

ENTRY No. 99
 NAME OF MACHINE .. NEN. Cyclotron. A. DATE 30 April. 1989
 INSTITUTION .. E. I. Du Pont
 ADDRESS 331. Treble Cove. Road, N. Billerica, MA. (U.S.A.)
 TEL (508) 671-8012 TELEX
 IN CHARGE P. Holton REPORTED BY F. Buck

Designed and built by
HISTORY AND STATUS The Cyclotron Corp.
 DESIGN, date Model tests
 ENG DESIGN, date
 CONSTRUCTION, date December. 79
 FIRST BEAM, date (or goal) July. 80
 MAJOR ALTERATIONS None

COST, ACCELERATOR
 COST, FACILITY, total
 FUNDED BY E. I. Du Pont

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 hr/wk
 TIME DISTR. in house 100 %, Outside %
 BUDGET, op & dev
 FUNDED BY E. I. Du Pont

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 }
 max 10.16 cm, Field 14.4 kG } at 26x10⁶
 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 tons
 COOLING system .. Deionized water
 ION ENERGY (bending limit) E/A = q²/a² MeV/amu
 (focusing limit) E/A = .26 q²/a² 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 rooms
 STATIONS served at same time, max
 MAG SPECTROGRAPH, type
 COMPUTER model
 OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (pμA)	
	Goal	Achieved	Internal	External
p	26	26	200	

SECONDARY (part/s)

BEAM PROPERTIES

MEASURED **CONDITIONS**
 PULSE WIDTH RF deg pμ A of MeV ions
 PHASE EXC, max RF deg pμ A of MeV ions
 EXTRACT eff % pμ A of MeV ions
 RESOL ΔE/E % pμ A of MeV ions
 EMITTANCE
 (r mm. mrad) { axial } pμ 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