

ENTRY NO. 12

NAME OF MACHINE CICLOTRON DE LA UNIVERSIDAD DE CHILE
 INSTITUTION FACULTAD DE CIENCIAS UNIVERSIDAD DE CHILE
 ADDRESS CASILLA 653 SANTIAGO - CHILE
 TEL 2712865 TELEX
 IN CHARGE J.R. MORALES REPORTED BY OSVALDO MALDONADO

HISTORY AND STATUS

DESIGN, date 1960 Model tests 1962
 ENG DESIGN, date 1960-1964
 CONSTRUCTION, date 1960-1964
 FIRST BEAM, date (or goal) 1962 (DAVIS), 1967 (SANTIAGO)
 MAJOR ALTERATIONS New RF System (1967)
 Now Ion Source (1982)
 COST, ACCELERATOR \$ 500.000.-
 COST, FACILITY, total \$ 300.000.-
 FUNDED BY U. of Chile - U. of California

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 1 ENGINEERS 1
 TECHNICIANS 2 CRAFTS 1
 GRAD STUDENTS involved during year
 OPERATED BY 1 Research staff or 1 Operators
 OPERATION 40 hr/wk, On target 25 hr/wk
 TIME DISTR, in house: 100 %, outside %
 BUDGET, op & dev \$ 10.000
 FUNDED BY U. de Chile

RESEARCH STAFF, not included above

USERS, in house 4 outside 2
 GRAD STUDENTS involved during year 5
 RESEARCH BUDGET, in house Not fixed
 FUNDED BY U. de Chile

MAGNET

POLE FACE, diameter (compact) 60 cm, R-extraction 25 cm
 R injection cm
 GAP, min cm, Field 19.7 kG
 max 4.4 cm, Field 19.7 kG at 0.2×10^6
 AVERAGE FIELD at R ext 19.7 kG Ampere turns
 $B_{max} / < B >$
 NUMBER OF SECTORS { compact 3 } Spiral, max 45 deg
 { separated }
 SECTOR ANGLE (SSC) deg
 TRIMMING COILS 9

CONDUCTOR, material and type Copper

STORED ENERGY (cryogenic) MJ
 POWER: main coils 57 max kW: current stability 10^{-4}
 trimming coils 5 max kW: current stability 10^{-2}
 WEIGHT: Fe tons: coils tons
 COOLING system Water
 ION ENERGY (Bending limit) $E/A =$ q^2/A^2 MeV/amu
 (Focusing limit) $E/A =$ q/A MeV/amu

ACCELERATION SYSTEM

DEES, number 2 angle 110 deg
 BEAM APERTURE 1.5 cm; DC Bias kV
 TUNED by, coarse fine
 RF 15 to 30 MHz, stable $\pm 10^{-6}$
 Orb F to MHz
 HARMONICS, RF/Orb F, used
 DEE-Gnd, max kV, min gap cm
 STABILITY, (pk-pk noise)/(pk RF volt)
 ENERGY GAIN, max 100 kV/turn
 RF PHASE, stable to \pm deg
 RF POWER input, max. 15 kW
 FREQUENCY MODULATION, rate /s
 modulator, type
 beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 5×10^{-5} mbar Torr or mbar
 PUMPS, No, Type, Size 1 mechanical

ION SOURCES

Hot cathode

INJECTION SYSTEM

EXTRACTION SYSTEM

Electrostatic deflector

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 150 m², movable m²
 TARGET STATIONS 2 in 2 rooms
 STATIONS served at same time, max 1
 MAG SPECTROGRAPH, type
 COMPUTER model Z-2D Cromemco, C53-68000 Cromemco
 OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (μ A)	
	Goal	Achieved	Internal	External
P	12	10	10	0.5
d	6	5	10	3
He ⁴	12	10	0.5	
SECONDARY			(part/s)	
M	20			10^5

BEAM PROPERTIES

MEASURED CONDITIONS
 PULSE WIDTH RF deg μ A of MeV ions
 PHASE EXC, max RF deg μ A of MeV ions
 EXTRACT eff 30 % μ A of 5 MeV d ions
 RESOL $\Delta E/E$ 1 % μ A of 5 MeV d ions
 EMITTANCE
 (π mm-mrad) axial μ A of MeV
 rad

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 60% SOLID STATES PHYSICS
 BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS
 Maintenance 10%
 Machine Research 30%

REFERENCES/NOTES

- 1) Nucl. Inst. Meth. 18, 19, 120-124 & 125-128
- 2) UCD - CNL 86 Report (1970).

PLAN VIEW OF FACILITY, COMMENTS, ETC.

