

ENTRY NO:C04
Date: 10 Feb 2005 13:26:50
Machine Name: HIRFL injector cyclotron-SFC
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History

Designed by: Accelerator group of IMP, Lanzhou
Construction Dates: Upgraded in 1984-1987
First Beam Date: the first beam after upgrading: 1987

Characteristic Beams

| | | | |
|-------|--------------|---------------|---------|
| 16O | 8.0 (MeV/n) | 1.5e13 (pps) | 300 (w) |
| 40Ar | 2.35 (MeV/n) | 0.9e13 (pps) | 140 (w) |
| 26Mg | 6.54 (MeV/n) | 0.15e13 (pps) | 43 (w) |
| 129Xe | 2.3 (MeV/n) | 0.3e12 (pps) | 15 (w) |
| 208Pb | 1.1 (MeV/n) | 0.3e12 (pps) | 11 (w) |

Transmission Efficiency (source to extracted beam)

Typical (%): 7-10

Best (%): 15

Emittance

Emittance Definition: 50%

Vertical (pi mm mrad): 20

Horizontal (pi mm mrad): 20

Longitudinal (dE/E[%] x RF[deg.]): 1.8 (%) * 10 (deg.)

USES

Basic Research (%): 55

Development (%): 10

Therapy (%):

Isotope Production (%):

Other Application (%): 15

Maintenance (%): 10

Beam Tuning (%): 10

Total Time (h/year): 6000

TECHNICAL DATA

(a)Magnet

Type: compact

Kb (MeV): 69

Kf (MeV): 30

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

Number of Sectors: 3

Hill Angular Width (deg.):

Spiral (deg.): 33

Pole Diameter (m): 1.7

Injection Radius (m): 0.025 , 0.03

Extraction Radius (m): 0.75

Hill Gap (m): 0.19

Valley Gap (m): 0.33

Trim Coils

Number: 12 x 2

Maximum Current (A-turns): 4000

Harmonic Coils

Number: 4 x 2

Maximum Current (A-turns): 600

Main Coils

Number: 1 x 2

Total Ampere Turns:

Maximum Current (A): 1200

Stored Energy (MJ):

Total Iron Weight (tons): 220

Total Coil Weight (tons): 16

Power

Main Coils (total KW): 260

Trim Coils (total, maximum, KW): 170

Refrigerator (cryogenic, KW):

(b)RF

Acceleration

Frequency Range (MHz): 5.5 - 16.5

Harmonic Modes: 1,3

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): 60

Phase Stability (deg.): +/- 0.3

Voltage Stability (%): 0.1

(c)Injection

Ion Source: ECR

Source Bias Voltage (kV): 25

External Injection: axial

Buncher (type): linear buncher

Injection Energy (MeV/n): 0.0015 - 0.0094 MeV/n

Component: Solenoid lens, spiral inflector

Injection Efficiency (%): 30

Injector:

(d)Extraction

Elements, Characteristic: Two electrostatic deflector

Typical Efficiency (%): 30 - 60

Best Efficiency (%): 75

(e)Vacuum

Pumps: Cryogenic pump

Achieved Vacuum (Pa): 4e-6 Pa 8e-6 Pa

REFERENCES F. Ye et al. 13th ICCTA, p78

EXPERIMENTAL FACILITIES

One target station (SFC can share the five target setups of SSC by bypass beam line)

COMMENTS