

ENTRY NO: C-49
Machine Name: Oak Ridge Isochronous Cyclotron (ORIC)
Date: 6/12/01 2:52:28 PM
Institution: Oak Ridge National Laboratory
Address P.O. Box 2008, MS 6368, Oak Ridge, TN 37831
In Charge of Cyclotron: B. Alan Tatum
Telephone: (865) 574-4759
Fax: (865) 574-1268
Person Reporting: B. Alan Tatum
Web: <http://www.phy.ornl.gov/hrifb/accelerator/oricweb/>
E-mail: tatumba@ornl.gov

HISTORY

Designed By: ORNL
Construction Dates: 1959-1962
First Beam Date: 1963

CHARACTERISTIC BEAMS

ions	/ energy(MeV/N)/current(pps)/power(w)
proton	42 9.38x10 ⁻¹³
deuteron	25 9.38x10 ⁻¹³
alpha	25 1.56x10 ⁻¹³

transmission efficiency(source to extract beam)

typical: 55% - **best:** 85%

transverse emittance

emittance definition:

vertical: 1-2 π mm mrad

horizontal: 1-2 π mm mrad

longitudinal: (Δ) E/E)%xdeg RF

USES

basic research: 70% **therapy:** 0%
development: 10% **isotope production:** 0%
other: 0% **maintenance:** 10%
beam tuning: 10% **Total Time:** 1200h/year

TECHNICAL DATA

a)magnet: type: Conventional Isochronous

Kb: MeV/A **Kf:** MeV/A

average field (min/max): 1.92 T

number of magnet sectors: 3

hill angular width: hill angular width

spiral (max): 30 deg

pole parameters

diameter: 1.93 m

injection radius: m

extraction radius: .81 m

hill gap: .19m **valley gap:** .71m

trim coils

-number: 10x2

-current(max): 7200 A-turns

harmonic coils

-number: 4xNsectorsx2

-current(max): A-turns

main coils

number: 1x2

total ampere-turns: 1,600,000 A-turns

current: 5000 A

stored energy: MJ

weight - iron: 200t **coils:** 9t

power

main coils (total): 1750 kW

trim coils (total max): 250 kW

refrigerator (cryogenic): kW

b)RF

acceleration

frequency range: 6.8-20.1MHz

harmonic modes: 1,3
number of dees: 1
number of cavities: 1
dee angular width: 180degrees
voltage
at injection: kV(peak to ground, max)
at extraction: 80kV(peak to ground, max)
peak: 80kV(peak to ground, max)

line power(max): 200kW

stability

phase: +/-1 deg

voltage: 0.05%

injection

c)ion source: Penning

external injection:

components:

source bias voltage: kV

injection energy: MeV/N

buncher:

injection efficiency: %

d)injector: none

e)extraction

Electrostatic Deflector Coaxial Magnetic Channel Iron-compensated Lower Magnetic Channel

efficiency

typical: 55%

best: 85%

f)vacuum

pumps: 3 diffusion, 1 cryogenic

achieved vacuum: 2.66x10⁻⁴Pa

REFERENCES

EXPERIMENTAL FACILITIES

Recoil Mass Spectrometer (RMS) Daresbury Recoil Separator (DRS)

COMMENTS

