

ENTRY No. 102

NAME OF MACHINE NIH, BABY CYCLOTRON DATE
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IN CHARGE Ron Finn REPORTED BY Paul Plascjak

HISTORY AND STATUS

DESIGN, date 1981 Model tests
ENG DESIGN, date Japan Steel Works JSW 1710
CONSTRUCTION, date 1984
FIRST BEAM, date (or goal) Acceptance: Sept. 1985
MAJOR ALTERATIONS

COST, ACCELERATOR
COST, FACILITY, total
FUNDED BY National Institutes of Health
ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
SCIENTISTS ENGINEERS 4
TECHNICIANS CRAFTS support

GRAD STUDENTS involved during year
OPERATED BY Research staff or Operators
OPERATION 50 hr/wk, On target 25 hr/wk
TIME DISTR. in house 100% % Outside %
BUDGET, op & dev
FUNDED BY National Institutes of Health

RESEARCH STAFF, not included above
USERS, in house PET Facility outside Nuclear Med.
GRAD STUDENTS involved during year 1
RESEARCH BUDGET, in house
FUNDED BY National Institutes of Health

MAGNET
POLE FACE, diameter (compact) 101.4 cm, R extraction 42.0 cm
R injection cm
GAP, min 7 cm, Field 18.4 kG
max 13 cm, Field 12.4 kG at 1.3x10^5
AVERAGE FIELD at R ext 15.4 kG Ampere turns
B max/ <B> 1.2

NUMBER OF SECTORS compact 4 separated } Spiral, max 0. deg
SECTOR ANGLE (SSC) 3 deg
TRIMMING COILS

CONDUCTOR, material and type Copper, hollow
STORED ENERGY (cryogenic) MJ
POWER: main coils 60 max, kW; current stability 2x10^-4
trimming coils 3 max, kW; current stability

WEIGHT: Fe 30 tons; coils 1 tons
COOLING system chilled deionized water
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 2; angle 45 deg
BEAM APERTURE 1 cm; DC Bias 0 kV
TUNED by, coarse movable short fine active capacitor
RF 43.5 to 47 MHz, stable +/- 5x10^-6
Orb F 11.7 to 21.7 MHz
HARMONICS, RF/Orb F, used 2nd, 4th
DEE - Gnd, max 45 kV, min gap 3 cm
STABILITY, (pk-pk noise)/(pk RF volt)
ENERGY GAIN, max 100 kV/turn
RF PHASE, stable to +/- deg
RF POWER input, max 28 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 1x10^-5 Torr or mbar
PUMPS, No, Type, Size oil diffusion, 10"

ION SOURCES

Hot Cathode, axial

INJECTION SYSTEM

EXTRACTION SYSTEM

Electrostatic deflector, magnetic channel

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 34 m^2; movable 0 m^2
TARGET STATIONS 1 ext in 1 rooms
STATIONS served at same time, max 1
MAG SPECTROGRAPH, type
COMPUTER model NEC 9800 (target system)
OTHER FACILITIES isotope production, hot cells

CHARACTERISTIC BEAMS

Table with columns: PARTICLE, ENERGY (MeV) Goal, Achieved, CURRENT (pA) Internal, External. Rows: Protons, Deuterons.

SECONDARY

(part/s)

BEAM PROPERTIES

MEASURED CONDITIONS
PULSE WIDTH RF deg pA of MeV ions
PHASE EXC, max RF deg pA of MeV ions
EXTRACT eff 70 % 5.2 pA of 17.5 MeV ions
RESOL delta E/E 1 % pA of MeV ions
EMITTANCE

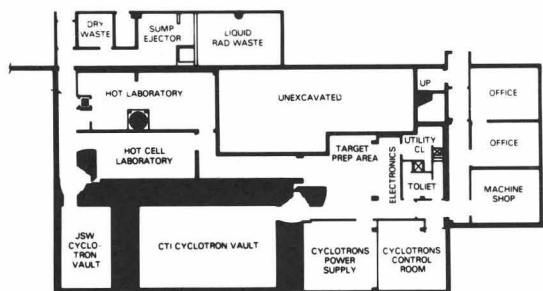
(pi mm. mrad) { .32 axial Horiz. } .15 rad Vert. pA of MeV ions

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS 100%
60% Radiopharmaceutical Production
40% Development

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS



NIH CYCLOTRON FACILITY B-3 LEVEL