

ENTRY No. 105

NAME OF MACHINE Medi-Physics MC-40 Cyclotron 1
INSTITUTION Medi-Physics Inc.
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IN CHARGE R. Hubbard REPORTED BY E.A. Kowalski

HISTORY AND STATUS Scanditronix MC40
DESIGN, date Model tests
ENG DESIGN, date
CONSTRUCTION, date
FIRST BEAM, date (or goal) Feb. 1979
MAJOR ALTERATIONS
COST, ACCELERATOR
COST, FACILITY, total
FUNDED BY
ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
SCIENTISTS ENGINEERS 4
TECHNICIANS 11 CRAFTS 2
GRAD STUDENTS involved during year
OPERATED BY Research staff or Operators
OPERATION 140 hr/wk, On target 120 hr/wk
TIME DISTR. in house 100 % , 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) 130 cm, R extraction 50. cm
R injection cm
GAP, min 10 cm, Field 21.3 kG }
max 18 cm, Field 13.2 kG } at 241,000.
AVERAGE FIELD at R ext 17.9 kG } Ampere turns
B max/ 1.19
NUMBER OF SECTORS { compact 3 } Spiral, max 45 deg
SECTOR ANGLE (ISS) deg
TRIMMING COILS 8 Concentric Gradient Coils
4 Set of Harmonic Coils
CONDUCTOR, material and type Cu Sq. Tube
STORED ENERGY (cryogenic) MJ
POWER: main coils 130 max, kW; current stability 10^{-5}
trimming coils 10 max, kW; current stability 10^{-4}
WEIGHT: Fe 57 tons; coils 2.8 tons
COOLING system P.I. Water
ION ENERGY (bending limit) E/A = 40 q²/a² MeV/amu
(focusing limit) E/A = q²/a² MeV/amu
ACCELERATION SYSTEM
DEES, number 2; angle 90 deg
BEAM APERTURE 2 cm; DC Bias 0 kV
TUNED by, coarse Mov. Short fine Variable Cap.
RF 12 to 27 MHz, stable $\pm 10^{-5}$
Orb F 6 to 26.8 MHz
HARMONICS, RF/Orb F, used 1&2
DEE - Gnd, max 44 kV, min gap
STABILITY, (pk-pk noise)/(pk RF volt) $\leq 10^{-3}$
ENERGY GAIN, max 176 kV/turn
RF PHASE, stable to ± 0.5 deg
RF POWER input, max 60 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width 15-20 Deg
VACUUM SYSTEM
OPERATING PRESSURE 9×10^{-6} Torr or mbar
PUMPS, No, Type, Size 2 Oil Diffusion @ 400 with
Refrigerated Baffles
ION SOURCES Internal Cold Cathode, Axially Mounted

INJECTION SYSTEM

EXTRACTION SYSTEM
Electrostatic Deflector, Magn. Focus Channel
FACILITIES FOR RESEARCH
SHIELDED AREA, fixed m²; movable m²
TARGET STATIONS in rooms
STATIONS served at same time, max
MAG SPECTROGRAPH, type
COMPUTER model
OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (μ A)	
	Goal	Achieved	Internal	External
P		38	200	65
P		20	200	65
D		9, 18		65
H-4		36		30 μ A

SECONDARY (part/s)

BEAM PROPERTIES

MEASURED **CONDITIONS**
PULSE WIDTH 13 RF deg μ A of MeV ions
PHASE EXC, max RF deg μ A of MeV ions
EXTRACT eff 80 % 65μ A of 38 MeV P ions
RESOL $\Delta E/E$ % μ A of MeV ions
EMITTANCE
(π mm. mrad) { axial } μ A of MeV ions
{ rad }
OPERATING PROGRAMS, time distribution
BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS
REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

Conventional Analog Control.