

CERN News

PS and SC

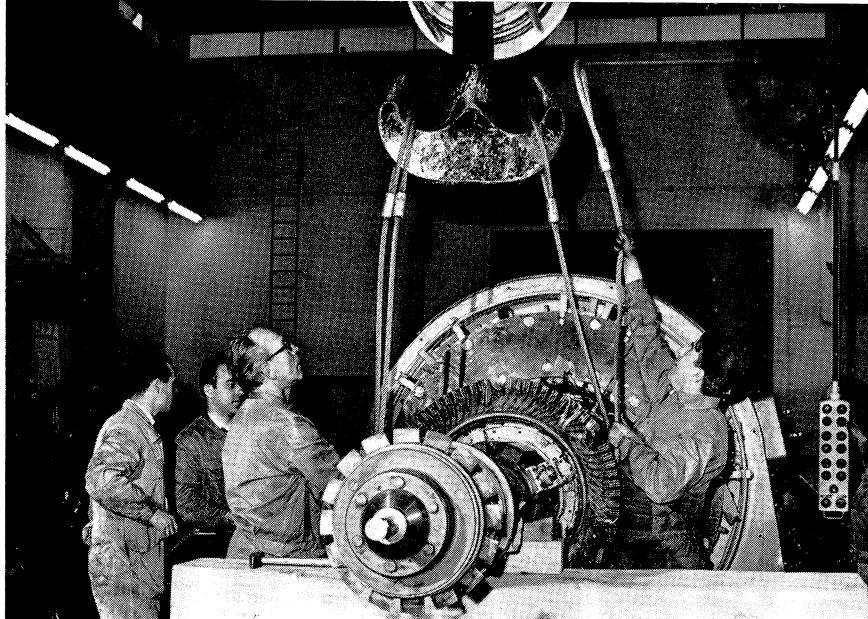
The repaired magnet power supply motor of the proton synchrotron is scheduled to return to CERN on 16 May. The synchrotron would then begin operation on 25 May, the date originally planned as the end of the Easter shutdown. Information on the work carried out during the extended shutdown will be given in a future issue of CERN COURIER.

The first of three test r.f. cavities for the synchrotron was completed at CERN in March. It now goes to the manufacturers who are developing the amplifier and power supply systems for delivery in October of this year. The other cavities will be used for tests at CERN when they are completed. (Three additional accelerating cavities are to be installed in the PS as part of the first stage of the improvement programme, which is designed to increase the repetition rate of the machine.)

After the Christmas shutdown the synchro-cyclotron began operation on the 18 January. Since the demand for experimental time has increased, it has been decided to reorganize the machine schedule on a trial basis so that, from the end of February, one maintenance period out of two is not taken and the machine continues with its experimental programme.

Wire chamber

The first wire spark chamber to be used in an experiment at the PS was installed on the b8 beam line at the end of December. The experiment, being carried out by a group led by M. Vivargent, R. Mermoud and K. Winter, is one of the investigations into CP violation (see CERN COURIER, vol. 5 no. 9 (September 1965) p. 131). It is concerned with the 'interference' between the decay amplitudes of K_0^1 mesons, regenerated in a block of carbon, and K_0^2 mesons. The experiment studies this effect in the two pion decay mode. The theoretical description involves a phase term which is the sum of a 'nucleon phase shift' (introduced by the regenerator) and a 'CP violation phase shift' (the main item of information wanted from the experiment).



The damaged rotor of the PS magnet power supply being removed for dispatch to the manufacturers. The repaired rotor is due back at CERN on 16 May.



The first wire spark chamber installed in a PS experiment. Behind the chamber stand the two black shapes of scintillation counters which trigger the spark chamber when they themselves have recorded the passage of a charged particle. Behind them, below the concrete support, the block of iron (see below) is visible.

Data has already been taken on the decay into two pions which involves CP violation. In June, it is intended to look at the leptonic decay (into pion, muon and neutrino) which involves only the nucleon phase shift. Thus the two different phase shifts can be determined.

The wire spark chamber is part of the detection equipment to differentiate between pions and muons. A system involving conventional optical spark chambers and a magnet, defines the direction of a charged particle approaching the wire chamber. Between the system and the chamber is placed a block of iron. A muon, which does not interact with the nuclei in

the iron will pass through and emerge travelling in virtually the same direction (suffering a small deviation due to coulomb scattering). A pion, however, interacts strongly with nuclei and can suffer a major deviation. The wire chamber records the position of the particle passing through it and it is then possible to distinguish the pion from the muon.

A conventional spark chamber could be used, but it was decided to gain some experience in the operation of a wire chamber. This is a recent development in the technology of particle detection, which holds considerable promise for the future. Its great advantage is that it can detect

and record the passage of several charged particles at once and provide the required data directly in electronic form.

The chamber which has been installed has a sensitive area of 80 x 100 cm. It consists of two planes of parallel wires; one pulsed at a high voltage (5 kV) and the other earthed. When a charged particle passes through, it causes ionisation along its path in the gap between the planes and a spark is formed, on application of the pulse, at the track of the particle. Currents then pass in the wires where the spark occurs.

