

ENTRY NO. C27 Date July 6, 1992
 Name of Machine VARIABLE ENERGY CYCLOTRON
 Institution VARIABLE ENERGY CYCLOTRON CENTRE
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 In Charge: BIKASH SINHA Reported by: N.K. MUKHOPADHYAY

HISTORY

MILESTONE DATES:
 Design 1967 Model Tests
 Construction 1969-77 First Beam June '77 Internal
 DESIGN/CONSTRUCTION BY: July '78 External
 in house other
 COST: Accelerator \$ 3 x 10⁶ Facility \$ 15 x 10⁶
 FUNDED BY: Department of Atomic Energy

STATUS

STAFF: Machine
 Scientists 14 Engineers 36
 Technicians 60 Students
 Research (in house/external)
 Scientists 7 Groups 30 group Engineers /
 Technicians / Students /
 BUDGET: Machine \$ 2 x 10⁶ Funded by DAE
 Research \$ 1 x 10⁶ Funded by DAE
 TIME DISTRIBUTION:
 Basic Research (in house/external) 10 % / 43 %
 Applied Program (in house/external) 10 % / 12 %
 Development 5 % Maintenance 20 %

MAGNET

POLE PARAMETERS:
 Diameter 224 cm R_{extract} 100 cm R_{inject} cm
 HILL PARAMETERS: Gap (min) 19 cm B_{max} 2.1 T
 (@ AT) Gap (max) 19 cm B_{min} T
 VALLEY PARAMETERS: Gap (min) 30 cm B_{max} 1.4 T
 (@ AT) Gap (max) 30 cm B_{min} T
 AVERAGE FIELD: < B >_{min} T < B >_{max} 1.7 T
 NUMBER OF SECTORS: compact/separated Compact / 3
 sector angle deg. spiral (max) 55 deg.
 FIELD TRIMMING: Trim Coils 17
 Harmonic Coils 5
 Other
 CURRENT: Main Coils 2800 Amps Stability 1 x 10⁻⁴
 Trim Coils 2500 Amps Stability 1 x 10⁻³
 Stored Energy (cryogenic) MJ
 WEIGHT: Iron 275 Tons Conductor Cu
 ION ENERGY: Bending Limit E/A = 140 q²/A² MeV/u
 Focussing Limit E/A = 70 q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:
 Description: Single 180 Degree Dee
 No. of Gaps/turn 2 dE/dn(max) 12 MeV/q
 Voltage(max) 0.05 MV Harmonic f_{rf}/f_{ion} 1.3
 Freq 5.5-16.5 MHz Power in(max) 0.3 MW
 Stability: Phase Voltage 2 x 10⁻³
 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 T
 PUMPS: No. and type 2 x 89 Cms. Oil. Diff. Pump
 .10 inch. Diffstack near extraction

ION SOURCE(S)

Type	Intensity (mA)	ϕ (πmm mrad)	ε _n = βγϕ	Ion Species
(a) PIG Int	2			P. d.v. C
(b) ECR	undertest			
(c)				
(d)				

INJECTION SYSTEM

Axial injection under progress, Efficiency %
 minor inflector.

EXTRACTION SYSTEM

Electrostatic Efficiency 20 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current(part μA)	
		Internal	External
(a) P	30	12	2
(b) d	12.5	100	20
(c) α	30	5	
(d) α	22	5	0.5

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

EXTRACTED BEAM PROPERTIES:

For 5 μA of 10 MeV/u He⁺⁺ ions
 ΔE/E 0.3 % Δφ 30 °rf
 ε_n = βγϕ x πmm mrad z πmm mrad

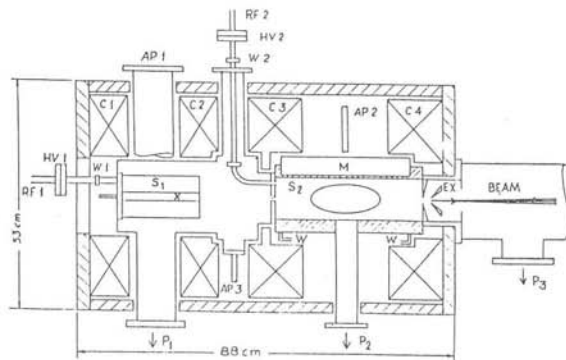
FACILITIES FOR RESEARCH

SHIELDED AREA: Fixed 226 m² Moveable 535 m²
 Target Stations: 3 No. Served At Same Time: 1
 MAGNETIC SPECTROMETERS:
 OTHER FACILITIES: 915 mm. Scattering Chamber, Target detector, Lab., Electronic Module, Radiochemistry, Radio-Isotope Lab., ISOL System, Rabbit (under construction)

REFERENCES/NOTES

(a) Int. Cyclotron Conf. Proc. 1989, 86, 84, 78, 75, 72.
 (b)

PLAN VIEW OF FACILITY, COMMENTS



Room Temp. ECR Source Commissioned, Injection line near completion.