ENTRY NO. 108

NAME OF MACHINE HARPER HOSPITAL K100 CYCLOTRON

INSTITUTION NATIONAL SUPERCONDUCTING CYCLOTRON LABORATORY, MICHIGAN STATE UNIVERSITY

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IN CHARGE H. BLOSSER REPORTED BY H. BLOSSER

HISTORY AND STATUS

DESIGN, date 81-84 Model tests 83-85

ENG DESIGN, date

CONSTRUCTION, date 84-86

FIRST BEAM, date (or goal) February 1986

MAJOR ALTERATIONS

COST, ACCELERATOR $1,250,000 (including gantry)

COST, FACILITY, total

FUNDED BY Harper-Grace Hospitals, Inc.

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS ENGINEERS

TECHNICIANS CRAFTS

GRAD STUDENTS involved during year

OPERATED BY Research staff or Operators

OPERATION hr/wk. On target hr/wk

TIME DISTR. in house %, outside %

BUDGET, op & dev

FUNDED BY

RESEARCH STAFF, not included above

USERS, in house outside

GRAD STUDENTS involved during year

RESEARCH BUDGET, in house

FUNDED BY

MAGNET

POLE FACE, diameter (compact) cm, R-extraction cm

R injection cm

GAP, min 3.8 cm, Field 40 kG
max 40.6 cm, Field 54 kG } at 1,929,000

AVERAGE FIELD at R ext 47 kG Ampere turns

B max/<B>

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

SECTOR ANGLE (SSC) deg

TRIMMING COILS none

CONDUCTOR, material and type NbTi in Cu

STORED ENERGY (cryogenic) 2.0 MJ

POWER: main coils 0 max kW: current stability

trimming coils none max kW: current stability

WEIGHT: Fe 24 US tons: coils 1 tons

COOLING system conduction from helium bath

ION ENERGY (Bending limit) E/A = 100 q^2/A^2 MeV/amu

(Focusing limit) E/A = 50 q/A MeV/amu

ACCELERATION SYSTEM

DEES, number 3 angle 50 deg

BEAM APERTURE 4 cm; DC Bias kV

TUNED by, coarse fixed freq. fine

RF 105 to MHz, stable ±

Orb F 35 to MHz

HARMONICS, RF/Orb F, used 3

DEE–Gnd, max 40 kV, min gap 0.4 cm

STABILITY, (pk-pk noise)/(pk RF volt)

ENERGY GAIN, max 240 kV/turn

RF PHASE, stable to ± deg

RF POWER input, max. kW

FREQUENCY MODULATION, rate /s

modulator, type

beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 1×10^{-5} Torr or mbar

PUMPS, No, Type, Size Turbo 300 l/sec

ION SOURCES

PIG

INJECTION SYSTEM

NONE

EXTRACTION SYSTEM

NONE

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed m^2; movable m^2

TARGET STATIONS in rooms

STATIONS served at same time, max

MAG SPECTROGRAPH, type

COMPUTER model

OTHER FACILITIES Cyclotron mounts on 360° isocentric gantry

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
d	50		20	
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	%	pμ A of	MeV	ions
RESOL ΔE/E	%	pμ A of	MeV	ions
EMITTANCE				
(π mm-mrad)	axial	pμ A of	MeV	
	rad			

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS

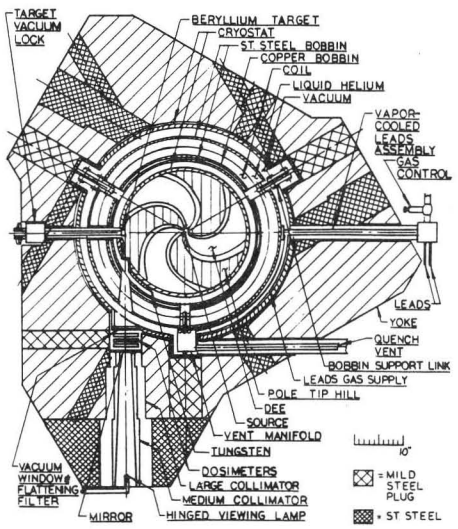
BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS

REFERENCES/NOTES

1) Proceedings of 9th Int.Conf. on Cyc. (1981)431.

2) IEEE Trans. on Nuc. Sci. NS-32(1985)3287.

PLAN VIEW OF FACILITY, COMMENTS, ETC.



CYCLOTRON MEDIAN PLANE VIEW