

ENTRY NO. C9 Date

Name of Machine INR Cyclotron

Institution Institute of Nuclear Research, Academia Sinica, Shanghai

Address Shanghai, China

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In Charge: Lin-xing Chen Reported by: Gen-xiang Gu

HISTORY

MILESTONE DATES:

Design 1978-1979 Model Tests

Construction 1980-1982 First Beam Nov. 1983

DESIGN/CONSTRUCTION BY:

in house other

COST: Accelerator Facility

FUNDED BY: Academia Sinica

STATUS

STAFF: Machine

Scientists Engineers

Technicians Students

Research (in house/external)

Scientists / Engineers /

Technicians / Students /

BUDGET: Machine Funded by

Research Funded by

TIME DISTRIBUTION:

Basic Research (in house/external) 30 % / %

Applied Program (in house/external) 60 % / %

Development % Maintenance 10 %

MAGNET

POLE PARAMETERS:

Diameter 1.38 cm $R_{extract}$ 61 cm R_{inject} cm

HILL PARAMETERS: Gap (min) 14.6 cm B_{max} 17.5 T

(θ AT) Gap (max) cm B_{min} T

VALLEY PARAMETERS: Gap (min) 22.4 cm B_{max} 11.7 T

(θ AT) Gap (max) cm B_{min} T

AVERAGE FIELD: $\langle B \rangle_{min}$ 14.6 T $\langle B \rangle_{max}$ T

NUMBER OF SECTORS: compact/separated 3 /

sector angle deg. spiral (max) deg.

FIELD TRIMMING: Trim Coils 9

Harmonic Coils 3

Other

CURRENT: Main Coils 450 Amps Stability 5×10^{-5}

Trim Coils 400 Amps Stability 1×10^{-4}

Stored Energy (cryogenic) MJ

WEIGHT: Iron 120 tons Conductor

ION ENERGY: Bending Limit $E/A =$ 32 q^2/A^2 MeV/u

Focussing Limit $E/A =$ 30 q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:

Description: 1×180 Dee

No. of Gaps/turn 2 $dE/dn(max)$ 0.140 MeV/q

Voltage(max) 0.07 MV Harmonic f_r/f_{ion} 0.100

Freq $10-22$ MHz Power in(max) MW

Stability: Phase Voltage

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_r/f_{ion}

Freq MHz Power in(max) MW

Stability: Phase Voltage

VACUUM SYSTEM

OPERATING PRESSURE: 1.5×10^{-5} torr

PUMPS: No. and type 2×1250 l/s oil diff.

ION SOURCE(S)

Type	Intensity (mA)	θ (mm mrad)	$\epsilon_n = \beta\gamma\epsilon$ (mm mrad)	Ion Species
(a) <u>P.I.G type</u>				<u>D, alpha, d</u>
(b)
(c)
(d)

INJECTION SYSTEM

..... Efficiency %

EXTRACTION SYSTEM 2 sections of electrostatic defl. + Foc. Mag. Channel + Mag. Efficiency %

Weak. Channel

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current (part μA)	
		Internal	External
(a) <u>D</u>	<u>10-30</u>		<u>30</u>
(b) <u>d</u>	<u>20-16</u>		<u>60</u>
(c) <u>alpha</u>	<u>32-40</u>		<u>15</u>
(d)			

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

EXTRACTED BEAM PROPERTIES:

For μA of MeV/u ions

$\Delta E/E$ $0.43-0.7$ % $\Delta \phi$ $^\circ$ rf

$\epsilon_n = \beta\gamma\epsilon$ x π mm mrad z π mm mrad

FACILITIES FOR RESEARCH

SHIELDED AREA: Fixed m^2 Moveable m^2

Target Stations: No. Served At Same Time:

MAGNETIC SPECTROMETERS:

OTHER FACILITIES:

REFERENCES/NOTES

(a)

(b)

PLAN VIEW OF FACILITY, COMMENTS

