ENTRY No. CU112

NAME OF MACHINE Biomedical cyclotron ..... DATE 7/10/78

INSTITUTION University of California - Center for the Health Sciences

ADDRESS Los Angeles, CA 80024 - USA

TEL ..... TELEX .....

IN CHARGE N.S. Mac Donald Ph-D REPORTED BY N. S. Mac Donald Ph-D

HISTORY AND STATUS CS-22

DESIGN, date Cyclotron Corp. Model tests ... 1970

ENG DESIGN, date

CONSTRUCTION, date

FIRST BEAM, date (or goal) 3/15/71

MAJOR ALTERATIONS

COST, ACCELERATOR

COST, FACILITY, total $ 700,000

FUNDED BY AEC, University

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 1 ENGINEERS 2

TECHNICIANS 2 CRAFTS

GRAD STUDENTS involved during year 1

OPERATED BY x Research staff or Operators

OPERATION 50 hr/wk, On target 24 hr/wk

TIME DISTR. In house 100 %, Outside %

BUDGET, op & dev

FUNDED BY

RESEARCH STAFF, not included above

USERS, In house 3 outside 2

GRAD STUDENTS involved during year 1

RESEARCH BUDGET, In house

FUNDED BY D.O.E.

MAGNET

POLE FACE, diameter (compact) 97 cm, R extraction 40.5 cm

R injection cm

GAP, min 5 cm, Field 20 kG
max 10 cm, Field 12 kG
} at 2.10^5 Ampere turns

AVERAGE FIELD at R ext 16 kG

B max/ <B> 1.25

NUMBER OF SECTORS { compact 3 / separated } Spiral, max .. deg

SECTOR ANGLE (SSC) deg

TRIMMING COILS 3/sect

CONDUCTOR, material and type

STORED ENERGY (cryogenic) MJ

POWER : main coils 30 max, kW ; current stability 3.10^{-5}

trimming coils max, kW ; current stability

WEIGHT : Fe 24 tons ; coils tons

COOLING system

ION ENERGY (bending limit) E/A = q^2/a^2 MeV/amu

(focusing limit) E/A = q^2/a^2 MeV/amu

ACCELERATION SYSTEM

DEES, number 2 ; angle 180 deg

BEAM APERTURE 4 cm ; DC Bias 2.5 kV

TUNED by, coarse straps fine VC, auto

RF 12 to 25 mHz, stable ± 10^{-5}

Orb F to mHz

HARMONICS, RF/Orb F, used

DEE - Gnd, max 25 kV, min gap 1 cm

STABILITY, (pk-pk noise)/(pk RF volt) 17/12 kV

ENERGY GAIN, max kV/turn

RF PHASE, stable to ± deg

RF POWER input, max 150 kW

FREQUENCY MODULATION, rate /s

modulator, type

beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE Torr or mbar

PUMPS, No, Type, Size

ION SOURCES

Penning, cold cathode

INJECTION SYSTEM

EXTRACTION SYSTEM

DC electrostatic, mag. channel

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed m² ; movable m²

TARGET STATIONS 1 in 1 rooms

STATIONS served at same time, max 1

MAG SPECTROGRAPH, type

COMPUTER model

OTHER FACILITIES Isotope production, Irradiation, solid state

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
p	22.1	22.1	100	52
d	12.2	12.2	750	75
^{3}He	31.6	31.6	90	50
α			95	55
SECONDARY				(part/s)

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 60-70	%	100 pμ A of 22 MeV p Ions
RESOL ΔE/E	%	pμ A of MeV ... Ions
EMITTANCE		
(π mm. mrad) { axial / rad }		pμA of MeV ... Ions

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS .. SOLID STATES PHYSICS ....

BIOMEDICAL APPLICAT. .... ISOTOPE PRODUCTIONS ....

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

- Prinicpal use: preparing radionuclides for the nuclear medicine clinic of the hospital and for research in biology and medicine.
- Quantitative analysis of ^{18}O in small water samples of biological origin by proton activation to ^{18}F are routine.