

ENTRY No. 7

NAME OF MACHINE MNI Medical Cyclotron DATE August 31, 1981
INSTITUTION Montreal Neurological Institute
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IN CHARGE Dr. Y.L. Yamamoto REPORTED BY Leo Nikkinen

HISTORY AND STATUS

DESIGN, date 1974 Model tests 1976
ENG DESIGN, date 1977
CONSTRUCTION, date 1979
FIRST BEAM, date (or goal) 1981
MAJOR ALTERATIONS

COST, ACCELERATOR \$600 K
COST, FACILITY, total \$1 million
FUNDED BY Private Funds

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 1 ENGINEERS
TECHNICIANS 2 CRAFTS
GRAD STUDENTS involved during year
OPERATED BY Research staff or 1 Operators
OPERATION 40 hr/wk, On target hr/wk
TIME DISTR. in house 100 % , Outside %
BUDGET, op & dev \$50 K
FUNDED BY MRC

RESEARCH STAFF, not included above

USERS, in house 5 outside
GRAD STUDENTS involved during year
RESEARCH BUDGET, in house \$50 K
FUNDED BY Medical Research Council

MAGNET

POLE FACE, diameter (compact) 72 cm, R extraction 30 cm
R injection 0 cm
GAP, min 5.5 cm, Field 20.5 kG }
max 9.5 cm, Field 13 kG } at 1.2 x 10⁵
AVERAGE FIELD at R ext 18 kG } Ampere turns
B max/ < B >

NUMBER OF SECTORS { compact 4 } Spiral, max deg
SECTOR ANGLE (SSC) 45 deg
TRIMMING COILS 4 pairs

CONDUCTOR, material and type copper - hollow conductor
STORED ENERGY (cryogenic) MJ
POWER: main coils 30 max, kW ; current stability 5x10⁻⁵
trimming coils 0.1 max, kW ; current stability 10⁻⁴
WEIGHT: Fe 12.1 tons ; coils Cu, 0.9 tons
COOLING system H₂O
ION ENERGY (bending limit) E/A = 10 q²/a² MeV/amu
(focusing limit) E/A = q/a MeV/amu

ACCELERATION SYSTEM

DEES, number 2 ; angle 45 deg
BEAM APERTURE 1-2 cm ; DC Bias kV
TUNED by, coarse shorting plate fine compensator
RF 55 to 46.5 mHz, stable ± 10⁻⁷
Orb F 13.75 to 23.25 mHz
HARMONICS, RF/Orb F, used 4(d), 2(p)
DEE - Gnd, max 30 kV, min gap cm
STABILITY, (pk-pk noise)/(pk RF volt)
ENERGY GAIN, max 85 kV/turn
RF PHASE, stable to ± deg
RF POWER input, max 25 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width CW or 0.1 to 0.9 duty cycle

VACUUM SYSTEM

OPERATING PRESSURE 10⁻⁵ torr Torr or mbar
PUMPS, No, Type, Size 1, turbomolecular
450 l/sec

ION SOURCES

1 hot cathode

INJECTION SYSTEM

radial extraction ion source

EXTRACTION SYSTEM

electrostatic deflector

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 120 m² ; movable m²
TARGET STATIONS 1 in 1 rooms
STATIONS served at same time, max 1
MAG SPECTROGRAPH, type
COMPUTER model
OTHER FACILITIES radiochemical laboratory

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (pμA)	
	Goal	Achieved	Internal	External
p	10	10	150	50
d	7	7	150	50

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 45 % μA of MeV p. ions
RESOL ΔE/E % μA of MeV ions
EMITTANCE
(π mm. mrad) { axial } μA of MeV ions
rad

OPERATING PROGRAMS, time distribution
BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS 100%

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS