

ENTRY NO:C14
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Machine Name: JULIC
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History

Designed by: AEG
Construction Dates: 1966-1968

First Beam Date: 1968

Characteristic Beams

H- /22.5 -45 MeV/N / 10 microA
D- /22.5 -45 MeV/N / 10 microA
pol. H- /22.5 -45 MeV/N / 1 microA
pol. D- /22.5 -45 MeV/N / 1 microA

Transmission Efficiency (source to extracted beam)

Typical (%) : 5

Best (%) :

Emittance

Emittance Definition: RMS

Vertical (pi mm mrad): 6.4

Horizontal (pi mm mrad): 3.2

Longitudinal (dE/E[%] x RF[deg.]): 0.3

USES

Basic Research (%) : 25

Development (%) : 1

Therapy (%) : 0

Isotope Production (%) : 1

Other Application (%) : 0

Maintenance (%) : 2

Beam Tuning (%) : 1

Total Time (h/year): 8000

TECHNICAL DATA

(a)Magnet

Type: solid pole

Kb (MeV): 45

Kf (MeV/A):

Average Field (min./max. T): 1.35 (1.92/ 0.7)

Number of Sectors: 3

Hill Angular Width (deg.): 60

Spiral (deg.): 20

Pole Diameter (m): 3.3

Injection Radius (m): 0.03

Extraction Radius (m): 1.54

Hill Gap (m): 0.084

Valley Gap (m): 0.24

Trim Coils

Number: 9x2

Maximum Current (A-turns): 960

Harmonic Coils

Number:

Maximum Current (A-turns):

Main Coils

Number: 2

Total Ampere Turns: 151200

Maximum Current (A): 360

Stored Energy (MJ):

Total Iron Weight (tons): 700

Total Coil Weight (tons): 12

Power

Main Coils (total KW): 50

Trim Coils (total, maximum, KW): 12

Refrigerator (cryogenic, KW):

(b)RF

Acceleration

Frequency Range (MHz): 20-30

Harmonic Modes: 3

Number of Dees: 3

Number of Cavities:

Dee Angular Width (deg.): 40

Voltage

At Injection (peak to ground, KV): 45

At Extraction (peak to ground, KV): 30

Peak (peak to ground, KV):

Line Power (max, KW): 100

Phase Stability (deg.): <0.5

Voltage Stability (%): <0.05

(c)Injection

Ion Source: multicusp volume sources, polarized ions source (CBS)

Source Bias Voltage (kV): 4.5 / N

External Injection: axial

Buncher Type: 2 double gap (sinus/ parabolic)

Injection Energy (MeV/n): 0.0045

Component: hyperboloid inflector

Injection Efficiency (%): 30

Injector:

(d)Extraction

Elements, Characteristic: electrostatic deflector, focussing channel, multiturn extraction

Typical Efficiency (%): 60

Best Efficiency (%): 75

(e)Vacuum

Pumps: 2 turbomolecular pumps 2200 l/s each, 3 cryo pumps 10000 l/s each

Achieved Vacuum (Pa): < 1 E-5

REFERENCES

EXPERIMENTAL FACILITIES

The cyclotron JULIC is the injector for the cooler synchrotron COSY.

Production of radioisotopes.

Irradiation on internal and external targets.

COMMENTS