

ENTRY No. C71

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 X 10⁶
AVERAGE FIELD at R ext 14 kG } Ampere turns
B max/
NUMBER OF SECTORS { compact 3 } Spiral, max .. deg
separated ..
SECTOR ANGLE (SSC) 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 = q²/a² MeV/amu
(focusing limit) E/A = q²/a² 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 ±
Orb F 7 to 16 MHz
HARMONICS, RF/Orb F, used
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 ± 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 (pμA)	
	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	pμA of	MeV .. ions
PHASE EXC, max	RF deg	pμA of	MeV .. ions
EXTRACT eff	%	pμA of	MeV .. ions
RESOL ΔE/E	%	pμA of	MeV .. ions
EMITTANCE			
(π mm. mrad) { .. axial }		pμA 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