

SPACE

Cold as Radiation Shield

Superconductors that function only at temperatures near absolute zero may be used to protect astronauts from deadly charged particles, Ann Ewing reports.

► A SHIELD for space vehicles to protect astronauts from sources of possible deadly charged particles could be made from superconductors.

Superconductors, found only at temperatures near absolute zero which is 459.7 degrees below zero Fahrenheit, are materials in which an electric current once started continues forever in a kind of perpetual motion. They would be much lighter than other materials proposed for shielding space travelers.

The current in a superconductor generates a magnetic field. Charged particles bombarding a superconducting space shield would be sent back into space by this magnetic field, Dr. Richard L. Garwin, associate director of Columbia University's IBM Watson Laboratories, reported in Seattle.

Shielding spacecraft is only one of the many possible uses for superconductors, he told an International Seminar for Science Writers at the Century 21 Exposition in Seattle.

Another expected use is to make, economically, the magnetic field needed to continue a fusion reaction if the goal of harnessing the H-bomb reaction for peaceful purposes ever becomes a reality.

Superconductors are now being widely used in laboratories to generate high magnetic fields, and Dr. Garwin predicted that research would be an even more important application in the future. Superconductors

are also now being used experimentally to reduce the size of electronic "brains" and to make them calculate much faster. This use is expected also to increase greatly in the future.

Two other expected uses for superconductors are what would be, when perfected, a virtually perfect gyroscope, and the production of power using magnetohydrodynamics.

Dr. Bernd T. Matthias of the University of California at La Jolla and Bell Telephone Laboratories told the Seminar that he had discovered two compounds that became ferromagnetic at very low temperatures. They exhibit a new kind of ferromagnetism not known before, he said.

Dr. Matthias pointed out that materials are either superconducting or ferromagnetic but not both. Since these two states are mutually exclusive, they are related and the two new compounds may help to show how ferromagnetism and, therefore, superconductivity works.

Also participating in the report on latest scientific investigation were two brothers, Drs. William M. Fairbank of Stanford University, Palo Alto, Calif., and Henry A. Fairbank of Duke University, Durham, N. C.

Dr. Athelstan Spilhaus, U. S. Commissioner of the United States Science Exhibit at the Century 21 Exposition, welcomed the 50 science writers at the four-day Seminar.

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ASTROPHYSICS

Hydrogen Seen on Saturn

► HYDROGEN has been discovered on Saturn for the first time by two astronomers in Pasadena, Calif. The find proves the popular theory that the planet is mainly hydrogen and helium like the sun when it was young.

Tremendous gusts of wind probably create the characteristic dark and light bands seen on the ringed planet, the two astronomers also found.

It had been believed that Saturn consisted largely of hydrogen because of its low density, but conditions for detecting it are difficult. Only trace substances, methane and ammonia, had been detected previously.

While studying Saturn, Drs. Guido Munch of Mt. Wilson and Palomar Observatories and Hyron Spinrad of California Institute of Technology's Jet Propulsion Laboratory discovered molecules of hydrogen. Molecular hydrogen also occurs in the earth's atmosphere.

The astronomers detected evidence of

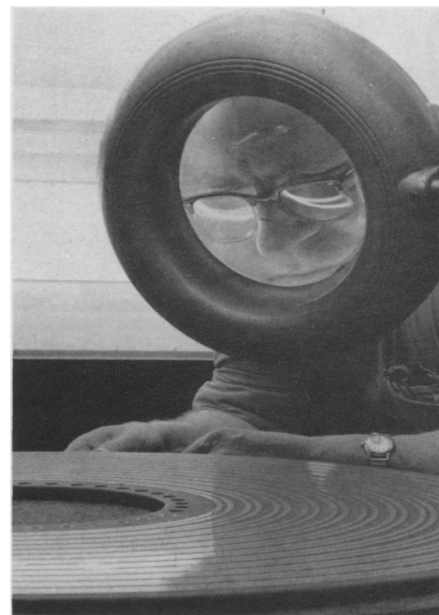
very high winds of many hundreds of miles per hour in Saturn's atmosphere. These winds could sweep the gases into bands that are observed paralleling the planet's equator.

"It now appears," Dr. Munch said, "that the composition of Saturn and of Jupiter is the same as that of the sun when it was young, while the small planets—including the earth—that are nearer to the sun have a much greater concentration of the heavier chemical elements.

"The reason for this difference is that the less massive and hotter planets were unable to retain but a very small amount of the light gases, most of which escaped from their gravitational fields."

The astronomers made their discoveries by studying photographs of Saturn's spectra, obtained by sorting out the different wavelengths of sunlight reflected from the planet. These disclosed the chemical composition of Saturn's atmosphere, as well as its temperature, motions and other physical properties.

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SPACEMAN?—The face of a Good-year Aircraft Corporation inspector is distorted by the magnifying glass through which he studies slip rings, which conduct electrical signals to rotating radar antennas.

BIOCHEMISTRY

"Enzyme Therapy" Seen As Mental Defect Cure

► CURING the mental defects of babies by supplying the missing proteins causing the problem was forecast at Seattle by a University of Wisconsin scientist.

Dr. Henry A. Lardy said that "enzyme therapy," which would make up for the lack of an essential protein, could result from current research. He cited the mental retardation called phenylketonuria as an example of the kind of mental defect that would be cured. This disease is now held in check, when caught soon enough, by severely limiting the diet of any baby so afflicted. It is detected by testing the urine of the newly born. Only those lacking the essential enzyme, a relatively few, have to go on the limited diet.

An enzyme is a protein secreted by the body cells, that acts as a catalyst. The amino acid, phenylalanine, is given in the smallest possible doses to counteract its absence in the phenylketonuria patient.

Phenylketonuria is an inherited disease, Dr. Lardy told an International Seminar for Science Writers at the Century 21 exposition in Seattle. He said that such a genetic defect was due to the absence of an enzyme, called phenylalanine hydroxylase. Supplying this missing factor could, in the future, be as routine as giving insulin to diabetics, thus eliminating the mental problems.

Dr. Lardy noted that giving the enzyme penicillinase to patients who were allergic to penicillin was an example of application of the same kind of "enzyme therapy."

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