Physical Sciences Notes

HIGH ENERGY PHYSICS

200 BEV Site Picked

The Atomic Energy Commission has selected Weston, Ill., as the site for its proposed giant new atom smasher. The 200 billion electron volt proton accelerator is expected to cost at least $375 million. The decision to locate what has been called the "scientific plum of the century" in the Chicago suburb was made after AEC exhaustively studied six possible sites, chosen from among 86 by a National Academy of Sciences committee. The accelerator, a magnetic ring 4,350 feet in diameter, will provide protons of energies six times higher than now available. Appropriation of engineering money is expected this year.

HOLOGRAPHY

One Hologram Gives Many Copies

A technique for producing many copies from one hologram has been devised by Dr. D. B. Brumm of the University of Michigan's Institute of Science and Technology. The method involves using either the real or the virtual image, or both, reconstructed by a hologram as an object for a second hologram, with the undiffracted wavefront being used as the reference beam.

This procedure allows duplicating the first hologram without requiring close contact between the two emulsions involved, as has been necessary in previously reported methods of duplicating or reproducing holograms. As in the recording of the original holograms, Dr. Brumm reports in the December Applied Optics, a laser beam is used for making the copies.

LOW ENERGY PHYSICS

Shutdown for Cosmotron?

At midnight on Dec. 23, operation of Brookhaven National Laboratory's Cosmotron, once the most powerful accelerator in the world, was halted. Hopefully, the shutdown will be temporary, not permanent, because scientists have found that the Cosmotron can be used to probe nuclear structure with a precision not available with other machines.

When the Atomic Energy Commission announced its decision to stop operating the Cosmotron three years ago, after 15 years, no protests were heard. Now there is much unhappiness among the scientific community that this facility will no longer be available for experiments by chemists and low energy physicists, who did not have a chance to use the precision accelerator until the 30 billion electron volt machine known as the Alternate Gradient Synchrotron became available for experiments at higher energy levels.

FUSION

Electromagnetic Waves Heat Plasma

A promising method of heating the gas particles of a plasma to achieve the very high temperatures required to fuse atoms for controlled production of nuclear power is being tested at the University of Texas. Dr. Hans Schluter and his associates are using electromagnetic waves to heat a hydrogen plasma to high temperatures.

Before the tremendous energies released when atoms join together can be tapped for useful power, scientists must find ways of confining the hot plasma under stable conditions for a time long enough for fusion reactions to occur. Magnetic fields are used to contain the plasma since all materials vaporize long before the required temperature of some 100 million degrees is reached. Besides containment, another problem is finding an effective means of heating the plasma to a sufficiently high initial temperature. The University of Texas experiments are aimed at determining if electromagnetic waves would solve the heat problem.

HIGH ENERGY PHYSICS

Super Bubble Chambers

One population explosion expected to continue with no attempts to halt it is the increase in the number of bubble chambers being used around the world. They detect and track the high energy particles that spew out of atomic nuclei when they are bombarded with speedy particles in an accelerator. The bubble chamber has been so successful in this detecting role that plans are now underway to build "super chambers" 20 times as large as present ones and costing nearly as much as the accelerators themselves.

The super bubble chambers will hold as much as 5,000 gallons of liquid hydrogen. They will use superconducting coils to produce magnetic fields that, even over the enormous volumes planned, will be up to double the intensity of the fields now generated.

More than half of the total research at high energy accelerators in the United States involves the use of bubble chambers.

BIOCHEMISTRY

Early-Earth Hydrogen Defended

The earth's atmosphere at the dawn of life could have consisted of methane, hydrogen and other reducing agents, according to new calculations by S. I. Rasool and W. E. McGovern of New York University. Previous experiments had shown that such a mixture of gasses, when exposed to electrical discharged in the laboratory, produced amino acids, the building blocks of life.

The new computations show that hydrogen released from the interior of the earth, could have remained in the atmosphere for about one billion years before being dissipated into space; it could have been present at the beginning of life, some three to four billion years ago.

PHYSICS

Speed of Light Tested

Experiments designed to test Einstein's postulate that light moves at constant speed in a vacuum were reported in the Dec. 10 Nature by two Czech physicists. The results were in agreement with the relativity postulate, unlike earlier results by other scientists. Further experiments were held necessary by the two scientists.