

ENTRY No. C72

NAME OF MACHINE W.U. Sector Focused Cyclotron DATE 7/15/81

INSTITUTION Washington University

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IN CHARGE John T. Hood REPORTED BY John T. Hood

HISTORY AND STATUS

DESIGN, date 1960 Model tests 1961-62

ENG DESIGN, date 1961-63

CONSTRUCTION, date 1962-65

FIRST BEAM, date (or goal) 1965

MAJOR ALTERATIONS

COST, ACCELERATOR

COST, FACILITY, total

FUNDED BY AFOSR, NSF

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS ENGINEERS 1

TECHNICIANS CRAFTS 1

GRAD STUDENTS involved during year

OPERATED BY Research staff or x Operators

OPERATION 12 hr/wk, On target 10 hr/wk

TIME DISTR, in house % Outside %

BUDGET, op & dev

FUNDED BY Washington University

RESEARCH STAFF, not included above

USERS, in house 4 outside 1

GRAD STUDENTS involved during year 6

RESEARCH BUDGET, in house

FUNDED BY

MAGNET

POLE FACE, diameter (compact) 137 cm, R extraction 54.5 cm

R injection cm

GAP, min 14.8 cm, Field 17.8 kG

max 33.8 cm, Field 10.3 kG } at 46×10^6

AVERAGE FIELD at R ext 14 kG } Ampere turns

B max/

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

SECTOR ANGLE (SSC) { separated .. } deg

TRIMMING COILS 5 pairs radial

4 pairs/sector first harmonic

CONDUCTOR, material and type copper strap

STORED ENERGY (cryogenic) MJ

POWER: main coils 120 max, kW; current stability

trimming coils 60 max, kW; current stability

WEIGHT: Fe 82 tons; coils 12 tons

COOLING system oil

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 1; angle 180 deg

BEAM APERTURE 3.2 cm; DC Bias 0 kV

TUNED by, coarse MS fine Vc, Auto

RF 7 to 16 MHz, stable $\pm$

Orb F 7 to 16 MHz

HARMONICS, RF/Orb F, used 1

DEE - Gnd, max 60 kV, min gap 1 cm

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

ENERGY GAIN, max kV/turn

RF PHASE, stable to $\pm$ deg

RF POWER input, max 100 kW

FREQUENCY MODULATION, rate /s

modulator, type

beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 20 μ Torr or mbar

PUMPS, No, Type, Size 2 - oil diffusion

Twenty and seven inch

ION SOURCES

Penning, Hot Filament

INJECTION SYSTEM

EXTRACTION SYSTEM

Electrostatic and Magnetic Channel

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 100 m²; movable m²

TARGET STATIONS 6 in 2 rooms

STATIONS served at same time, max 1

MAG SPECTROGRAPH, type

COMPUTER model

OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (pA)	
	Goal	Achieved	Internal	External
α		12-30		10
³ He		9-37		20
p		12		20
d		15		20

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	%	μ A of	MeV .. 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 60% SOLID STATES PHYSICS

BIOMEDICAL APPLICAT. 20% ISOTOPE PRODUCTIONS 20%

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS