

CERN 25 GeV PROTON SYNCHROTRON

European Organization for Nuclear Research, (CERN), Geneva

(No status report presented)

SYNCHROTRON DATA

Person in charge J. B. Adams Person supplying data M. G. N. Hine

History and Status

Design study 1953-1954
Model tests 1954-1957
Engineering design 1955-1958
Construction started 1956
Completion date 1960

Scheduled operation 112 hr/wk by end 1960
Magnet cost Sw. Fr. 10 million
Total cost Sw. Fr. 100 million
incl. buildings and general expenses

Design Specifications

Magnet

Focusing, type Strong, a.g.
Focusing, order $\frac{1}{2}$ FO $\frac{1}{2}$ F $\frac{1}{2}$ DO $\frac{1}{2}$ D
Field index, n 288.4
Orbit radius 70.08 m
Mean radius 100.00 m
Sectors, number 100
Field, at inj. 147 G
Field, maximum 12-14 kG
Power input, maximum 27-32 000 kW
Storage system. Flywheel
Rise time 1.0-1.2 s
Weight Fe 3 400; Al 130 ton

Design Goals

Particle accelerated Protons
Energy 25-28 GeV
Pulse rate 20-12/min
Output $\sim 10^{10}$ part/pulse

Injector System

Type Linac
Energy 50 MeV
Injector output ~ 1 mA
Injection period 1 turn
Inflector type Pulsed electric

Acceleration System

Frequency 3 to 10 MHz
Accel. cavities 16
Harmonic number 20
Orbit freq. final 0.5 MHz
Gain, average 54 keV/turn
Input to RF, maximum 16×6 kW

Aperture

Width 14 cm
Height 7 cm
Shielding 5.5 m baryte concrete

Published Articles Describing Machine

1. Conference on the alternating-gradient proton synchrotron. Geneva. October 26-8, 1953. Lectures on the theory and design of an alternating-gradient proton synchrotron. Geneva, CERN Proton Synchrotron Group, 1953.
2. CERN Symp. 1956. 1.
3. Regenstreif, E. Le synchrotron à protons du CERN (1^{re} partie). CERN (*) 58-6a, 1^{er} juillet 1958.
The CERN proton synchrotron (1st part) CERN (*) 59-29, 21st August, 1959.
4. Regenstreif, E. Le synchrotron à protons du CERN (2^e partie). Ch. V. L'injection des particles. CERN (*) 59-26, 31 juillet, 1959.

(*) See note on reports, p. 696.

No status report on the CERN Proton Synchrotron was presented at the Conference: instead, the participants were invited to visit the P.S. Division on the evening of September 15th, and were shown the machine.

During the Conference, studies of the injected beam in the synchrotron were in progress, and on September 16th this beam made one revolution of the vacuum chamber for the first time.

ADDITIONAL PAPERS

The following papers, related to the subject of this session, were not read but are included in the Appendix.

Bolotin, L. I. et al. A linear accelerator of multicharged ions.

see p. 643

Bolotin, L. I. et al. Strong focusing in linear accelerators.

see p. 644

Vorob'ev, A. A. et al. Some aspects of the theory of cyclic waveguide electron accelerators.

see p. 680
