

ENTRY NO. C29 Date October 6, 1995
 Name of Machine VARIABLE ENERGY CYCLOTRON
 Institution VARIABLE ENERGY CYCLOTRON CENTRE
 Address 1/AF, BIDHAN NAGAR, CALCUTTA-700 064, INDIA
 Tel +91 33 371230 Telex CA 4526 Fax +91 33 346871 E-MAIL guest@veccal.ernet.in.
 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 10⁸ Facility \$15x10⁶
 FUNDED BY: Department of Atomic Energy

STATUS

STAFF: Machine

Scientists 14 Engineers 39
 Technicians 60 Students
 Research (in house/external)
 Scientists 8 Groups / Engineers /
 Technicians / Students /
 BUDGET: Machine \$2.5 x 10⁶ Funded by DAE
 Research \$1 x 10⁶ Funded by DAE

TIME DISTRIBUTION:

Basic Research (in house/external) 10 % / 30 %
 Applied Program (in house/external) 20 % / 15 %
 Maintenance 20 % Development 5 %

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: _{min} T _{max} 1.7 T

NUMBER OF SECTORS: compact/separated /
 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 = 130 q²/A² MeV/u
 Focusing 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) MeV/q
 Voltage (max) 0.06 MV Harmonic f_{rf}/f_{ion} 1/3
 Freq 5.5 - 15.5 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 cm. oil Diff. Pump
 10 inch Diffstack near extraction

ION SOURCE(S)

Type	Intensity (mA)	@ ε _n = βγε (π mm mrad)	Ion Species
(a) PIG Int.	2		P, d, α
(b) ECR Development			Ar, O, Xe, N
(c)			
(d)			

INJECTION SYSTEM

Axial Injection under test Efficiency %

EXTRACTION SYSTEM

Electrostatic Efficiency 15 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current (part μA)	
		Internal	External
(a) P	30	200	15
(b) d	30	200	20
(c) α	80	50	2
(d)			

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

EXTRACTED BEAM PROPERTIES:

For 5 μA of 10 MeV/u He⁺⁺ ions
 ΔE/E 3 % Δφ 30 °rf
 ε_n = βγε x 12.5 π mm mrad z 16.5 π mm mrad

FACILITIES FOR RESEARCH

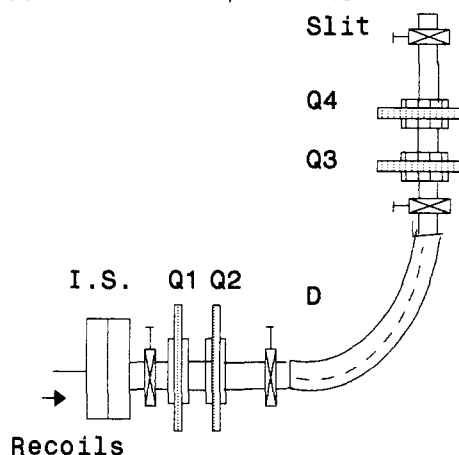
SHIELDED AREA: Fixed 226 m² Moveable 535 m²
 Target Stations: 4 No. Served At Same Time: 1

MAGNETIC SPECTROMETERS:
 OTHER FACILITIES: 915 mm Scattering chamber, Target, detector Lab., Electronic module, Radiochemistry, radio-isotope Lab., ISOL System, Rabbit on line data analysing computer.

REFERENCES/NOTES

(a) Int. Cyclotron Conf. Prof. 1992, 89, 86, 84, 78, 75,
 (b) 22

PLAN VIEW OF FACILITY, COMMENTS



LAYOUT OF THE VECC ISOL SYSTEM