ENTRY No. CU106

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.