

ENTRY No. CU108

NAME OF MACHINE Biomedical cyclotron DATE 7/10/78
INSTITUTION University of California - Center for the Health Sciences
ADDRESS Los Angeles, CA 90024 - USA
TEL TELE
IN CHARGE N.S. MacDonald Ph-D REPORTED BY N.S. MacDonald 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 $2 \cdot 10^5$

AVERAGE FIELD at R ext 16 kG } Ampere turns
B max / < B > 1, 25

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

SECTOR ANGLE (ISSC) deg
TRIMMING COILS 3/sect

CONDUCTOR, material and type
STORED ENERGY (cryogenic)

POWER: main coils .30 max, kW; current stability 3.10 M
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 $\pm 10^{-5}$

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 $\pm$ 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 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)		CURRENT (pA)	
	Goal	Achieved	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 μ A of MeV ions

PHASE EXC, max RF deg μ A of MeV ions

EXTRACT eff 60-70 % 100 μ A of 22 MeV p ions

RESOL $\Delta E/E$ % μ A of MeV ions

EMITTANCE
(π mm. mrad) { axial } μ A of MeV ions
{ rad }

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

- Principal use: preparing radionuclides for the nuclear medicine clinic of the hospital and for research in biology and medicine.

- Quantitative analysis of ¹⁸O in small water samples of biological origin by proton activation to ¹⁸F are routine.