

**ENTRY NO. 121**

NAME OF MACHINE . . . W.U. Sector. Focused. Cyclotron. . . . . DATE . . 7/15/81. . . . .  
 INSTITUTION . . . . . Washington. University. . . . .  
 ADDRESS . . . . . Box. 1134., St. Louis., Missouri. 63130. U.S.A. . . . .  
 TEL . 314-889-6579 . . . . . TELEX . . . . .  
 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 . . . . . none . . . . .

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 . 14.8cm, Field . 17.8 . . . kG }  
 max . 33.8cm, Field . 10.3 . . . kG } at . 46. X. 10<sup>6</sup> . . . . .  
 AVERAGE FIELD at R ext . . . 14 . . . . . kG } Ampere turns  
 B max / < B > . . . . .

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 = . . . . . q<sup>2</sup>/A<sup>2</sup> MeV/amu  
 (Focusing limit) E/A = . . . . . q/A 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 . . 1.00 . . m<sup>2</sup>; movable . . . . . m<sup>2</sup>  
 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 (μA)	
	Goal	Achieved	Internal	External
<sup>3</sup> α		12-30		10
<sup>3</sup> He		9-37		20
p		12		20
d		15		20
SECONDARY			(part/s)	

**BEAM PROPERTIES**

MEASURED		CONDITIONS	
PULSE WIDTH . . . . .	RF deg . . . . .	μA of . . . . .	MeV . . . . . ions
PHASE EXC. max . . . . .	RF deg . . . . .	μA of . . . . .	MeV . . . . . ions
EXTRACT eff . . . . . %		μA of . . . . .	MeV . . . . . ions
RESOL ΔE/E . . . . . %		μA of . . . . .	MeV . . . . . ions
EMITTANCE			
(π mm-mrad) . . . . . axial		μA of . . . . .	MeV . . . . .
			rad . . . . .

**OPERATING PROGRAMS, time distribution**

BASIC NUCLEAR PHYSICS . 60% SOLID STATES PHYSICS . . . . .  
 BIOMEDICAL APPLICAT. . 20% ISOTOPE PRODUCTIONS 20% . . . . .

**REFERENCES/NOTES**

- 1)
- 2)

**PLAN VIEW OF FACILITY, COMMENTS, ETC.**