

PHYSICS

Matter In Cores of Atoms Found to be Closely Packed

If Human Fist Had the Same Density as the Atom Heart It Would Weigh a Million Times a Million Tons

THE NUCLEI or cores of atoms are composed of such dense matter that if the human fist were packed as tightly with matter it would weigh a million times a million tons, declared the Danish Nobel prize-winning scientist, Prof. Niels Bohr, at the University College lecture, London.

It is this close packing of the hearts of atoms which is proving puzzling to scientists, said Prof. Bohr, for the structure and behavior of atom nuclei are governed by laws quite different from those already known for atoms as a whole, or for familiar matter that can be seen or handled.

A possible explanation for the mysterious explosions of atoms which have been observed in studies of cosmic rays might be found, Prof. Bohr suggested, by the impact of particles having energy of perhaps 1,000 million volts. This is a hundred-fold multiplication over the mere 10,000,000 volt energy particles available in laboratories. When the particle "bullets" can be produced hav-

ing the much higher energy, atomic explosions may also be produced in the laboratory. That 1,000 million volt energy particles may be produced is not beyond distant hope, he said.

The nucleus, Prof. Bohr suggested, may be likened to a group of billiard balls lying on a circular table with low cushions. If some external ball is shot into the group there starts a series of mutual collisions which may cause the capture of the impinging ball. Such a capture explains the creation of the super heavy element No. 93 by the Italian physicist Dr. Enrico Fermi.

Another possibility, Prof. Bohr pointed out, is that if the balls keep colliding there is a possibility that one of them will collect enough energy to jump the barrier and go off the table. This situation could be likened to the experiments on artificial radioactivity performed first by the latest Nobel prize-winners, Irene Curie Joliot and her husband, M. Joliot.

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ASTRONOMY

Twenty Billion Years Held Maximum Age of Universe

THE universe is not so old after all! Flatly contradicting Sir James Jeans' figure of ten million times a million years for the age of the universe, Dr. Bart J. Bok of the Harvard College Observatory has found that number approximately five hundred times as high as it should be.

Twenty billion years is the upper limit of the age of the universe, as viewed by Dr. Bok. Jeans' long time scale does not fit with the evidence of star clusters, with the known facts of the rotation of the Milky Way system or with the existing theories of the creation of the spiral nebulae. Nor does it explain the existence in the same star cluster of "young" red giant stars and

of "old" dwarf stars.

"The giants with their tremendous energy output can hardly have existed for much longer than ten billion years, unless we wish to make the as yet unfounded hypothesis that the energy radiated away is being replenished in some unknown fashion from surrounding space," Dr. Bok said.

"We found it unlikely," he concluded, "that the observed clusters have existed for more than twenty billion years as groups of stars. Lemaitre's theory of the expanding universe indicates that a catastrophe took place a few billion years ago, and it is tempting to place the origins of the stars and stellar systems at the epoch of this catastrophe."

Hundreds of star clusters, including the well known Pleiades, Hyades, and Taurus, would now be on the verge of disintegrating all at once, torn apart by the gravitating forces of the Milky Way, if they had been in existence as long as Jeans believes, Dr. Bok has found.

"In the course of their development these clusters must have wandered through widely different parts of our galaxy, but in spite of this, under Jeans' long time scale we would find them ready to disintegrate, cosmically speaking, simultaneously," he said. "In other words if we were to take our observations at a future epoch removed from the present by only half a per cent. of the total supposed age of our galaxy, no sign of them would be left."

"It seems absurd to assume that several hundred clusters, all of which had presumably considerable mass and density at the time of their birth, would be observed simultaneously on the verge of disintegration in a galaxy for which the conditions that determine the rate of disintegration will be apt to vary from point to point."

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PUBLIC HEALTH

Showers Won't Prevent Throat Infection Spread

SHOWER baths required before swimmers are allowed to enter pools are not enough to prevent the spread of the streptococcus infections of nose and throat, which so commonly develop among those who use pools regularly, W. B. Ardrey of the Michigan State College told the Society of Bacteriologists, Pathologists and Allied Workers.

Mr. Ardrey found that when examinations were made of the skin at various parts of the body, streptococci were found in very small numbers except on the hands, and that when swabs were made of the mouth and nose, tremendous numbers of these "germs" were discovered.

Bathers were instructed to take their usual baths before entering the pools and then to stay at the shallow end of the pool and wade around. Few or no streptococci were found in the water until the bathers were told to swim and take exercises which placed their mouths and noses under water. Bacterial counts then made of the swimming pool water showed large increases in streptococci. This was explained on the basis that some water enters the nose and mouth and is immediately blown out again.

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