

ENTRY No. 61

NAME OF MACHINE INS SF Cyclotron DATE April, 1989
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HISTORY AND STATUS

DESIGN, date 1968 Model tests 1968-1970
ENG DESIGN, date 1969-1970
CONSTRUCTION, date 1969-1973
FIRST BEAM, date (or goal) Extracted 1974
MAJOR ALTERATIONS Deflector (1978)
COST, ACCELERATOR 3 x 10^8 yen
COST, FACILITY, total 7.7 x 10^8 yen
FUNDED BY Japan Ministry of Education
ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
SCIENTISTS 1 ENGINEERS 3
TECHNICIANS 3 CRAFTS
GRAD STUDENTS involved during year 0
OPERATED BY 1/2 Research staff or 1/2 Operators
OPERATION 140 hr/wk, On target 100 hr/wk
TIME DISTR. in house 50% Outside 50%
BUDGET, op & dev 4 x 10^7 yen
FUNDED BY Japan Ministry of Education
RESEARCH STAFF, not included above
USERS, in house 15 outside 50
GRAD STUDENTS involved during year 5
RESEARCH BUDGET, in house 5 x 10^7 yen
FUNDED BY Japan Ministry of Education

MAGNET

POLE FACE, diameter (compact) 168 cm, R extraction 73 cm
R injection cm
GAP, min 14.8 cm, Field 19.5 kG
max 22.8 cm, Field 13.2 kG at 3.8 x 10^5
AVERAGE FIELD at R ext 16.4 kG Ampere turns
B max/ <B> 1.19

NUMBER OF SECTORS

compact 3 } Spiral, max 55 deg
separated }
SECTOR ANGLE (ISSC) deg
TRIMMING COILS 11 sets of circular
7 sets of harmonic correction

CONDUCTOR, material and type Cu and MI cable
STORED ENERGY (cryogenic) MJ
POWER: main coils 260 max, kW; current stability 10^-5
trimming coils 60 max, kW; current stability 10^-3

WEIGHT: Fe 130 tons; coils 5 tons
COOLING system Oil and demineralized water
ION ENERGY (bending limit) E/A = 6.8 q^2/a^2 MeV/amu
(focusing limit) E/A = 4.8 q^2/a^2 MeV/amu

ACCELERATION SYSTEM

DEES, number 1; angle 180 deg
BEAM APERTURE 4 cm; DC Bias 0 kV
TUNED by, coarse short plate fine 2 trimming cap
RF 7.4 to 22.5 MHz, stable +/- 10^-7
Orb F 0.9 to 22.5 MHz
HARMONICS, RF/Orb F, used 1, 3, 5
DEE - Gnd, max 70 kV, min gap 2.8 cm
STABILITY, (pk-pk noise)/(pk RF volt) 2 x 10^-4
ENERGY GAIN, max 70 q kV/turn
RF PHASE, stable to +/- 0.5 deg
RF POWER input, max 150 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 2 x 10^-6 Torr or mbar
PUMPS, No, Type, Size 36 inch and 10 inch
oil diffusion

ION SOURCES

internal PIG, cold cathode PIG, ECR

INJECTION SYSTEM

Axial injection for p, d and HI

EXTRACTION SYSTEM

2 channel dc deflector

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 950 m^2; movable m^2
TARGET STATIONS 11 in 6 rooms
STATIONS served at same time, max 1
MAG SPECTROGRAPH, type QDD
COMPUTER model FACOM U 400, M360R
OTHER FACILITIES 80 cm scatt. chamber,
IGISOL, GARIS, line for channeling,
HI cooler ring TARN II

CHARACTERISTIC BEAMS

Table with columns: PARTICLE, ENERGY (MeV) Goal, Achieved, CURRENT (pA) Internal, External. Rows include p, 23Na, 27Al, and SECONDARY.

BEAM PROPERTIES

MEASURED CONDITIONS
PULSE WIDTH 15 RF deg 1 pA of 60 MeV q ions
PHASE EXC, max RF deg pA of MeV ions
EXTRACT eff 90% 10 pA of 25 MeV p ions
RESOL ΔE/E 0.1% 10 pA of 25 MeV p ions
EMITTANCE (π mm. mrad) { 18 axial } 0.1 pA of 50 MeV q ions
{ 13 rad }

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 60 SOLID STATES PHYSICS 5
BIOMEDICAL APPLICAT. 5 ISOTOPE PRODUCTIONS 10

REFERENCES/NOTES

- 1) Proc. 7th Cyclotron conf., p. 103 and 312 (1975)
2) Proc. 8th Cyclotron conf., p. 1984 (1978)

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

