ENTRY NO. 107

NAME OF MACHINE K800

INSTITUTION MICHIGAN STATE UNIVERSITY

ADDRESS NSCL/CYCLOTRON LABORATORY , EAST LANSING, MICHIGAN 48824-1321 USA

TEL 517-355-9671 TELEX 5106019207 NATSUPCYCLAB

IN CHARGE H. BLOSSER REPORTED BY F. MARTI

HISTORY AND STATUS

DESIGN, date 76-86 Model tests

ENG DESIGN, date 79-86

CONSTRUCTION, date 80-87

FIRST BEAM, date (or goal) 87

MAJOR ALTERATIONS

COST, ACCELERATOR $8,000,000

COST, FACILITY, total $35,000,000

FUNDED BY DOE (1980-82), NSF (1983-86)

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) 219.7 cm, R-extraction 103 cm

R injection 1 cm

GAP, min 7.6 cm, Field 62 kG

max 91.4 cm, Field 45 kG } at 7,200,000 Ampere turns

AVERAGE FIELD at R ext 53 kG

B max/<B>

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

SECTOR ANGLE (SSC) deg

TRIMMING COILS (21 x 3)+1

CONDUCTOR, material and type NbTi in Cu

STORED ENERGY (cryogenic) 60 MJ

POWER: main coils 0 max kW: current stability 1/10^5

trimming coils 100 max kW: current stability 1/10^4

WEIGHT: Fe 265 US tons: coils 22 US tons

COOLING system Helium Bath

ION ENERGY (Bending limit) E/A = ≅1200* q^2/A^2 MeV/amu

(Focusing limit) E/A = 400 q/A MeV/amu

ACCELERATION SYSTEM

DEES, number 3 angle 53 deg

BEAM APERTURE cm; DC Bias kV

TUNED by, coarse sliding short fine capacitive plate

RF 9 to 27.5 MHz, stable ± 1/10^7/day

Orb F 4.5 to 27.5 MHz

HARMONICS, RF/Orb F, used 1 and 2

DEE–Gnd, max 200 kV, min gap 2 cm

STABILITY, (pk-pk noise)/(pk RF volt) 1/10^4

ENERGY GAIN, max 1040 kV/turn

RF PHASE, stable to ± deg

RF POWER input, max. 3x200 kW

FREQUENCY MODULATION, rate /s

modulator, type

beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 1x10^{-7} Torr or mbar

PUMPS, No, Type, Size 3 cryopanels, 4.5K 2500 lts/second/panel

3 turbo molecular pumps 500 lts/sec/each

ION SOURCES

ECR and PIG

*depends on relative excitation of split main coil.

INJECTION SYSTEM

SPIRAL INFLECTORS, AXIAL INJECTION

EXTRACTION SYSTEM

PRECESSIONAL & 2 ELECT. DEFLEC. & IRON CHANNELS

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed m^2; movable 1300 m^2

TARGET STATIONS 9 in 7 rooms

STATIONS served at same time, max 1

MAG SPECTROGRAPH, type S320, S800, Enge split pole

COMPUTER model Vax 780, FPS 164, VAX 750's

OTHER FACILITIES Reaction Product Mass Separator, Multi detector array, 92" scattering chamber, 60" scattering chamber

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
^{12}C	2,400			
^{40}Ca	8,000			
^{238}U	4,800			
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
	rad	

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS

BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS

REFERENCES/NOTES

1) IEEE Trans. on Nuc. Sci. NS-26 (1979) 2078.
2) MSU Reports MSUCP 29 (June 1980) & MSUCP 35 (June 1981).
3) Proceedings of 9th Int. Conf. on Cyc. (1981) 197.

PLAN VIEW OF FACILITY, COMMENTS, ETC.

Building additions completed in 1982.
First operating test of magnet May 3, 1984.
First full field tests May 9, 1984.
First full power operator of #1 rf amplifier Feb. 1984.