

Entry: **C63**
Machine Name: Nuffield 60" Cyclotron
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HISTORY

Design by: Sir Mark Oliphant
Construction time: 10 years (stopped during WW II)
First beam: 1948

CHARACTERISTIC BEAMS

ions / energy (MeV/n) / current (pps) / power (W) :

- He4 / 40 MeV / 250 μ A int.50. μ A ext.....
- He3 / 30 MeV / 250 μ A int.60. μ A ext.....
- d+ / 20. MeV / 500 μ A int.100. μ A ext.....
- p+ / 10 MeV / 500 μ A int.100. μ A ext.....

transmission efficiency (total)
- typical:% - best:%

transverse emittance (rms)

- vertical: π mmmrad
- horizontal: π mmmrad

longitudinal emittance (rms) $\Delta E/E$.deg RF

USES

basic research:% therapy:%
development:% isotope production: 100%
other applications:% maintenance:%
beam tuning:%
total time: 5500 h/year

TECHNICAL DATA

a) magnet

type:
Kb: MeV/A Kf: MeV/A
average field (min-max): T
number of magnet sectors:
- angle: deg
- spiral (max): deg

pole parameters

- diameter: 1.8 m
- injection radius: m
- extraction radius: m

hill gap: 0.25 m valley gap: m

field trimming

- trim coils
- number: 9
- current (max): 2 A
- harmonic coils
- number:
- current (max): 5 radial/ 4 quadrature A
- others
- number:
- current (max): A

main coils:
- number: 32
- Ampere-turns: A.T.
- current: A

stored energy: MJ

weight : - iron: 250 t - coils: 40 t

power

- main coils (total): 40 kW
- trim coils (total max): 1.5 kW
- refrigerator (cryogenic): kW

b) RF

- acceleration

- frequency range: 10 (fixed) MHz
- harmonic modes:
- number of dees: 2
- angular aperture: deg
- voltage: - average (min-max): 50 kV
- variation with radius:
- power in (max): 80 kW
- stability: - phase: deg - voltage:%

- other cavities

- purpose: MHz
- frequency range: MHz
- region of influence: m
- voltage (max): kV
- power in (max): kW
- stability:- phase: deg - voltage:%

c) injection

- internal source: Berkeley hooded arc hot cathode
- external (radial/axial): none.....
- elements:
- source voltage: kV
- injection energy: MeV/n
- buncher:
- injection efficiency:%

d) ion sources/injector

e) extraction

- elements, characteristics:
- electrostatic deflector 70 deg.....
-
-
- efficiency
- typical:% - best:%

f) vacuum

- pumps: 2 x 37 cm + 22 cm booster.....
- achieved vacuum: 1.10^{-5} Pa

REFERENCES

EXPERIMENTAL FACILITIES

PLAN VIEW OF FACILITY

COMMENTS

This cyclotron is believed to be the oldest running machine and celebrates its 50th birthday this year