ENTRY NO: C-47
Machine Name: K500
Date: 9/7/01 1:30:21 PM
Institution: Michigan State University
Address NSCL/ Cyclotron Laboratory, E. Lansing, MI 48824
In Charge of Cyclotron: C.K. Gelbke
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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)/**curre**nt(pps)/**powe**r(w)	
18O 3+	11.0	*
40Ar 7+	12.5	*
78Kr 14+	12.5	*
86Kr 14+	12.5	*
136Xe 20+	10.0	*
197Au 27+	8.6	*

transmision efficiency(source to extract beam)
typical: 3% - **best:** 10%
tranverse emmitance
emmitance definition: 50%
vertical: 5 - 12π mm mrad
horizontal: 5 - 8π mm mrad
longitudinal: (Δ) E/E)%xdeg RF

USES
basic research: % **therapy:** %
development: % **isotope production:** %
other: % **maintenance:** %
beam tuning: % **Total Time:** h/year

TECHNICAL DATA
a)magnet: **type:** compact superconducting
Kb: 500MeV/A **Kf:** 160MeV/A
average field (min/max): 3.0-5.0 T
number of magnet sectors: 3
hill angular width: hill angular width
spiral (max): 170 deg
pole parameters
diameter: 1.42 m
injection radius: 0.015 m
extraction radius: 0.66 m
hill gap: 0.0635m **valley gap:** 0.914m
trim coils
-number: (12x3)+1x2
-current(max): 400x20/2 A-turns
harmonic coils
-number: 2xNsectorsx2
-current(max): 400x20/2 A-turns
main coils
number: 2x2
total ampere-turns: 5E6 A-turns
current: 800 A
stored energy: 18MJ
weight - iron: 91t coils: 7t
power
main coils (total): 0 kW
trim coils (total max): 100 kW
refrigerator (cryogenic): 1300 kW
b)RF
acceleration
frequency range: 11-27MHz
harmonic modes: 2
number of dees: 3
number of cavities: 3
dee angular width: 60degrees
voltage
at injection: 70kV(peak to ground, max)
at extraction: 70kV(peak to ground, max)
peak: 70kV(peak to ground, max)
line power(max): 300kW
stability
phase: 0.1 deg
voltage: 0.01%
injection
c)ion source: ECR
external injection: axial
components: soleniod lenses, electrostatic quad and dipole
source bias voltage: 30kV
injection energy: 1-9E-3MeV/N
buncher: 2 grid, h=1 and 2
injection efficiency: 50-80%
d)injector: none
e)extraction
electrostatic deflectors (2), 100 kV/cm moveable focusing bars (8) and compensators (2) precessional combined function magnet in return yoke
efficiency
typical: 55%
best: 75%
f)vacuum
pumps: 3 cryopanels, 7k, 1 turbomolecular pump
achieved vacuum: 5.2E-5Pa
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