

Isotope Studied Data Gained For Theory of Nuclei

Eugene - A new radioactive isotope has been discovered by a University of Oregon nuclear physicist.

Dr. Bernd Crasemann, associate professor of physics in the university, who spent the past year at Brookhaven National Laboratory, has produced a practical demonstration of a theory that is expected to give more definite information on the structure and energy of nuclei. He has synthesized rhenium-189, which until this time has only been postulated.

It has been known, Crasemann explained, that nuclei in a certain region of the periodic table, including the "rare earths," are deformed and would look like a football (if one could see such small objects as atoms and nuclei), rather than like a beach ball as do the other nuclei.

Sudden Change
The region of deformed nuclei stops suddenly, with the isotopes of the metal osmium, and the ones that follow are heavier and round and smooth.

The nuclei in the "transition region," where the sudden change from deformed to round shapes occurs, are especially interesting to physicists, who believe that knowledge of nuclear structure can be gained by studying atoms in this region. Rhenium-189 is such a nucleus or isotope.

In 1960, Crasemann, with a U of O graduate assistant, James G. Pengra, conducted experiments using a cyclotron on the University of California campus at Berkeley. They hoped to make rhenium-189 but were unsuccessful. Their calculations predicted that the isotope would have a short life-time, between one and ten days. They also calculated that the life of the isotope probably could not survive in the targets shipped from Berkeley to Eugene.

During Crasemann's 1961-62 leave from Oregon, the elaborate equipment at Brookhaven, one of the world's largest centers for nuclear research, was available and he resumed his attempts.

Working with two Brookhaven physicists, G. T. Emery and W. R. Kane, Crasemann made further attempts to produce "odd" rhenium-189.

Months passed before the team had developed techniques for producing measurable amounts of the material.

Method Developed

The best method they developed consisted of placing tungsten foils in the interior of the cyclotron, where they were hit by intense beams of high-energy alpha particles (helium nuclei), some of which entered the tungsten atoms and stayed there, but kicked out a proton. The intensely radioactive foils were removed from the cyclotron and processed chemically.

The work had to be done partly by remote control, behind thick walls of lead, to protect the experimenters from the strong radiation.

Finally, the minute amounts of radioactive rhenium were electroplated on gold foils, that in turn had been plated on copper supports. Information was then gathered before the radioactive rhenium decayed away.

One of the most interesting aspects of the experiments, said Crasemann, is that the results were just as expected. They had already calculated the probable life expectancy of the isotope and with what energy it would decay and these facts were borne out by the experiments.

They now know, the physicist continued, that the new isotope is a bit deformed, that it both vibrates and rotates, and that it appears to be fairly hard.

Jet Airliners

Have Close Call

Kansas City, Mo., (UPI)—Two jet airliners came within 100 yards of colliding head-on over central Kansas Tuesday night, the Federal Aviation Administration disclosed Wednesday.

The airliners, a Trans World Airline jet flying east from Los Angeles and an American Airlines plane flying west from St. Louis, continued their flights without incident after the near collision.

Marshall Benedict, regional public affairs officer for the FAA here, said both airliners were flying under radar control at 33,000 feet when the incident occurred.

Benedict said the pilot of the TWA plane, not immediately identified, saw the approaching American jet and made a slight turn to avoid a collision.

TO START NEW WELL
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