ENTRY NO. 79

NAME OF MACHINE: AMERSHAM INTERNATIONAL CYCLOTRON NO. 2

INSTITUTION: AMERSHAM INTERNATIONAL

ADDRESS: WHITE LION ROAD, AMERSHAM, BUCKS, ENGLAND.

TEL: (02404) 4488 TELEX: 83141 ACTIVA G

IN CHARGE: DEWI M LEWIS REPORTED BY: DEWI M LEWIS

HISTORY AND STATUS

DESIGN, date: 1977 Model tests: -

ENG DESIGN, date: (CP42 negative ion)

CONSTRUCTION, date: 1979-1981

FIRST BEAM, date (or goal): September 1981

MAJOR ALTERATIONS: Control system automation 1985
Extraction system 1982/83

COST, ACCELERATOR: approx US$2M (1981)

COST, FACILITY, total: -

FUNDED BY: AMERSHAM INTERNATIONAL

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS: 1 ENGINEERS: 1

TECHNICIANS: 4 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): 120 cm, R-extraction: 53 cm

R injection: - cm

GAP, min: 5 cm, Field: 24 kG
max: 12 cm, Field: 16 kG } at 92,400 Ampere turns

AVERAGE FIELD at R ext: kG

B max/<B>: 1.3

NUMBER OF SECTORS: compact 3, separated - } Spiral, max: deg

SECTOR ANGLE (SSC): deg

TRIMMING COILS: 2 x 3 sets

CONDUCTOR, material and type: Hollow Copper

STORED ENERGY (cryogenic): - MJ

POWER: main coils: 100 max kW: current stability: 10^{-5}
trimming coils: - max kW: current stability: -

WEIGHT: Fe: 35 tons: coils: 3 tons

COOLING system: Closed loop demineralised water

ION ENERGY (Bending limit) E/A = 42 q^2/A^2 MeV/amu
(Focusing limit) E/A = q/A MeV/amu

ACCELERATION SYSTEM

DEES, number: 2 angle: 90° deg

BEAM APERTURE: 1.8 cm; DC Bias: 1.5 kV

TUNED by, coarse: mechanical plate fine: capacitors

RF: to 26.7 MHz, stable ± 1 KHz

Orb F: to 26.7 MHz

HARMONICS, RF/Orb F, used: 1

DEE–Gnd, max: 36 kV, min gap: 0.5 cm

STABILITY, (pk-pk noise)/(pk RF volt): 10^{-4}

ENERGY GAIN, max: 100 kV/turn

RF PHASE, stable to ±: - deg

RF POWER input, max.: 100 kW

FREQUENCY MODULATION, rate: - /s

modulator, type: -

beam pulse, width: -

VACUUM SYSTEM

OPERATING PRESSURE: 2×10^{-6} (H_2) Torr or mbar

PUMPS, No, Type, Size:
4 x 10 inch diff pump

ION SOURCES

PIG for H^-

INJECTION SYSTEM

EXTRACTION SYSTEM

Charge Exchange Carbon foil, fixed and variable energy

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed: - m², movable: - m²

TARGET STATIONS: - in - rooms

STATIONS served at same time, max: -

MAG SPECTROGRAPH, type: -

COMPUTER model: PDP 11/73 + multi micro controllers

OTHER FACILITIES: Industrial Radioisotope Production System

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
H^-	11-42	23-42		
		30	330	320
		42	260	250

SECONDARY (part/s)

	-			

BEAM PROPERTIES

	MEASURED		CONDITIONS		
PULSE WIDTH	40	RF deg	200 pμA of	42 MeV	H^- ions
PHASE EXC. max		RF deg	pμA of	MeV	ions
EXTRACT eff	99	%	pμA of	MeV	ions
RESOL ΔE/E	~1	%	pμA of	MeV	ions

EMITTANCE (π mm mrad) { ~15 axial, ~10 rad } pμA of MeV

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS: SOLID STATES PHYSICS:

BIOMEDICAL APPLICAT.: ISOTOPE PRODUCTIONS 90%
Machine Development 10%

REFERENCES/NOTES

1)

2)

PLAN VIEW OF FACILITY, COMMENTS, ETC.

ISOTOPE PRODUCTION MACHINE (commercial) with heavy commitment to machine development and improvement.

- Remote computer controlled target system
- Automated cyclotron control
- PDP 11/73 + 8 bit Rockwell computers