

ENTRY NO. 80
 NAME OF MACHINE NEN Cyclotron 4 DATE 30 April 1984
 INSTITUTION E.I. DuPont
 ADDRESS 331 Treble Cove Road, N. Billerica, MA (USA)
 TEL (617) 667-9531 TELEX 947126-NENMTC
 IN CHARGE R. Garniewicz REPORTED BY F. Buck

Designed and
HISTORY AND STATUS Built by the Cyclotron Corp.

DESIGN, date Model tests
 ENG DESIGN, date
 CONSTRUCTION, date December 79
 FIRST BEAM, date (or goal) July 80
 MAJOR ALTERATIONS None
 Ion Source
 COST, ACCELERATOR
 COST, FACILITY, total
 FUNDED BY E.I. DuPont

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS ENGINEERS
 TECHNICIANS CRAFTS
 GRAD STUDENTS involved during year None
 OPERATED BY Research staff or X Operators
 OPERATION 100 hr/wk. On target
 TIME DISTR. in house 100 % Outside
 BUDGET, op & dev
 FUNDED BY E.I. DuPont

RESEARCH STAFF, not included above None

USERS, in house outside
 GRAD STUDENTS involved during year
 RESEARCH BUDGET, in house
 FUNDED BY

MAGNET

POLE FACE, diameter (compact) 96.52 cm, R extraction 41.9 cm
 R injection cm
 GAP, min 5.08 cm, Field 22.5 kG
 min 10.16 cm, Field 14.4 kG at 26×10^6
 AVERAGE FIELD at R ext 17.5 kG Ampere turns
 B max / < B > 1.28

NUMBER OF SECTORS { compact 3 } Spiral, max deg
 { separated }
 SECTOR ANGLE (SSC) deg

TRIMMING COILS Inner and outer harmonic coils, one
 per sector

CONDUCTOR, material and type Hollow copper
 STORED ENERGY (cryogenic) MJ
 POWER: main coils 51 max, kW; current stability
 trimming coils 1.2 max, kW; current stability
 WEIGHT: Fe 22.5 tons; coils 2
 COOLING system Deionized water
 ION ENERGY (bending limit) E/A = q/a² MEV/amu
 (focusing limit) E/A = .26 q/a MeV/amu

ACCELERATION SYSTEM

DEES, number 2 ANGLE 81 deg
 BEAM APERTURE 1.9 cm; DC Bias 2.5 kV
 TUNED by, coarse shorting bar fine capacitor
 RF 26.9 to MHz, stable ±
 Orb F 26.9 to MHz
 HARMONICS, RF/Orb F, used 1st
 DEE-Gnd, max 34 kV, min gap 1 cm
 STABILITY, (pk-pk noise)/(pk RF volt)
 ENERGY GAIN, max kV/turn
 RF PHASE, stable to ± deg
 RF POWER input, max 55 kW
 FREQUENCY MODULATION, rate None /s
 modulator, type
 beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 10-20 Micro Torr or mbar
 PUMPS, No, Type, Size 1-10" oil diffusion

ION SOURCES

Pig. cold cathode, radial

INJECTION SYSTEM

EXTRACTION SYSTEM

FACILITIES FOR RESEARCH

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

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (pA)	
	Goal	Achieved	Internal	External
p	26	26	200	
SECONDARY			(part/s)	

BEAM PROPERTIES

MEASURED	CONDITIONS	
	RF deg	μA of MeV ions
PULSE WIDTH		
PHASE EXC. max		
EXTRACT eff	%	μA of MeV ions
RESOL ΔE/E	%	μA of MeV ions
EMITTANCE (π mm. mrad)	{ axial } { rad }	μA of MeV

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
 BIOMEDICAL APPLICAT ISOTOPE PRODUCTIONS 100

REFERENCES/NOTES

- 1)
- 2)

PLAN VIEW OF FACILITY, COMMENTS, ETC.