

ENTRY NO: C21
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Machine Name: RCNP AVF Cyclotron
Institution: Research Center for Nuclear Physics
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History

Designed by: RCNP Osaka University

Construction Dates: 1971-1973

First Beam Date: 1974

Characteristic Beams

ions / energy(MeV/N)/current(pps)/power(w)

Proton 80 3x10¹³

3He 53 3x10¹³

4He 35 3x10¹³

18O⁶⁺ 13.7 3x10¹¹

Transmission Efficiency (source to extracted beam)

Typical (%): 80

Best (%): 100

Emittance

Emittance Definition: RMS

Vertical (pi mm mrad): 3

Horizontal (pi mm mrad): 6

Longitudinal (dE/E[%] x RF[deg.]): 0.1x12

USES

Basic Research (%): 42

Development (%): 27

Therapy (%):

Isotope Production (%):

Other Application (%):

Maintenance (%): 24

Beam Tuning (%): 7

Total Time (h/year): 6800

TECHNICAL DATA

(a)Magnet

Type: normal conductor compact

Kb (MeV): 140

Kf (MeV): 80

Average Field (min./max. T): 1.6

Number of Sectors: 3

Hill Angular Width (deg.):

Spiral (deg.): 52

Pole Diameter (m): 2.3

Injection Radius (m):

Extraction Radius (m): 1.0

Hill Gap (m): 0.207

Valley Gap (m): 0.347

Trim Coils

Number: 16x2

Maximum Current (A-turns): 3000

Harmonic Coils

Number: 3xNsectorsx2

Maximum Current (A-turns): 1000

Main Coils

Number: 1x2

Total Ampere Turns: 4x10⁵

Maximum Current (A): 1430

Stored Energy (MJ):

Total Iron Weight (tons): 400

Total Coil Weight (tons): 13

Power

Main Coils (total KW): 450

Trim Coils (total, maximum, KW): 265

Refrigerator (cryogenic, KW):

(b)RF

Acceleration

Frequency Range (MHz): 6-18

Harmonic Modes: 1 and 3

Number of Dees: 1

Number of Cavities: 1

Dee Angular Width (deg.):180

Voltage

At Injection (peak to ground, KV): 80

At Extraction (peak to ground, KV): 80

Peak (peak to ground, KV): 80

Line Power (max, KW): 400

Phase Stability (deg.): 0.1

Voltage Stability (%): 0.1

(c)Injection

Ion Source: Atomic Polarized Ion Source and ECR Ion Source

Source Bias Voltage (kV): 15

External Injection: axial

Buncher Type: f+2f+3f

Injection Energy (MeV/n):

Component: inflector

Injection Efficiency (%): 12

Injector:

(d)Extraction

Elements, Characteristic: Electric Static Deflector efficiency

Typical Efficiency (%): 90

Best Efficiency (%): 100

(e)Vacuum

Pumps: 3 Diddusion Pumps

Achieved Vacuum (Pa): 4x10⁻⁵

REFERENCES

EXPERIMENTAL FACILITIES

Injection System to the Ring Cyclotron

COMMENTS