

ENTRY NO. C30 Date June 22, 1992
 Name of Machine RCNP Ring Cyclotron
 Institution Research Center for Nuclear Physics, Osaka University
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 In Charge: I. Miura Reported by: I. Miura

HISTORY
MILESTONE DATES:
 Design 1985 Model Tests 1987
 Construction Aug, 1987 First Beam Oct, 1991
DESIGN/CONSTRUCTION BY:
 in house design other constructed by SHI
COST: Accelerator 3.8 BY Facility 1.6 BY
FUNDED BY: Ministry of Education, Japan

STATUS SEE RCNP AVF
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) % / %
 Applied Program (in house/external) % / %
 Development % Maintenance %

MAGNET
POLE PARAMETERS:
 Diameter cm R_{extract} 400 cm R_{inject} 200 cm
HILL PARAMETERS: Gap (min) 6 cm B_{max} 1.75 T
 (θ AT) Gap (max) cm B_{min} T
VALLEY PARAMETERS: Gap (min) cm B_{max} T
 (θ AT) Gap (max) cm B_{min} T
AVERAGE FIELD: < B >_{min} T < B >_{max} 0.76 T
NUMBER OF SECTORS: compact/separated / 6
 sector angle 22-27.5 deg. spiral (max) 30 deg.
FIELD TRIMMING: Trim Coils 36
 Harmonic Coils 3
 Other
CURRENT: Main Coils 900 Amps Stability 3x10⁻⁶
 Trim Coils 500x16+350x20 Amps Stability 1x10⁻⁵
 Stored Energy (cryogenic) MJ
WEIGHT: Iron 2200 ton Conductor 32 ton
ION ENERGY: Bending Limit E/A = 400 q²/A² MeV/u
 Focussing Limit E/A = >400 q/A MeV/u

ACCELERATION SYSTEM
FUNDAMENTAL ACCELERATION:
 Description: Single gap type
 No. of Gaps/turn 3 dE/dn(max) 1.5 MeV/q
 Voltage(max) 0.5 MV Harmonic f_{rf}/f_{ion} 6, 10, 12, 18
 Freq. 30-52 MHz Power in(max) 0.25x3 MW
 Stability: Phase (0.01°) Voltage (10⁻⁴)
OTHER CAVITIES (Flattopping or otherwise):
 Description:
 Region of Influence: R_{min} 200 cm R_{max} 400 cm
 No. of Gaps/turn 1 dE/dn(max) 0.17 MeV/q
 Voltage(max) 0.17 MV Harmonic f_{rf}/f_{ion} 18, 30, 36, 54
 Freq. 90-155 MHz Power in(max) 0.045 MW
 Stability: Phase (0.01°) Voltage (10⁻⁴)

VACUUM SYSTEM
OPERATING PRESSURE: 1x10⁻⁷ Torr
PUMPS: No. and type 6 Cryo. pumps 500%,
 3 Cryo. pumps 400%, 6 Diff. pumps 400%

ION SOURCE(S)

Type	Intensity (mA)	ε _n = βγε (πmm mrad)	Ion Species
(a)			
(b)			
(c)			
(d)			

INJECTION SYSTEM
 2 deflectors + 2 magnetic channels Efficiency (100) %

EXTRACTION SYSTEM
 2 deflectors + 2 magnetic channels Efficiency (100) %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current(part μA)	
		Internal	External
(a) P	300	0.02	0.02
(b) P	300	0.005	0.005
(c) P	400	0.01	
(d)			

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

EXTRACTED BEAM PROPERTIES:
 For μA of 300 MeV/u ions
 ΔE/E 0.1 % Δφ 10 °rf
 ε_n = βγε x 0.6 πmm mrad z 0.6 πmm mrad

FACILITIES FOR RESEARCH
SHIELDED AREA: Fixed 3600 m² Moveable 0 m²
 Target Stations: 5 No. Served At Same Time: 1
MAGNETIC SPECTROMETERS: P/Δp=39000, 54kgM+p/Δp=5000, 32kgM
OTHER FACILITIES:
 100m TOF Tunnel and 0-90° Beam Swinger
 Beam Circulation Ring with 200MeV H₂⁺ injection
 Secondary-Beam Course

REFERENCES/NOTES
 (a) Commissioning of the RCNP Ring Cyclotron, Proc. of
 (b) this conf.

H. Ikegami, The RCNP Ring Cyclotron Facilities,
 Proc. of the 12th
PLAN VIEW OF FACILITY, COMMENTS
 Conf. on Cyc.

