

ENTRY NO. C36 Date 27 September 1995
 Name of Machine INS SF Cyclotron
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HISTORY

MILESTONE DATES:

Design 1968 Model Tests 1968-1970
 Construction 1969-1973 First Beam 1974

DESIGN/CONSTRUCTION BY:

in house Design other Constructed by Mitsubishi

COST: Accelerator 3 x 10⁸ yen Facility 7 x 10⁸ yen

FUNDED BY: Japan Ministry of Education

STATUS

STAFF: Machine

Scientists Engineers 5

Technicians Students

Research (in house/external)

Scientists / Engineers /

Technicians / Students /

BUDGET: Machine 3 x 10⁷ yen Funded by JME

Research 5 x 10⁷ yen Funded by JME

TIME DISTRIBUTION:

Basic Research (in house/external) 50 % / %

Applied Program (in house/external) % / 5 %

Maintenance 20 % Development 5 %

MAGNET

POLE PARAMETERS:

Diameter 168 cm R_{extract} 73 cm R_{inject} cm

HILL PARAMETERS: Gap (min) 14.6 cm B_{max} T

(@ AT) Gap (max) 14.6 cm B_{min} T

VALLEY PARAMETERS: Gap (min) 22.8 cm B_{max} T

(@ AT) Gap (max) 22.8 cm B_{min} T

AVERAGE FIELD: _{min} T _{max} 1.64 T

NUMBER OF SECTORS: compact/separated 3 /

sector angle deg. spiral (max) 55 deg.

FIELD TRIMMING: Trim Coils 11

Harmonic Coils 7

Other

CURRENT: Main Coils 600 Amps Stability 10⁻⁵

Trim Coils 450, 250 Amps Stability 5 x 10⁻⁴, 10⁻³

Stored Energy (cryogenic) MJ

WEIGHT: Iron 130 tons Conductor 5 tons

ION ENERGY: Bending Limit E/A = 68 q²/A² MeV/u

Focusing Limit E/A = 48 q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:

Description: lambda/4 resonator, MOPA

No. of Gaps/turn 2 dE/dn(max) 0.14 MeV/q

Voltage (max) 0.07 MV Harmonic f_{rf}/f_{ion} 1/3/5

Freq 7.4-22.5 MHz Power in(max) 0.15 MW

Stability: Phase +/- 1.0 deg Voltage 2 x 10⁻⁴

OTHER CAVITIES (Flattopping or otherwise):

Description:

Region of Influence: R_{min} cm R_{max} cm

No. of Gaps/turn dE/dn(max) MeV/q

Voltage (max) MV Harmonic f_{rf}/f_{ion}

Freq MHz Power in(max) MW

Stability: Phase Voltage

VACUUM SYSTEM

OPERATING PRESSURE: 2 x 10⁻⁶ Torr

PUMPS: (No. and type) 36 inch and 10 inch oil diffusion

ION SOURCE(S)

Type	Intensity (mA)	@ ε _n = βγc (π mm mrad)	Ion Species
(a) internal PIG			p, d, ³ He, a
(b)			
(c) ECR	0.08 Ar ⁸⁺		Li, Ar
(d)			

INJECTION SYSTEM

axial inj (electrostatic mirror) Efficiency 15 %

EXTRACTION SYSTEM

2 channel dc deflectors Efficiency 90 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current (part μA)	
		Internal	External
(a) p	45		10
(b) a	17		5
(c) d	6.7		1.1
(d) ⁶ Li ²⁺	6.2		0.6

Secondary Particles	E (MeV)	part/sec
(a)		
(b)		
(c)		

EXTRACTED BEAM PROPERTIES:

For 0.1 μA of 12.5 MeV/u a ions
 ΔE/E 0.1 % Δφ 30 °rf
 ε_n = βγc x 18 π mm mrad z 13 π mm mrad

FACILITIES FOR RESEARCH

SHIELDED AREA: Fixed: 950 m² Moveable m²

Target Stations: 11 No. Served At Same Time: 1

MAGNETIC SPECTROMETERS: QDD

OTHER FACILITIES: 80 cm scatt chamber

IGISOL, GARIS, line for channeling

HI cooler ring TARN-II

REFERENCES/NOTES

(a) proc. 7th Cyclotron conf., p.103 and 312 (1975)
 (b) proc. 7th Cyclotron conf., p.1984 (1978)

PLAN VIEW OF FACILITY, COMMENTS

