

throughout the material.

Will these questions ever be resolved? The experiments are difficult and the rewards are no longer as promising as the possible confirmation of the existence of a new form of water. It is unlikely that these answers will be forthcoming unless someone finds a way to produce the anomalous material in quantities larger than a few micrograms.

—Barbara G. Levi

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Hybrid magnets promise high field for low power

Researchers at MIT's National Magnet Laboratory are employing a hybrid system to produce high magnetic fields with relatively low power consumption. A field of 195 kilogauss has been produced through the combined effect of a water-cooled magnet within a superconducting magnet.

Such a field is not the highest produced at MIT. An all water-cooled magnet there produces a 230-kG field, but it draws the full power capacity of the laboratory—ten megawatts. It is

envisioned that hybrid-magnet technology will allow a 300-kG magnet to be constructed without requiring any more power; without the hybrid concept, 30 megawatts would be needed.

The 195 kG of the hybrid magnet is reached by a 153-kG contribution from the water-cooled magnet and 42 kG from the superconducting part. This section is composed of 24 double pancakes of a niobium-titanium alloy embedded in copper ribbon. This metal combination remains superconducting until approximately 100 kG, well above the 60 kG that the superconducting part was designed to produce. It draws 1500 amperes, and the field it produces stores two megajoules.

Inside the core of the superconducting magnet is the water-cooled portion with an access region of 3.2 cm. When both portions of the magnet are in operation, large forces exist between the two parts—80 000 newtons per cm axially and 12 000 newtons per cm radially.

Bruce Montgomery (MIT) spoke to us about the problems of using more powerful superconducting magnets in a hybrid system. A 165-kG superconducting magnet has been produced at Intermagnetics General Corporation of Schenectady, N.Y., but it has a bore of only two cm. The much larger bore of the MIT magnet (40 cm) allows the insertion of the water-cooled magnet. A 165-kG superconducting magnet with such a bore would be very costly, he said.

A group at Oxford Instruments in England is also involved with hybrid magnets. They are testing a unit having a field of approximately 160 kG, but its access of 5.0 cm is larger than MIT's thereby increasing certain research capabilities despite the lower field.

MIT workers are moving toward providing the laboratory with several hybrid magnets to provide fields of over 200 kG to a larger number of researchers and at the same time optimize the use of existing power sources.

—RAS

Magnetosphere study planned for 1976–78

Plans for a two-year International Magnetosphere Study (IMS) have been drawn up by the International Council of Scientific Unions. The programs, to run from 1976 to 1978, will pool ground-based, balloon, rocket and satellite capabilities and data-analysis facilities throughout the world to study the magnetosphere.

United States participation in the program is outlined in a report of the Joint Ad Hoc Study Panel of IMS, headed by Robert A. Helliwell of Stan-

ford University. The report recommends that the US endorse IMS and participate in it with a coordinated research program. It suggests that an NSF office for IMS be established and that representatives from other participating agencies be designated.

Other recommendations of the panel include US participation in a worldwide network of incoherent-scatter radars, support of satellite programs including the reactivation of satellites launched and used before the IMS period, and funding for balloon and rocket investigations and for data-evaluation centers.

Observations over the last 15 years have revealed a more complex picture of the magnetosphere than had once been thought. Before the 1960's it was conceived of as a simple extended, bipolar field. In recent years the model of geomagnetic-field lines that cross an open magnetosphere and connect with interplanetary magnetic field lines is gaining wide acceptance.

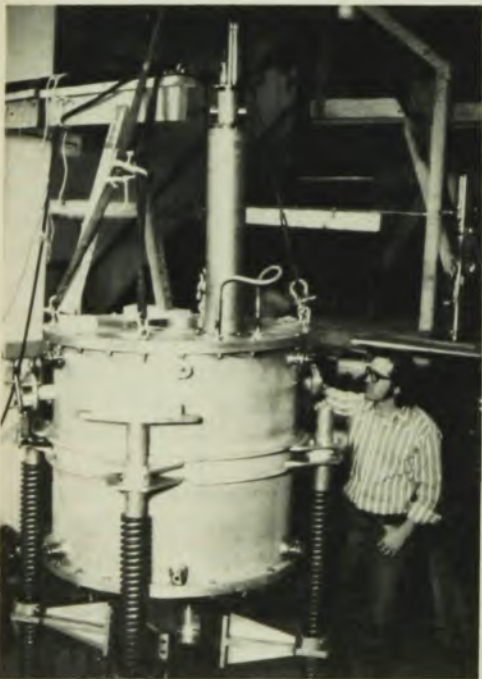
Increasing our knowledge of the magnetosphere is expected to further the understanding of many processes on earth. The amount of the sun's magnetic-field energy and charged-particle populations that reach the upper atmosphere is regulated by the magnetosphere. Changes in the amount of energy reaching the atmosphere can affect the delicate energy balance in the lower atmosphere. Other issues of interest include the possible magnetospheric involvement with climate and power-transmission disruptions.

European nations plan molecular biology lab

A great stride forward has been taken to establish a European molecular biology laboratory in Heidelberg. Eight member nations of the European Molecular Biology Conference have approved the plan (Austria, France, Federal Republic of Germany, Israel, Netherlands, Sweden, Switzerland, and the UK) although Greece, Norway and Spain indicated that they could not join at the beginning.

The program will be under the supervision of Director-General designate John C. Kendrew, Nobel Prize winner in 1962 for his work on the structure of proteins. Member states will exercise control through a council of delegates, but maximum autonomy is envisioned for the laboratory and its director-general.

Initial nonrecurring expenses for the laboratory will be \$11 million over the first seven years, with the Federal Republic of Germany contributing \$3.3 million of this in addition to the site in Heidelberg. Annual operating costs are expected to grow to \$4.2 million. □



Hybrid magnet at MIT Magnet Laboratory produces a 195-kG field: 153 kG from the water-cooled magnet and 42 kG from the surrounding superconducting magnet.