

ENTRY NO. FM-4

NAME OF MACHINE SYNCHROCYCLOTRON 200 MeV protons (S.C. 200)
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IN CHARGE Mr. J. GUILLOT REPORTED BY Mr. M. LOUIS

HISTORY AND STATUS

DESIGN, date 1972 Model tests
ENG DESIGN, date 1973
CONSTRUCTION, date sept. 1975
FIRST BEAM, date (or goal) 20.06.1977
MAJOR ALTERATIONS

COST, ACCELERATOR about 10 MF
COST, FACILITY total 20 MF
FUNDED BY Institut de Physique Nucléaire et de Physique des Particules (IN2P3)

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 1 ENGINEERS 1
TECHNICIANS 23 CRAFTS
GRAD STUDENTS involved during year
OPERATED BY Research staff or 8 Operators
OPERATION 104 hr/wk. On target 200 hr/wk
TIME DISTR. in house 90 % outside 10 %
BUDGET, op & dev 500 .KF
FUNDED BY

RESEARCH STAFF, not included above

USERS, in house 50 outside 20
GRAD STUDENTS involved during year
RESEARCH BUDGET, in house
FUNDED BY C.N.R.S. - IN2P3

MAGNET

POLE FACE, diameter (compact) 320 cm, R-extraction 140 cm
R injection 1 cm
GAP, min 40 cm, Field 15.4 kG
max cm, Field 15.4 kG at 6.3 Å 5. X 10^6
AVERAGE FIELD at R ext kG Ampere turns
B max / < B >

NUMBER OF SECTORS compact separated } Spiral, max deg
SECTOR ANGLE (SSC) no deg
TRIMMING COILS yes

CONDUCTOR, material and type copper

STORED ENERGY (cryogenic) MJ
POWER: main coils 350 max kW: current stability +/- 3 . 10^-5
trimming coils 40 max kW: current stability +/- 3 . 10^-5

WEIGHT: Fe 900 tons coils 22 tons
COOLING system De-ionized water

ION ENERGY (Bending limit) E/A = 223 q^2/A^2 MeV/amu
(Focusing limit) E/A = q/A MeV/amu

ACCELERATION SYSTEM

DEES, number 1 angle 180 deg
BEAM APERTURE 6 cm; DC Bias 1 kV
TUNED by, coarse fine
RF 25 to 10 MHz, stable +/-
Orb F 25 to 10 MHz
HARMONICS, RF/Orb F, used
DEE-Gnd, max 20 kV, min gap 0,4 cm
STABILITY, (pk-pk noise)/(pk RF volt)
ENERGY GAIN, max 20 kV/turn
RF PHASE, stable to +/- deg
RF POWER input, max 30 kW
FREQUENCY MODULATION, rate 440 anc 700 new /s
modulator, type rotating condenser
beam pulse, width 50-100 micro-second

VACUUM SYSTEM

OPERATING PRESSURE Torr or mbar
PUMPS, No, Type, Size oil diffusion Galileo
16.000 l/s

ION SOURCES

Pig Hot Filament

INJECTION SYSTEM

Internal ion source

EXTRACTION SYSTEM

Electromagnetic and magnetostatic channels

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 500 m^2; movable m^2
TARGET STATIONS 3 in rooms
STATIONS served at same time, max
MAG SPECTROGRAPH, type 102°N = 1/2
COMPUTER model micro-processors
OTHER FACILITIES one-line Mass Spectrometer
ISOCELE II

CHARACTERISTIC BEAMS

Table with columns: PARTICLE, ENERGY (MeV) Goal, Achieved, CURRENT (pA) Internal, External. Rows include P, d, 3He++, 4He++ and SECONDARY.

BEAM PROPERTIES

MEASURED CONDITIONS
PULSE WIDTH RF deg pA of MeV ions
PHASE EXC, max RF deg pA of MeV ions
EXTRACT eff 80 % .4 pA of 201 MeV P ions
RESOL ΔE/E 0.7 % .4 pA of 201 MeV P ions
EMITTANCE
(π mm-mrad) 9 axial .4 pA of 201 MeV P
19 rad

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 99% SOLID STATES PHYSICS
BIOMEDICAL APPLICAT ISOTOPE PRODUCTIONS 1%

REFERENCES/NOTES

- 1)
2)

PLAN VIEW OF FACILITY, COMMENTS, ETC.

Axial injection for p and d polarized beams and 6Li, 7Li beams is in project. Low intensity (few nA) beams of 326 MeV 6Li3+ and 282 MeV 7Li3+ have been obtained.