This chamber detects the currents using 'magnetostrictive read-out' — employing the magnetostrictive property of a ferromagnetic wire (in this case nickel). The wires of the parallel plane cross at 90° to the nickel wire. When there is a current in one of these wires, it passes over the nickel wire and the magnetic field associated with the current causes a distortion in the nickel wire which travels along it at the velocity of sound. At the end of the wire the distortion is detected by a 'pick up' coil, thus giving the time between the creation of the distortion and its detection, which is proportional to the position of the spark. (Another method, called core read-out, is also being pursued in connection with wire chambers.)

Work on wire chambers of the magnetostrictive read-out type was initiated at CERN by G. Brautti who carried out some tests with a chamber on the SC. Development of the chamber and the electronics to be used in the PS experiment was done by M. Bott-Bodenhausen and B. Friend, members of the Vivargent group.

Appointments

At a meeting on 8 March, the Scientific Policy Committee elected Professor G. Puppi to the post of Chairman of the Committee in succession to Professor L. Leprince-Ringuet. The SPC is the major authority which makes recommendations to the CERN Council on matters of scientific policy. It consists of a small number of members (11 in 1966, plus 4 ex-officio) selected for their scientific merit.

After the election of Professor B. Gregory as Director-General of CERN, Professor Leprince-Ringuet informed the CERN Council that he would not seek re-election as

Chairman of the SPC since he considered it better that the Director-General and the Chairman should not come from the same scientific background. The two Professors had been in close association during their scientific careers (See CERN COURIER, vol. 6, no. 2 (February 1966) p. 28).

Professor Gianpietro Puppi was born in Bologna in 1917. In 1950, he was appointed to the chair of theoretical physics at Naples University. From 1953, he has been Professor of higher physics and Director of the physics institute of Bologna University. In September 1962, Professor Puppi was appointed Directorate Member for Research at CERN, a post he held until the end of 1963. A detailed biography can be found in CERN COURIER, vol. 3, no. 10 (October 1963), p. 129.

Professor J. S. Bell has been appointed Deputy, ad interim, to the Leader of the Theoretical Study Division.

News from the USA

The USA Atomic Energy Commission asked the National Academy of Sciences to investigate 85 sites from the more than 200 put forward for the proposed 200 GeV accelerator. Using eight teams, this investigation was completed by 3 December 1965 and the results were presented to the NAS Site Evaluation Committee (under the Chairmanship of Dr. Piore). Five or six sites are expected to emerge shortly from this stage of the decision and the AEC Commissioners themselves will take part in the examination of the last few sites. The final choice is expected to be made in a few months' time.

The AEC has asked the Berkeley design team to look again at the possibility of reducing the costs of the machine (the present design estimate is \$348 million). Several suggestions, based on developments at lower energy machines, such as the Brookhaven AGS, have been put forward but the idea of building the accelerator in this way was rejected in the Ramsey Report which recommended the 200 GeV machine. However the Joint Congressional Committee on Atomic Energy has asked the AEC not to present its case for authorization until the cheaper possibilities have been explored again. A

decision about authorization of the project seems to have been put off for a further year.

The Universities Research Association Inc. (URAI), which was set up in the summer of 1965 by 34 University Presidents, has offered its services to the government as 'contracting agency' for the construction and operation of the 200 GeV accelerator. This is an extension of the principle of University management of very large government supported projects which has worked well at Brookhaven (operated by Associated Universities Inc. — an association of 9 Universities).

Construction of the 2 mile long, 20 GeV electron linear accelerator at Stanford is nearing completion. Manufacture of the beam tube, a 4 in diameter copper pipe which is installed 25 ft underground, is complete. The original estimate of funds for the project, \$114 million still appears to be adequate. It is hoped that the first electron beams will be achieved in May.

\$450 000 has been made available to the University of Utah by the National Science Foundation for a natural neutrino research project. J. W. Keuffel leads the research team. The detection equipment will be located in a laboratory 1000 ft underground and construction is now under way.

Money has been provided for design work on a 'meson factory' at the Los Alamos Scientific Laboratory. The eventual project involves a linear accelerator 2000 ft long to provide a proton beam at 800 MeV with an average intensity of 1 mA. The cost of the project is estimated at \$55 million.

A radiofrequency separator, developed by H. Hahn and H. Halama, has been brought into operation at the Brookhaven 33 GeV synchrotron. The separator is used in a beam line which supplies kaons at a momentum of 12.8 GeV/c to the 80 in hydrogen bubble chamber. On average 10 kaons reach the chamber together with one unwanted muon. The separator consists of two 10 ft r.f. deflectors separated by a drift space of 130 ft. The beam line will be used for studies using kaons, antiprotons and pions in the momentum range 7 to 18 GeV/c. (For information on the principle of operation of r.f. separators and of the separator first used at CERN at the beginning of 1965, see CERN COURIER, vol. 5 no. 3 (March 1965) p. 35.)