

ENTRY No. 118

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 TELEEX
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
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 (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
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 m^3; movable m^2
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

Table with columns: PARTICLE, ENERGY (MeV) Goal, Achieved, CURRENT (pA) Internal, External. Rows include p, d, 3He, alpha.

SECONDARY

BEAM PROPERTIES

MEASURED CONDITIONS
PULSE WIDTH RF deg pA of MeV ions
PHASE EXC, max RF deg pA of MeV ions
EXTRACT eff 60-70 % 100 pA of 22 MeV p ions
RESOL ΔE/E % pA of MeV ions
EMITTANCE
(π mm. mrad) {axial} pA 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.