ENTRY No. 82

NAME OF MACHINE AMERSHAM INTERNATIONAL CYCL. ~~DATE~~ NO. 2
INSTITUTION AMERSHAM INTERNATIONAL
ADDRESS WHITE LION ROAD, BUCKS, ENGLAND
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IN CHARGE DEMI M LEWIS REPORTED BY DEMI M LEWIS

HISTORY AND STATUS
DESIGN, date 1977 Model tests --
ENG DESIGN, date (CP42 negative ion)
CONSTRUCTION, date 1979-81
FIRST BEAM, date (or goal) September 1981
MAJOR ALTERATIONS Control system automation 1985
Extraction system 1982/83
COST, ACCELERATOR approx US $ 2 M (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 PHARACEUTICALS 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^2/a^2 MeV/amu

ACCELERATION SYSTEM
DEES, number 2 ; angle 90° deg
BEAM APERTURE 18 cm ; DC Bias 15 kV
TUNED by, coarse mech. 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 Syst.

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
H^-	11-42	23-43		
		30	320	320
		42	260	250
SECONDARY			(part/s)	

BEAM PROPERTIES

MEASURED		CONDITIONS	
PULSE WIDTH 40	RF deg 200	pμ A of 42	MeV H⁻ ions
PHASE EXC, max	RF deg	pμ A of	MeV ions
EXTRACT eff 99	%	pμ A of	MeV ions
RESOL ΔE/E -1	%	pμ A of	MeV ions

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

OPERATING PROGRAMS, time distribution
BASIC NUCLEAR PHYSICS -- SOLID STATES PHYSICS --
BIOMEDICAL APPLICAT. -- ISOTOPE PRODUCTIONS 90%
Machine Development 10%

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

ISOTOPE PRODUCTION MACHINE (commercial) with heavy commitment

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