**ENTRY NO.** 88

NAME OF MACHINE K800 DATE 5/9/84

INSTITUTION Michigan State University

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TEL 517-355-9671 TELEX

IN CHARGE H. Blosser REPORTED BY H. Blosser

**HISTORY AND STATUS**

DESIGN, date 76-84 Model tests

ENG DESIGN, date 79-85

CONSTRUCTION, date 80-86

FIRST BEAM, date (or goal) 86

MAJOR ALTERATIONS

COST, ACCELERATOR $6,400,000

COST, FACILITY, total $33,000,000

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 22. cm

GAP, min 7.6 cm, Field 62 kG
min 91.4 cm, Field 47 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

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 14 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 blade

RF 9 to 27.5 mHz, stable ± $1/10^7$

Orb F 4.5 to 27.5 mHz

HARMONICS, RF/Orb F, used 1,2

DEE—Gnd, max 200 kV, min gap 2.5 cm

STABILITY, (pk-pk noise)/(pk RF volt) 1/10,000

ENERGY GAIN, max 1040 kV/turn

RF PHASE, stable to ± deg

RF POWEP input, max 3 x 200 kW

FREQUENCY MODULATION, rate /s

modulator, type

beam pulse, width

**VACUUM SYSTEM**

OPERATING PRESSURE $1 \times 10^{-7}$ Torr or mbar

PUMPS, No, Type, Size 3 cryopanels, 4.5K

**ION SOURCES**

PIG (for cyclotron testing) and ECR

*depends on relative excitation of split main coil

**INJECTION SYSTEM**

Internal stripping foil

**EXTRACTION SYSTEM**

Precessional & 2 electrostatic deflectors & 9 iron channels

**FACILITIES FOR RESEARCH**

SHIELDED AREA, fixed m²; movable 1300 m²

TARGET STATIONS 10 in 6 rooms

STATIONS served at same time, max 1

MAG SPECTROGRAPH, type S800 and Enge splitpole

COMPUTER model VAX 780 & 750's

OTHER FACILITIES Reaction Product Mass Separator, Multi-detector array 120" 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 | 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 / rad | pμ A of MeV |

**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.