ENTRY NO: C48
Date: 12 Feb 2005 21:24:35
Machine Name: K500
Institution: Michigan State University
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History
Designed by: Michigan State University
Construction Dates: 77-81 (rebuilt 95-99)
First Beam Date: 8/82 (rebuilt 7/98)
Characteristic Beams

ions	/ energy(MeV/N)	/current(pps)	/power(w)
16O3+	13.05	469E10	157
18O3+	10.9	417E10	131
40Ar7+	12.34	250E10	197
48Ca8+	12.23	29E10	27
78Kr14+	12.34	60E10	93
86Kr14+	12.29	107E10	181
124Xe20+	12.25	6.1E10	15
124Sn19+	10.83	9.4E10	20
209Bi27+	7.69	3.5E10	8.9

Transmission Efficiency (source to extracted beam)
Typical (%): 15
Best (%): 21.5
Emittance
Emittance Definition: 50%
Vertical (pi mm mrad): 5 - 12
Horizontal (pi mm mrad): 5 - 8
Longitudinal (dE/E[%] x RF[deg.]):
USES
Basic Research (%):
Development (%):
Therapy (%):
Isotope Production (%):
Other Application (%):
Maintenance (%):
Beam Tuning (%):
Total Time (h/year):

TECHNICAL DATA
(a)Magnet
Type: compact superconducting
Kb (MeV): 500
Kf (MeV): 160
Average Field (min./max. T): 3.0-5.0
Number of Sectors: 3
Hill Angular Width (deg.): 60
Spiral (deg.): 120
Pole Diameter (m): 1.42
Injection Radius (m): 0.015
Extraction Radius (m): 0.66
Hill Gap (m): 0.0635
Valley Gap (m): 0.914
Trim Coils (square coil. Axis horizontal)
Number: (13x3 sectors)
Maximum Current (A-turns): 400x20/2
Harmonic Coils
Number: 2 (trim coil #1, #12)
Maximum Current (A-turns): 400x20/2
Main Coils
Number: 2x2
Total Ampere Turns: 5E6
Maximum Current (A): 800
Stored Energy (MJ): 18
Total Iron Weight (tons): 91
Total Coil Weight (tons): 7
Power
Main Coils (total KW): 0
Trim Coils (total, maximum, KW): 100
Refrigerator (cryogenic, KW): 1300

(b)RF
Acceleration
Frequency Range (MHz): 11-27
Harmonic Modes: 2
Number of Dees: 3
Number of Cavities: 3
Dee Angular Width (deg.):60
Voltage
At Injection (peak to ground, KV): 70
At Extraction (peak to ground, KV): 70
Peak (peak to ground, KV): 70
Line Power (max, KW): 300
Phase Stability (deg.): 0.1
Voltage Stability (%): 0.01

(c)Injection
Ion Source: ECR
Source Bias Voltage (kV): 30 kV max
External Injection: axial
Buncher Type: 2 grid, h=1
Injection Energy (MeV/n): 4 to 6 keV/n typical
Component: solenoid and electroetatic lenses, electric and magnetic dipoles
Injection Efficiency (%): 6 to 37 (typical 25)
Injector: none

(d)Extraction
Elements, Characteristic: electrostatic deflectors (2), 7 mm gap, 100 kV/cm, moveable passive magnetic dipole and 2 compensators, movable focusing bars (8) and compensators (2) precessional
Typical Efficiency (%): 75
Best Efficiency (%): 90

(e)Vacuum
Pumps: 3 cryopanels, 7K, Cu+charcoal, 1 TMP
Achieved Vacuum (Pa): 5.2E-5

REFERENCES
R.C. York et. al., Proc. 15th Int. Conf. on Cyclotrons,
E. Baron and M.Lieuvin, eds. (1999)687

EXPERIMENTAL FACILITIES
See K1200 cyclotron data for coupled cyclotron experimental facilities.

COMMENTS