PHYSICS

Need Negative Proton To Explain Spin of Atom Nucleus

TO EXPLAIN why the central nucleus of many kinds of atoms sometimes spins one way and sometimes the other, science has postulated a new kind of entity within the atom tentatively called a negative proton.

The negative proton is still unfound but physicists all over the world are on the lookout for it. It would have the same mass as the cores of hydrogen atoms—the protons—but would have a negative charge of electricity upon it instead of the customary positive charge.

Latest of the scientists to suggest the existence of such a particle is Dr. S. Tolansky of the Imperial College of Science, London, in a report to the British scientific journal *Nature*.

Only a few weeks ago Prof. George Gamow, distinguished Russian expert on atom nuclei from the Polytechnical Institute, Leningrad, U. S. S. R., told the American Physical Society meeting in Ann Arbor that a negative proton would be most helpful in explaining many of the difficulties regarding the stability of certain atoms like beryllium, which are now made to undergo artificial radioactivity.

The original prediction of the negative proton can be credited to Dr. Carl Anderson of California Institute of Technology who in March, 1933, (*See SNL, March* 25, 1933, *p.* 179) suggested that the emission of positrons from an atom struck by high-energy radiation might be due to the break up of a neutron by the impact. In the collision a positron would come off and a negative proton should remain within the atom. If an electron came off when a neutron broke up an ordinary positive-charged proton should remain inside.

Basically the negative proton enters atomic physics because there is a growing suspicion that the neutron may be composed of two different arrangements of parts which are externally indistinguishable. The neutron is the so-called non-electrical particle because whatever charges it contains are so closely bound that there is no observable external field.

It seems now as though a neutron may be composed of a close union of a proton and an electron whose charges equalize one another; or it may be composed of a negative proton and a positive electron where again the opposite charges neutralize each other. Both these neutrons would have the same weight and the same lack of external charge. They would be hard to tell apart unless they were split apart, but after such a break up the original composition would, of course, no longer exist.

Science News Letter, September 1, 1934

CHEMISTRY

Neutrons From Artificially Radioactive Elements

NEUTRONS have hitherto been produced only by the bombardment of atoms, and have ceased to be emitted when the bombardment stopped. Now comes the announcement from the Paris Academy of Sciences that Irene Curie, F. Joliot, and P. Preiswerk have observed neutrons to be given off bombarded phosphorus for as much as three hours after the bombardment had ceased. The spontaneous emission of neutrons is a new form of radioactivity.

The discovery was not made by accident. The investigators had been bombarding various elements with helium cores (alpha particles), and with neutrons. In the case of phosphorus they found that the artificial radioactivity produced was of two sorts. One had a half life of two minutes forty-five seconds, as had already been discovered by Dr. E. Fermi of Rome. The other had a half life of over three hours.

In studying the possible reactions that might give rise to these radiations the scientists found that one of these possible reactions should result in the emission of neutrons. Accordingly they set up the special apparatus required for the detection of neutrons, and found that neutrons were in fact emitted.

In this process they believe that two unstable atoms are produced. One of them is aluminum with an atomic weight 28. Ordinary aluminum has an atomic weight 27. The other atom is silicon with an atomic weight 31. Ordinary silicon is of weight 28, 29, or 30. Both of these top-heavy atoms disintegrate, according to the reactions worked out by the experimenters, with the production of neutrons.

Science News Letter, September 1, 1934

SEISMOLOGY

Slight Missouri Quake in New Madrid Area

THE EARTHQUAKE that was felt in southeast Missouri Sunday evening, Aug. 19, was also recorded on seismographs, miles distant from the locality. The slight quake occurred in the same general area as the famous New Madrid quake of 1811 which is rated as one of the most severe seismic disturbances in American records.

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