

ENTRY No. 112

NAME OF MACHINE Hand Cyclotron Complex DATE March 20, 1989
INSTITUTION Mount Sinai Medical Center
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IN CHARGE T.E. Boothe, Ph.D. REPORTED BY James P. Dwyer

HISTORY AND STATUS

DESIGN, date Model tests 1971
ENG DESIGN, date Cyclotron Corporation, CS-30
CONSTRUCTION, date 1971
FIRST BEAM, date (or goal) 1972
MAJOR ALTERATIONS None

COST, ACCELERATOR \$1,000,000
COST, FACILITY, total \$2,500,000
FUNDED BY Mount Sinai Medical Center

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 5 ENGINEERS 3
TECHNICIANS 1 CRAFTS 0
GRAD STUDENTS involved during year 0
OPERATED BY 0 Research staff or 3 Operators
OPERATION 80-105 hr/wk, On target 72-96 hr/wk
TIME DISTR. in house 10% Outside 90%
BUDGET, op & dev \$230,000 (includes radiochemistry)
FUNDED BY Mount Sinai Medical Center

RESEARCH STAFF, not included above

USERS, in house 1 outside 3
GRAD STUDENTS involved during year 0
RESEARCH BUDGET, in house \$0
FUNDED BY Mount Sinai Medical Center

MAGNET

POLE FACE, diameter (compact) 96 cm, R extraction 42 cm
R injection 0 cm
GAP, min 5 cm, Field 14.4 kG }
max 10 cm, Field 22.5 kG } at 1.6×10^5
AVERAGE FIELD at R ext 18 kG } Ampere turns
B max/ 1.3

NUMBER OF SECTORS { compact 3 } Spiral, max 23 deg
{ separated }

SECTOR ANGLE (SSC) deg

TRIMMING COILS (3) 800A-turns each

CONDUCTOR, material and type copper foil

STORED ENERGY (cryogenic) MJ

POWER: main coils 58 max, kW; current stability 3×10^{-4}

trimming coils max, kW; current stability

WEIGHT: Fe 20.5 tons; coils 2.5 tons

COOLING system 60 degrees F water

ION ENERGY (bending limit) E/A = 27.5 q²/a² MeV/amu

(focusing limit) E/A = 26.5 q²/a² MeV/amu

ACCELERATION SYSTEM

DEES, number 2; angle 90 deg

BEAM APERTURE 0.3 cm; DC Bias 1.8 kV

TUNED by, coarse straps fine

RF 12 to 26.7 MHz, stable $\pm 1 \times 10^{-4}$

Orb F 12 to 26.7 MHz

HARMONICS, RF/Orb F, used first

DEE - Gnd, max 35 kV, min gap 4 cm

STABILITY, (pk-pk noise)/(pk RF volt) 1%

ENERGY GAIN, max 100 kV/turn

RF PHASE, stable to \pm deg

RF POWER input, max 40 kW

FREQUENCY MODULATION, rate /s

modulator, type 1

beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 2.5×10^{-5} Torr or mbar

PUMPS, No, Type, Size 10" OD

(2) 4" OD

ION SOURCES P, I, G, type

INJECTION SYSTEM

electrostatic

EXTRACTION SYSTEM

electrostatic

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 90 m²; movable m²

TARGET STATIONS 7 in 2 rooms

STATIONS served at same time, max 1

MAG SPECTROGRAPH, type

COMPUTER model (3) IBM PC/AT/XT

OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (pA)	
	Goal	Achieved	Internal	External
proton	26.6	26.6	250	65
deuteron	15	15	200	50
helium-3	40	40	100	50

SECONDARY

(part/s)

BEAM PROPERTIES

MEASURED	CONDITIONS		
	RF deg	pA of	MeV ions
PULSE WIDTH			
PHASE EXC, max			
EXTRACT eff			
RESOL $\Delta E/E$			
EMITTANCE			

(π mm. mrad) { axial } pA 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