through two hydrogen filled chambers to get atoms whose spins are all in the same direction. Then the beam is passed through a carbon target. The resulting nuclear particles are analyzed with a scintillation counter.

Physicists call this a triple scattering, since protons in the original beam are bounced from three targets.

The University of California group is the first to perform triple scattering experiments, but this has been done so recently that the results are still being analyzed.

Science News Letter, February 19, 1955

ANIMAL NUTRITION

Lambs Fatten Faster If Shorn of Wool

➤ LAMBS THAT have their wool removed will fatten faster, while requiring less feed, than will their coated cousins.

In a two-year study made by Cecil Pierce, an animal husbandman at the Oregon State College eastern Oregon branch experiment station in Union, Ore., he found that shorn lambs fed in both open lots and shelters, gained more than 17% a day over the wooled lambs.

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