

ENTRY NO. 11

NAME OF MACHINE CICLOTRON DE LA UNIVERSIDAD DE CHILE
 INSTITUTION FACULTAD DE CIENCIAS-UNIVERSIDAD DE CHILE
 LOCATION SANTIAGO-CHILE DATE APRIL 1975

IN CHARGE H. Riquelme A. 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 (Stoggy)
 MAJOR ALTERATIONS New design MS and RI
 OPERATION, 40 hr/wk; On Target 24 hr/wk
 TIME DIST., in house 100 %, outside _____ %
 USERS' SCHEDULING CYCLE _____ weeks
 COST, ACCELERATOR \$ 500 000
 COST, FACILITY, total \$ 300 000
 FUNDED BY U. of Chile and U. of Chi-

le-U. of Cal. Coop. program (Operation)
ACCELERATOR STAFF, OPERATION and DEVELOPMENT

SCIENTISTS 2 ENGINEERS 1
 TECHNICIANS 1 CRAFTS -
 ADMIN & CLER - TOTAL 4
 GRAD. STUDENTS involved during year 2
 OPERATED BY 1 Res staff or 1 Sp operators
 BUDGET, op & dev aprox. \$ 2,000
 FUNDED BY U. of Chile and convenio
U. Chile - U. California
RESEARCH STAFF, not included above

USER GROUPS, in house 1 outside _____
 STAFF SCIENTISTS, in house 2 outside _____
 TOTAL RES STAFF, in house 2 outside _____
 GRAD STUDENTS involved during year 2
 RES. BUDGET, in house non fixed
 FUNDED BY U. of Chile

FACILITIES FOR RESEARCH PROGRAMS

SHIELDED AREA, fixed 150 m²
 movable _____ m²
 TARGET STATIONS 2 in 2 ROOMS
 STATIONS SERVED AT THE SAME TIME, max 1
 MAG SPECTROGRAPH, type _____
 ON-LINE COMPUTER, model _____
 FACILITIES for:
 Isotope production _____
 Irradiation, Solid State _____
 Biological _____
 Time-of-Flight Study up to 10m flight path
 On-Line Mass Separation _____

MAGNET

POLE FACE dia 60 cm; R ext 25 cm
 GAP, min _____ cm; Field _____ kG
 max 4.4 cm; Field 19.7 kG } at 0.2 x 10⁶
 YOKE FIELD at R max 19.7 kG } A-turns
 CURRENT, STABILITY ± 100 (Goal) } parts/10⁶
 B max/ = _____
 AVF SECTORS 3 SPIRAL, max 45 deg
 POLE FACE coil pairs, AVF _____ /sec
 Harmonic 1 /sec; Rad Grad _____ /sec, or
 _____ circular; HEAVY ION, E max = _____ q²/A
 WEIGHT, Fe _____, Cu, or Al _____ tons
 POWER, main coils 40 KW, pole tips 34 KW
 total 74 kW; cooled by water
 YOKE/POLE area 100 %; θ sec (Sect Mag) _____ deg
 TOTAL POWER, installed 0.3 MW
 normal load 0.12 MW

ION SOURCE, int Hot Cathode
 ext _____

ACCELERATION SYSTEM

DEES, number 2, width 110 deg
 BEAM APERTURE 1.5 cm; DC BIAS _____ kV
 TUNED by, coarse MS, fine MC
 RF 15 to 30 MHz, stable ± 1 /10⁶
 Orb F _____ to _____ Mc/s; GAIN 100 kV/t
 HARMONICS, RF/OF, used _____
 DEE-Gnd, max 60 kV, x/field, min _____ cm,
 STABILITY, (pk-pk noise)/(pk RF volt) 0.05
 RF PHASE stable to ± _____ deg
 RF POWER input, max 15 kW
 RF PROTECT curcuit, speed 1000 μs
 type Relay
 EXTRACT System DC Electrostatic

FREQUENCY MODULATION, rate _____ /sec
 MODULATOR, type _____
 BEAM PULSE, width _____ nsec

FM only

SELECTED REFERENCES

Nucl. Inst. Meth. 18,19, 120-124
 and 125-128 (1962)
 UCD-CNL 56 Report (1970)

NOTATIONS # This Cyclotron was transferred from UC Davis through the U. of Chile - U. of California Cooperative Program, financed by Ford Foundation.

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CHARACTERISTIC BEAMS

	Particle	Goal (MeV)	Achieved (MeV)
ENERGY	p	12	10
	d	6	5
	He-4	12	10
CURRENT		(μ A)	(μ A)
	Internal		
	External		
		(part/s)	(part/s)
Secondary	20MeV n		10 ⁵
HEAVIEST ion			

BEAM PROPERTIES

	Measured	Conditions
Pulse Width	_____ RF deg	_____ μ A of _____ MeV
Phase Exc, max	_____ RF deg	_____ μ A of _____ MeV
Extract Eff	30 %	2 μ A of 5 MeV d
Res, $\Delta E/E$	1 %	2 μ A of 5 MeV d
Emittance	{ _____ axial } (mm-mrad) { _____ radial }	_____ μ A of _____ MeV
VACUUM norm	40 μ torr;	PUMPDOWN time 1-2 hr

OPERATING PROGRAMS, time dist

Basic Nuclear Physics/Chemistry	20 %
Solid State Physics	%
Bio-Medical Applications	%
Isotope Production	%
Materials Science	%
Machine Research	20 %
Maintenance	60

OTHER FEATURES and OPERATION SUMMARY

- 1.- The beam is pulsed with a variable duty cycle up to 50% through the RF system
- 2.- The facilities include a spherical neutron pit with a radius of aprox. 5 m and with a centered target holder
- 3.- A new ion-source was developed and tested