

PHYSICS

Experiments on Neutrinos

ELEVEN NEW EXPERIMENTS that could help determine the real nature of the atomic "ghost" particle called the neutrino are suggested by the ex-British physicist who lives near Moscow, Dr. Bruno Pontecorvo.

Italian-born Pontecorvo, who fled from England to Russia in 1950, is now a Soviet citizen, has won a Stalin Prize and is a member of the USSR Academy of Sciences. He is considered one of Russia's top physicists, and works at the Joint Institute for Nuclear Research less than a hundred miles from Moscow.

Dr. Pontecorvo's suggested experiments are reported in Soviet Physics JETP 37(10), 1236, 1960, a translation of the Journal of Experimental and Theoretical Physics published by the American Institute of Physics. He lists 16 ways in which the reactions of free neutrinos could be determined in large atom-smashing machines. Five of the methods have previously been investigated either experimentally or theoretically.

The neutrino is uncharged, has a vanishingly small mass, and has been found to spiral in a left-handed manner. The elusive neutrino occurs when certain radioactive nuclei disintegrate radioactively. It is then spinning in a direction such as is

described by a left-handed screw, meaning that it is spinning counter-clockwise when moving away from the observer. Its spin direction, together with its direction of motion, define a left-handedness or right-handedness.

The discovery that there is a distinction between left-handedness and right-handedness in nature under certain conditions—known as the non-conservation of parity—won the Nobel Prize in Physics for the United States physicists, Drs. T. D. Lee and C. N. Yang, now of the Institute for Advanced Study, Princeton, N. J.

Dr. Pontecorvo points out that, although the experiments he suggests may not be possible today, they could be done in particle accelerators producing more intense beams of mesons than now available.

Science News Letter, July 9, 1960

PHYSICS

New Theory Extends Relativity to Particles

A PHYSICIST in New York proposed a new theory extending the theory of relativity to account for the internal structure of such elementary particles as electrons and protons.



RIDING ON AIR—The Curtiss Wright Air Car rides on a "cushion" of air that is directed straight down to the ground by a urethane skirt, a highly abrasion-resistant material. The United States Rubber Co. developed the skirt, which also protects the vehicle's undersurface.

In his theory, a part of which will be published later in Physical Review, the scientist argued that a particle moving from one point to another in an electromagnetic field undergoes changes in its dimensions.

The theory is the product of Dr. Lloyd Motz, an associate professor of astronomy at Columbia University. He is the author of "This Is Astronomy" and "Outer Space."

Dr. Motz said modern physicists have treated the particles as points that do not change dimensions. He believes they are wrong.

His theory, he said, shows how an electron is held together and accounts for the capture of light by the electron.

Dr. Motz has demonstrated that, by making certain assumptions about the way in which the dimensions of the particle can alter when it moves in various paths, several of the well-tried, older equations that govern the properties of particles may be derived.

He has shown, for example, that the second order Dirac equation, a fundamental equation in modern wave mechanics, can be derived from his theory.

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PHYSICS

Experiment to Duplicate Energy Source of Sun

See Front Cover

THREE HUNDRED CONDENSERS, a section of a power supply with a discharge of electrical energy totalling 100 billion watts, are being used in research to find a way to duplicate the energy source of the sun.

Sponsored by General Dynamics Corporation's General Atomic Division and the Texas Atomic Energy Research Foundation at John Jay Hopkins Laboratory for Pure and Applied Science, San Diego, Calif., this research is aimed at achieving a power source from nuclear fusion. Some of the clamps tying the condensers together are shown on the cover of this week's SCIENCE NEWS LETTER.

Science News Letter, July 9, 1960

METALLURGY

Alloy Will Increase Use of Alumina

AN ALLOY with similar heat expansion properties as alumina, a ceramic of great potential in the electronics industry, has been developed.

The advent of the inexpensive and easily fabricated alloy, called Fernico-5, will make alumina more useful in such things as electron tubes, thermionic energy converters and high temperature circuits, all of which require metal-to-ceramic seals.

Fernico-5 is an alloy of iron, nickel and cobalt in undisclosed proportions. It was developed at the General Electric Research Laboratory in Schenectady, N. Y.

Ceramics made of alumina, the oxide of aluminum, have excellent properties as insulators in the electronics industry.

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