ENTRY No. 10

NAME OF MACHINE CICLOTRON DE LA UNIVERSIDAD DE CHILE Date : April 1975
INSTITUTION FACULTAD DE CIENCIAS - UNIVERSIDAD DE CHILE
ADDRESS SANTIAGO - CHILE
TEL ..... TELEX .....
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 (Stgo)
MAJOR ALTERATIONS New design MS and RI
COST, ACCELERATOR $ 500,000
COST, FACILITY, total $ 300,000
FUNDED BY # U. of Chile, U. of Chile+U. of Calif (operat.)

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 2 ENGINEERS 1
TECHNICIANS 1 CRAFTS -
GRAD STUDENTS involved during year 2
OPERATED BY 1 ..... Research staff or 1 ... Operators
OPERATION 40 ..... hr/wk, On target 24 ..... hr/wk
TIME DISTR. in house 100 %, Outside ..... %
BUDGET, op & dev Approx. $ 2,000
FUNDED BY U. of Chile, U. of Chile+U. California

RESEARCH STAFF, not included above

USERS, in house 1 ..... outside .....
GRAD STUDENTS involved during year 2
RESEARCH BUDGET, in house non fixed
FUNDED BY U. of Chile

MAGNET

POLE FACE, diameter (compact) 60 cm, R extraction 25 cm
R injection ..... cm
GAP, min ..... cm, Field ..... kG
max 4.4 cm, Field 19.7 kG } at 0.2.10⁶ Ampere turns
AVERAGE FIELD at R ext ..... 19.7 kG
B max/ <B>
NUMBER OF SECTORS { compact 3 / separated ... } Spiral, max 45 deg
SECTOR ANGLE (SSC) ..... deg
TRIMMING COILS 1/sect.
CONDUCTOR, material and type
STORED ENERGY (cryogenic) ..... MJ
POWER : main coils 74 max, kW ; current stability 10^{-4}
trimming coils ..... max, kW ; current stability .....
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 MS ..... fine MC
RF 15 to 30 mHz, stable ± 10^{-6}
Orb F ..... to ..... mHz
HARMONICS, RF/Orb F, used
DEE - Gnd, max 60 kV, min gap ..... 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 ..... /s
modulator, type
beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 40 μ Torr
PUMPS, No, Type, Size

ION SOURCES

Hot cathode

INJECTION SYSTEM

EXTRACTION SYSTEM

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 150 m² ; movable ..... m²
TARGET STATIONS 2 .. in 1 ..... rooms
STATIONS served at same time, max 1
MAG SPECTROGRAPH, type
COMPUTER model
OTHER FACILITIES
Time of flight study : up to 10m flight path

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (μA) Internal	External
p	12	10	1	0.3
d	6	5	10	3
^{4}He	12	10	0.5	
SECONDARY				(part/s)
n		20		10^5

BEAM PROPERTIES

	MEASURED		CONDITIONS
PULSE WIDTH	RF deg	pμ A of	MeV ... ions
PHASE EXC, max	RF deg	pμ A of	MeV ... ions
EXTRACT eff	30 %	2 μ A of	5 MeV d ions
RESOL ΔE/E	1 %	2 μ A of	5 MeV d ions
EMITTANCE			
(π mm. mrad) { axial / rad }		pμA of	MeV ... ions

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 20% SOLID STATES PHYSICS ....
BIOMEDICAL APPLICAT. .... ISOTOPE PRODUCTIONS ....
Machine research 20 %
Maintenance 60%

REFERENCES/NOTES

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

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

1. - The beam is pulsed with a variable duty cycle up to 50 % through the RF system
2. - Facilities include a spherical neutron pit with a radius of approx. 5 m and with a centred target holder.
3. - A new ion-source was developed and tested.
4. - The machine was closed from 1975 to 1978.

\# Cyclotron transferred from UC Davis through U. Chile - U. Calif. cooperative program, financed by Ford Foundation.