operation in groups with up to four power supplies. Three power supplies were used to attain the 140-kG field.

Edward R. Schrader, engineering leader of magnet design for RCA's superconductive devices development department, explained that over 200 electrical leads are included in the design for sensing voltages and magnetic fields as well as current to the many modules. Radial and axial slots in the module walls allow cooling of the magnet and access for the leads. The complete assembly is 46 cm long with a 56-cm outside diameter.

James C. Laurence, chief of the cryophysics and magnetics branch at Lewis, told PHYSICS TODAY that NASA is interested in large, high-field electromagnets such as this for future applications in aerospace propulsion and power generation. This magnet, in particular, will also be used for solid-state physics and biomedical studies. Another large magnet at Lewis, of more conventional design, has produced fields of 200 kG in a 11.5-cm bore, when operated at liquid-neon temperatures.

Research on Neutron Electric Dipole Moment

Experiments searching for a neutron electric dipole moment are being carried out at Oak Ridge and Brookhaven National Laboratories. At Oak Ridge, Norman F. Ramsey, of Harvard, with Philip Miller, William Dress and James Baird, is now engaged in an experiment similar to the neutron magnetic resonance experiment of James H. Smith, Edward M. Purcell and Ramsey, reported in *Phys. Rev.* **78**, 807 (1950) and *Phys. Rev.* **108**, 120(1957). However, much slower neutrons are used even though the moderator is at room temperature or somewhat above. Those few neutrons which have a velocity of approximately 70 m/sec are selected out of the total Maxwellian velocity distribution. The loss in intensity by this severe velocity selection is compensated to some degree by the fact that totally reflecting neutron pipes can be used to overcome partially the loss of intensity that goes inversely with the square of the distance from the source. Such

140-kG SUPERMAGNET. Above magnet proper is the dewar-lid assembly.

neutron pipes have been used previously by Heinz Maier-Leibnitz and others, but not at such extremely low velocities.

The low velocities have the advantage of providing a narrower resonance and hence greater sensitivity as well as diminishing the apparent magnetic field which accompanies the motion of the neutron through the electrostatic field. In the experiment a separated oscillatory magnetic field is tuned to a frequency on the steep slope of a neutron beam magnetic resonance. A strong electric field is then successively turned on and off to see if there is a change in beam intensity accompanying the modulation of the electric field, as would be the case if there were a neutron electric dipole moment. At present preliminary observations would correspond to a neutron electric moment with $(-2 \pm 3) \times 10^{-22}$ cm for μ_e/e. It is hoped in the near future that the precision of this limit can be increased.

At Brookhaven, Ramsey is in collaboration with Edgar Lipworth, Victor Cohen, Henry Silsbee and Robert Nathans in an experiment that is somewhat similar to the Oak Ridge experiment except faster neutrons are used. They make possible a more rapid modulation of the radio-frequency field. In this experiment, as well as the one at Oak Ridge, no neutron electric dipole moment significantly larger than the experimental error has been observed so far.

A third experiment has been carried out at Brookhaven by Clifford Shull of MIT and Nathans of Brookhaven Laboratory. This experiment depends upon the scattering of polarized neutrons. Insofar as is known the results of this experiment are also consistent with no neutron electric dipole moment.

Cornell Synchrotron Makes 3-GeV Electrons in Tests

Cornell's 10-GeV synchrotron has successfully accelerated electrons to 3 GeV in preliminary tests. Earliest operation was limited by lack of sufficient power and water at the site, but utilities have now been completed and operation at full energy is anticipated in October. After the first of the year a significant fraction of the machine time is expected to be available for experiment. Qualified experimenters from other institutions can use it.

Boyce D. McDaniel has succeeded Robert R. Wilson as director of the synchrotron laboratory with Wilson's resignation to become director of the 200-GeV accelerator to be built at Weston, Ill.

Berkeley Experimenters Find New Lithium, Boron Isotopes

Recent measurements at Berkeley's Lawrence Radiation Laboratory show evidence for a surprisingly high degree of stability for some hitherto unknown isotopes of light elements including Li^{11}, B^{14}, and B^{15}. This work was reported by Arthur Poskanzer, Sam K. Cosper, Earl K. Hyde and Joseph Cerny in a paper in *Phys. Rev. Letters* **17**, 1271 (1966), where data for a complete range of helium, beryllium, boron and carbon isotopes were presented.

The technique for producing these neutron-rich isotopes has been previously established—the 5.3-GeV proton beam from the Bevatron is scattered in a thin uranium foil target—but as so often happens in physics the successful identification of the products awaited a suitable detector. This was