

ENTRY No. 12

NAME OF MACHINE **CYCLOTRON U. de CHILE** DATE **JUNE 1980**
 INSTITUTION **INSTITUTO DE CIENCIAS UNIVERSIDAD DE CHILE**
 ADDRESS **SANTIAGO, CHILE, CASILLA 653**
TEL 2712865. Anexo 215 TELEX 240230 BOOTH 'CL' NUCLEAR
 IN CHARGE **J.R. MORALES** REPORTED BY **J.R. MORALES**

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 design MS and RI

COST, ACCELERATOR \$ 500,000
 COST, FACILITY, total \$ 300,000
 FUNDED BY U. of Chile

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 1 ENGINEERS 1
 TECHNICIANS 1 CRAFTS 1
 GRAD STUDENTS involved during year
 OPERATED BY 1 Research staff or 1 Operators
 OPERATION 50 hr/wk On target 40 hr/wk
 TIME DISTR. in house 90 % Outside 10 %
 BUDGET, op & dev US \$ 10,000
 FUNDED BY Univ. of Chile

RESEARCH STAFF, not included above

USERS, in house 4 outside 3
 GRAD STUDENTS involved during year 2
 RESEARCH BUDGET, in house non fixed, about US \$ 10,000
 FUNDED BY U. of Chile, CONICYT

MAGNET

POLE FACE, diameter (compact) cm, R extraction cm
 R injection cm
 GAP, min cm, Field kg }
 max 4.4 cm, Field 19.7 kg } at 0.2-10⁶
 AVERAGE FIELD at R ext 19.7 kg } Ampere turns
 B max/

NUMBER OF SECTORS { compact 3 } Spiral, max deg
 separated }
 SECTOR ANGLE (SSC) deg
 TRIMMING COILS 1/sect

CONDUCTOR, material and type Cu pipes
 STORED ENERGY (cryogenic) MJ
 POWER: main coils 74 max, kW ; current stability 10
 trimming coils max, kW ; current stability

WEIGHT: Fe 50 tons ; coils 5 tons
 COOLING system Destil. water
 ION ENERGY (bending limit) E/A = q²/a² MeV/amu
 (focusing limit) E/A = q²/a² MeV/amu

ACCELERATION SYSTEM

DEES, number 2 ; angle 100 deg
 BEAM APERTURE 1.5 cm ; DC Bias kV
 TUNED by, coarse MS fine 10⁻⁶
 RF 15 to 30 MHz, stable ± 10⁻⁶
 Orb F MHz
 HARMONICS, RF/Orb F, used
 DEE - Gnd, max 60kV, min gap 0.05 cm
 STABILITY, (pk-pk noise)/(pk RF volt) 0.05
 ENERGY GAIN, max 100 kV/turn
 RF PHASE, stable to ± deg
 RF POWER input, max 15 kW
 FREQUENCY MODULATION, rate 500 /s
 modulator, type pulsed
 beam pulse, width 25-30 %

VACUUM SYSTEM

OPERATING PRESSURE 45 μ mbar
 PUMPS, No, Type, Size Leybold E-250/two diffusion pumps

ION SOURCES

A "COLD-CATHODE" ion source is now being used.

INJECTION SYSTEM

EXTRACTION SYSTEM
 Electrostatic

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 150 m² ; movable m²
 TARGET STATIONS 3 in 2 rooms
 STATIONS served at same time, max 1
 MAG SPECTROGRAPH, type
 COMPUTER model PC Acer 500
 OTHER FACILITIES 19 in. ORTEC SCATT. CHAMBER

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (pμA)	
	Goal	Achieved	Internal	External
p	12	10	15	1.0
d	6	4.8	10	2.0
He	12	10	0.5	0.3

SECONDARY

0 20 (part/s)₅

BEAM PROPERTIES

MEASURED CONDITIONS
 PULSE WIDTH RF deg μA of MeV ions
 PHASE EXC, max RF deg μA of MeV ions
 EXTRACT eff 50 % 2 μA of 5 MeV d ions
 RESOL ΔE/E 1 % 2 μA of 5 MeV d ions
 EMITTANCE

(π mm. mrad) { axial } μA of MeV ions
 rad }

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 10% SOLID STATES PHYSICS
 BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS
 PIXE 70%
 PROTON ACTIVATION ANALYSIS 20%

REFERENCES/NOTES

- (1) Nucl. Inst. Meth. 18, 19, 120-124 and 125-128 (1962)
 UCD - CNL 56 Report (1970).
- (2) Cyclotron transferred from UC Davis through U. Chile -
 U. Calif. cooperative program, financed by Ford Foundation.

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

