

ENTRY NO. 80

NAME OF MACHINE AMERSHAM INTERNATIONAL CYCLOTRON NO. 3
 INSTITUTION AMERSHAM INTERNATIONAL
 ADDRESS WHITE LION ROAD, AMERSHAM, BUCKS, ENGLAND.
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 IN CHARGE DEWI M LEWIS REPORTED BY DEWI M LEWIS

HISTORY AND STATUS

DESIGN, date Model tests
 ENG DESIGN, date SCANDITRONIX (MC40 Mk2)
 CONSTRUCTION, date 1985
 FIRST BEAM, (date (or goal) June 1986
 MAJOR ALTERATIONS -

COST ACCELERATOR approx £1.5M (1986)
 COST, FACILITY, total -
 FUNDED BY AMERSHAM INTERNATIONAL

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
 SCIENTISTS 1 ENGINEERS 1
 TECHNICIANS 3 CRAFTS

GRAD STUDENTS involved during year
 OPERATED BY Research staff or Operators
 OPERATION hr/wk. On target hr/wk
 TIME DISTR. in house %, outside %
 BUDGET, op & dev
 FUNDED BY AMERSHAM INTERNATIONAL PHARMACEUTICALS DIVISION

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) 135 cm, R-extraction 51 cm
 R injection cm
 GAP, min 10 cm, Field 20.9 kG }
 max 18 cm, Field 13.3 kG } at 227800 (35 MeV)
 AVERAGE FIELD at R ext 17.7 kG } Ampere turns
 B max / < B > 1.18

NUMBER OF SECTORS { compact 3 } Spiral, max 50 deg
 { separated }
 SECTOR ANGLE (SSC) deg
 TRIMMING COILS 7 concentric coils
 4 x 3 sets of harmonic coils
 CONDUCTOR, material and type Cu cooled
 STORED ENERGY (cryogenic) MJ
 POWER, main coils 82 max kW: current stability 10⁻⁵
 trimming coils 5 max kW: current stability 10⁻⁴
 WEIGHT Fe 65 tons: coils 3 tons
 COOLING system recirculating chilled deionised water
 ION ENERGY (Bending limit) E/A = 40 q²/A² MeV/amu
 (Focusing limit) E/A = q/A MeV/amu

ACCELERATION SYSTEM

DEES, number 2 angle 90 deg
 BEAM APERTURE 2 cm: DC Bias kV
 TUNED by, coarse shorting panel fine capacitive panel
 RF 13 to 27 MHz, stable ± 10⁻⁶
 Orb F to MHz
 HARMONICS, RF/Orb F, used
 DEE-Gnd, max 42 kV, min gap 2 cm
 STABILITY, (pk-pk noise)/(pk RF volt) 10⁻³
 ENERGY GAIN, max 168 kV/turn
 RF PHASE, stable to ± 1 deg
 RF POWER input, max, 40 kW
 FREQUENCY MODULATION, rate /s
 modulator, type
 beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE approx 4 x 10⁻⁶ Torr or mbar
 PUMPS, No. Type, Size Two Balzers DIP 400
 (diameter 400mm)

ION SOURCES

Hot filament

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 (pA)	
	Goal	Achieved	Internal	External
p	11-35.5	11-35.5		
		35.5	250	
SECONDARY			(part/s)	

BEAM PROPERTIES

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

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.

ISOTOPE PRODUCTION MACHINE (commercial)

- modified magnet MC40 cyclotron
- computer control PDP 11/73
- fully automated remote target handling facilities using PDP 11/73 computer system