

BIG ATOM SMASHER SHOWN BY SOVIET

Machine With 10-Billion-Volt
Acceleration Capability Is
Largest in Operation

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By OSGOOD CARUTHERS

Special to The New York Times.

MOSCOW, Jan. 23—Soviet nuclear scientists announced today that they had put the world's largest atom smasher into capacity operation.

They showed newsmen the humming control room of a giant, doughnut-shaped synchro-phasatron, which they said could accelerate protons from the hydrogen atom to an energy of 10,000,000,000 electron-volts.

This is a much higher energy than that generated by a similar installation at Berkeley, Calif., which scientists here said had achieved a peak of 6,300,000,000 electron-volts.

[Atomic-particle accelerators such as the new Russian device and the Berkeley machine are used to explore the structure and composition of the atomic nucleus and the forces that hold it together.]

The Soviet atom smasher is a new addition to the nuclear laboratories at Dubna, eighty miles northeast of Moscow. Scientists of eleven Communist

countries are cooperating there.

Continued on Page 2

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Continued From Page 1, Col. 2

in the Joint Institute for Nuclear Research.

Western correspondents were driven through the gently rolling, snow-covered countryside to the neat research village nestled in a pine and birch forest.

A 29-year-old chief engineer, Ivan Yalovoi, led the visitors into the huge, square control room.

Mr. Yalovoi said the synchrophasatron was accelerating protons to only 9,000,000,000 electron-volts at this time.

"We prefer to run it at 9,000,000,000 and we get almost the same results" as at 10,000,000,000, said Prof. Viktor Votruba, a member of the institute's fifteen-man academic council.

He said that in the year and a half that the accelerator had been operating, scientists had succeeded in attaining 10,000,000,000 volts for short periods. But the particles that went through were so few, he added, that scientists were able to register their paths only on photographic plates inside the chamber.

Now, he said, scientists are pushing enough particles through to be able to "scatter them into bubble chambers where we have some very good pictures of them."

The newsmen also talked briefly with Dr. Bruno Pontecorvo, the Italian-born nuclear physicist who left Britain's atomic center at Harwell in 1952 to come to the Soviet Union.

Dr. Pontecorvo said that Soviet science, because of the social system here, was more advanced than that of the West.

The visitors also saw a two-story high synchrotron that accelerates protons and neutrons to an energy of 630,000,000 electron-volts.

In the control room of the synchrophasatron, Mr. Yalovoi explained that the doughnut-shaped vacuum chamber, fifty-six meters in diameter, received protons from the hydrogen atom after they had achieved an energy of 9,000,000 electron-volts.

A 36,000-ton magnet, powered by generators producing up to 140,000 kilowatts a pulse, drives the particles in a beam around this vacuum ring. In a little more than three seconds, the particles travel 4,500,000 revolutions and achieve the 10,000,000,000-electron-volt energy. The beam is then deflected to the laboratory, where scientists study the particles.

Other Devices Described

Four other atomic accelerators of the same type as the new Soviet machine are operating at energies greater than 1,000,000,000 electron volts, according to Dr. G. K. Green, chairman of the accelerator development department at the Brookhaven National Laboratory, Upton, L. I.

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3,000,000,000 - volt ^{laboratory's} cosmotron
was the first of them to go into
operation, in 1952. The second
was a 1,000,000,000-volt device
in Birmingham, England, which
began operating in 1953. This
was followed in 1954 by the Uni-
versity of California's bevatron,
which, he said, has an accelera-
tion capability of 6,400,000,000
electron volts. ^{and he said}
The fourth was the 3,500,000,-
000-volt saturne in Saclay,
France, which was successfully