

ENTRY NO. C59 Date October, 1995  
 Name of Machine Radial Ridge Cyclotron  
 Institution University of Birmingham  
 Address School of Physics, Edgbaston, Birmingham, B15 2TT  
 Tel 0121-414-4704 Telex Fax 0121-414-4725 E-MAIL  
 In Charge: T. D. Beynon Reported by: R. G. Green

#### HISTORY

##### MILESTONE DATES:

Design 1957 Model Tests None  
 Construction 1957-63 First Beam Int 1961 Ext 1963

##### DESIGN/CONSTRUCTION BY:

in house Yes other

COST: Accelerator £30,000 Facility

FUNDED BY: O.S.I.R. (now SERC.)

#### STATUS

##### STAFF: Machine

Scientists/Manager 1 Engineers 1  
 Technicians 1 Students  
 Research (in house/external)

Scientists / Engineers /

Technicians / Students /

BUDGET: Machine Funded by Self

Research Funded by

##### TIME DISTRIBUTION: Isotope Production Only

Basic Research (in house/external) % / %

Applied Program (in house/external) % / %

Maintenance % Development %

#### MAGNET

##### POLE PARAMETERS:

Diameter 102 cm  $R_{\text{extract}}$  46 cm  $R_{\text{inject}}$  cm

HILL PARAMETERS: Gap (min) 7 cm  $B_{\text{max}}$  1.8 T

@ AT Gap (max) 14.5 cm  $B_{\text{min}}$  1.3 T

VALLEY PARAMETERS: Gap (min) cm  $B_{\text{max}}$  T

@ AT Gap (max) cm  $B_{\text{min}}$  T

AVERAGE FIELD:  $\langle B \rangle_{\text{min}}$  1.6 T  $\langle B \rangle_{\text{max}}$  T

NUMBER OF SECTORS: compact/separated 3 /

sector angle deg. spiral (max) deg.

##### FIELD TRIMMING: Trim Coils

Harmonic Coils 2

Other Radial 8

CURRENT: Main Coils 250 Amps Stability

Trim Coils 10 + 5 Amps Stability

Stored Energy (cryogenic) MJ

WEIGHT: Iron 50 tons Conductor Cu Strip

ION ENERGY: Bending Limit  $E/A =$   $q^2/A^2$  MeV/u

Focusing Limit  $E/A =$   $q/A$  MeV/u

#### ACCELERATION SYSTEM

##### FUNDAMENTAL ACCELERATION:

Description: Single dee 180°

No. of Gaps/turn 1  $dE/dn(\text{max})$  MeV/q

Voltage (max) MV Harmonic  $f_H/f_{\text{ion}}$

Freq 12 + 16 MHz Power in(max) MW

Stability: Phase Voltage

##### OTHER CAVITIES (Flattopping or otherwise):

Description:

Region of Influence:  $R_{\text{min}}$  cm  $R_{\text{max}}$  cm

No. of Gaps/turn  $dE/dn(\text{max})$  MeV/q

Voltage (max) MV Harmonic  $f_H/f_{\text{ion}}$

Freq MHz Power in(max) MW

Stability: Phase Voltage

#### VACUUM SYSTEM

OPERATING PRESSURE:  $3 \times 10^{-6}$

PUMPS: (No. and type) Oil Diff. 16" & 9"

#### ION SOURCE(S)

| Type        | Intensity (mA) | @ $\epsilon_n = \beta\gamma\epsilon$ ( $\pi$ mm mrad) | Ion Species |
|-------------|----------------|-------------------------------------------------------|-------------|
| (a) Berkley |                |                                                       |             |
| (b)         |                |                                                       |             |
| (c)         |                |                                                       |             |
| (d)         |                |                                                       |             |

#### INJECTION SYSTEM

None Efficiency %

#### EXTRACTION SYSTEM

Mag/Elec. Regenerator Efficiency %

2 Electrostatic Def.

#### CHARACTERISTIC BEAMS

| Accelerated Ions | $E/A$ (MeV/u) | Current (part $\mu A$ ) |          |
|------------------|---------------|-------------------------|----------|
|                  |               | Internal                | External |
| (a) 4 He         | 25            |                         | 100      |
| (b) 3 He         | 33            |                         | 50       |
| (c) D+           | 12.5          | 800                     | 200      |
| (d) P            | 6.25          |                         | 50       |

Secondary Particles  $E$  (MeV) part/sec

(a)

(b)

(c)

#### EXTRACTED BEAM PROPERTIES:

For  $\mu A$  of MeV/u ions

$\Delta E/E$  %  $\Delta\phi$  °rf

$\epsilon_n = \beta\gamma\epsilon$  x  $\pi$  mm mrad z 40  $\pi$  mm mrad

#### FACILITIES FOR RESEARCH

SHIELDED AREA: Fixed m<sup>2</sup> Moveable m<sup>2</sup>

Target Stations: No. Served At Same Time:

#### MAGNETIC SPECTROMETERS:

#### OTHER FACILITIES:

Only used for production of PET isotopes

#### REFERENCES/NOTES

(a)

(b)

#### PLAN VIEW OF FACILITY, COMMENTS