

ENTRY NO. C5 Date December 1995
 Name of Machine CYCLOTRON
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 In Charge: Dr. J.R. Morales Ph.D. Reported by: Dr. M.J. Avila-Sobarzo Ph.D.

HISTORY

MILESTONE DATES:
 Design 1960 Model Tests 1962
 Construction 1960-1964 First Beam 1962 (Davis)
 DESIGN/CONSTRUCTION BY: 1967 (Santiago)
 in house U. Calif. other
 COST: Accelerator 500,000 Facility 300,000
 FUNDED BY: University of Chile

STATUS

STAFF: Machine
 Scientists 1 Engineers 1
 Technicians 1 Students
 Research (in house/external)
 Scientists 4 / 2 Engineers /
 Technicians 1 / 1 Students 1 / 3
 BUDGET: Machine 10,000 U. of Chile
 (1993-95) Research 50,000 Funded by IAEA
 TIME DISTRIBUTION:
 Basic Research (in house/external) 15 % / %
 Applied Program (in house/external) 50 % / %
 Maintenance 25 % Development 10 %

MAGNET

POLE PARAMETERS:
 Diameter cm R_{extract} cm R_{inject} cm
 HILL PARAMETERS: Gap (min) cm B_{max} T
 (@ AT) Gap (max) cm B_{min} T
 VALLEY PARAMETERS: Gap (min) cm B_{max} T
 (@ AT) Gap (max) cm B_{min} T
 AVERAGE FIELD: $\langle B \rangle_{\text{min}}$ 0.62 T $\langle B \rangle_{\text{max}}$ 1.97 T
 NUMBER OF SECTORS: compact/separated 3 /
 sector angle deg. spiral (max) deg.
 FIELD TRIMMING: Trim Coils 1 / sector
 Harmonic Coils
 Other
 CURRENT: Main Coils Amps Stability
 Trim Coils Amps Stability
 Stored Energy (cryogenic) MJ
 WEIGHT: Iron 50 Tons Conductor 3 Tons
 ION ENERGY: Bending Limit $E/A = q^2/A^2$ MeV/u
 Focusing Limit $E/A = q/A$ MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:
 Description: 2 DEES 100° Angle
 No. of Gaps/turn $dE/dn(\text{max})$ MeV/q
 Voltage (max) MV Harmonic f_H/f_{ion}
 Freq. 15 - 30 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 $dE/dn(\text{max})$ MeV/q
 Voltage (max) MV Harmonic f_H/f_{ion}
 Freq. MHz Power in(max) MW
 Stability: Phase Voltage

VACUUM SYSTEM

OPERATING PRESSURE: 45 u
 PUMPS: (No. and type) LEYBOLD E-250 / TWO DIFFUSION
 PUMPS

ION SOURCE(S)

Type	Intensity (mA)	@ $\epsilon_n = \beta\gamma\epsilon$ (π mm mrad)	Ion Species
(a) Cold Cathode			H^+ D^+ He^{++}
(b)			
(c)			
(d)			

INJECTION SYSTEM

Efficiency %

EXTRACTION SYSTEM

Efficiency %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current (part μA)	Internal	External
(a) H^+	10	15	1.0	1.0
(b) D^+	4.8	10	2.0	2.0
(c) He^{++}	10	0.5	0.3	0.3
(d)				

Secondary Particles	E_s (MeV)	part/sec 10^3
(a) Neutrons	20	
(b)		
(c)		

EXTRACTED BEAM PROPERTIES:

For μA of MeV/u ions
 $\Delta E/E$ 1 % $\Delta \phi$ °
 $\epsilon_n = \beta\gamma\epsilon$ x π mm mrad z π mm mrad

FACILITIES FOR RESEARCH

SHIELDED AREA: Fixed: 150 m² Moveable m²
 Target Stations: 3 No. Served At Same Time: 1
 MAGNETIC SPECTROMETERS:
 OTHER FACILITIES:
 19 INCH ORTEC SCATTERING CHAMBER, AUTOMATED
 MULTITARGET PIXE CHAMBER, PROVIDED BY IAEA (1995).

REFERENCES/NOTES

- NUCL. INST. METH. 18, 19, 12, 124 and 125-128 (1962)
- UCD - CNL 56 Report (1970)
- CYCLOTRON TRANSFERRED: UCDavis to U.Chile Through U. Chile - U. Calif. coop. program funded by Ford Foundation 1967

PLAN VIEW OF FACILITY, COMMENTS

