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NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

GOVERNING BOARD

Progress at the Rutherford Laboratory

Note by T. G. Pickavance

Proton Linear Accelerator

The machine has been used almost entirely with polarised beams since October. The Birmingham group have completed experiments on polarisation angular distribution from a series of elements at 30 MeV; the results will take several weeks to analyse. Dr. Hanna and two research students (one from Oxford and one from King's College, London) have determined the polarisation in proton-helium scattering at 30 MeV. The results are very precise and deviate considerably from the polarisation predicted for lower energy by the calculations of Gammel and Thaler. The experiment is being repeated at 50 MeV. A third Ph.D. has been awarded for work on the P.L.A. (to a student from University College, London).

Nimrod

The prebuncher has been installed on the injector, and in tests has given the expected improvement in beam intensity of rather more than a factor two at an initial output current of 5 milliamperes. The highest current so far achieved, when the construction programme interrupted operation, was 15 milliamperes with the prebuncher but at this output the improvement was only by a factor 1.5. Further work is therefore needed on the prebuncher, and this has been started.

The engineered version of the radiofrequency drive chain gave trouble with parasitic oscillations when the cavity was tuned to 7-8 megacycles per second (the high frequency end of the required band). The parasitic oscillations have now been removed.

The second alternator has been installed and has been run. Both alternators can now be used for magnet pulsing, but cannot yet be run mechanically coupled together. The ripple filter equipment has been installed and operated. All eight outer vacuum vessels have been installed in the magnet octants. Seven of the inner vessels and the first header vessel have been delivered. Four of the outer vacuum vessels have been tested in the magnet octants; three of them gave barely acceptable rates of leakage but the other was much better. These leaks are not attributable to the vessels themselves, which are entirely satisfactory, but to equipment installed inside them. There is no reason to doubt that a satisfactory vacuum will be achieved under operating conditions.

Two magnet octants have been completed, with pole face correction windings, inner vacuum vessels and closure plates. One of these has been fitted with its full complement of five high vacuum pumps. All the steel vacuum vessels for the straight sections have been delivered.

Auxiliary apparatus

All components for the ten particle separator tanks have now been ordered. Rectifier-type power supplies for the quadrupole magnets are now being delivered, and five quadrupole magnets have been delivered. Three S.A.M.E.S. high voltage generators have been delivered, and eight radio-frequency cascade generators have been ordered from Messrs. Haefely in Switzerland.

Machining of the main components of the heavy liquid bubble chamber has been started at the contractor's works. The university group have started to cool down the liquid hydrogen bubble chamber.

General

Changes have become necessary in the internal administration of the Rutherford Laboratory, as a result of the additional load on the Secretary imposed by the growth of the Rutherford Laboratory and the approval of the Electron Laboratory. The formal position of the Secretary, N.I.R.N.S., as Secretary of the Rutherford Laboratory has been retained, as decided by the Governing Board, but Dr. J. M. Valentine has been appointed Deputy Secretary of the Rutherford Laboratory. Dr. Valentine is now responsible for the whole of the Laboratory administration; his former position was Assistant Secretary (Scientific) N.I.R.N.S.

Changes have also been made in the organisation of the applied physics groups. Following the tragic death of John Wilkins, the beams group has been placed under the leadership of Mr. A. J. Egginton and the Nimrod magnet group under Mr. D. A. Gray. The small section working on superconductivity applied to high magnetic fields, led by Dr. P. F. Smith, is now supervised by Mr. J. D. Lawson. On the resignation of Mr. S. H. Cross, who led the vacuum group, the staff working on testing and commissioning the Nimrod vacuum vessels have been transferred to the Nimrod engineering group, together with a small section working on resins. Some other members of the former vacuum group have been transferred to the beams group where they will work on the high vacuum plant for the particle separators and beam lines.