

ENTRY NO: C51
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Machine Name: Texas A&M K500 Cyclotron
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History

Designed by: Michigan State & Texas A&M
Construction Dates: 1982-1988
First Beam Date: June 15, 1988

Characteristic Beams

ions / energy(MeV/N)/current(pps)/power(w)			
16O8+	60	1.3E11	20
40Ar13+	40	7.2E11	185
84Kr27+	40	2.3E8	0.12
197Au33+	10.5	3.3E1	0.11

Transmission Efficiency (source to extracted beam)

Typical (%): 6
Best (%): 12.9

Emittance

Emittance Definition: RMS
Vertical (pi mm mrad): 5
Horizontal (pi mm mrad): 5
Longitudinal (dE/E[%] x RF[deg.]):

USES

Basic Research (%): 41
Development (%): 12
Therapy (%): 0
Isotope Production (%): 0
Other Application (%): 18
Maintenance (%): 18
Beam Tuning (%): 11
Total Time (h/year): 8000

TECHNICAL DATA

(a)Magnet

Type: Compact superconducting
Kb (MeV): 520
Kf (MeV): 160
Average Field (min./max. T): 3.1/4.9
Number of Sectors: 3
Hill Angular Width (deg.): 60
Spiral (deg.): 169.4
Pole Diameter (m): 1.42
Injection Radius (m): 0.008
Extraction Radius (m): 0.67
Hill Gap (m): 0.0635
Valley Gap (m): 0.914

Trim Coils

Number: 13x2
Maximum Current (A-turns): 4000

Harmonic Coils

Number: 2xNsectorsx2
Maximum Current (A-turns): 4000

Main Coils

Number: 2x2
Total Ampere Turns: 4.4E6
Maximum Current (A): 800
Stored Energy (MJ): 16.9
Total Iron Weight (tons): 100
Total Coil Weight (tons):

Power

Main Coils (total KW):
Trim Coils (total, maximum, KW): 200
Refrigerator (cryogenic, KW): 0.2

(b)RF

Acceleration

Frequency Range (MHz): 9-28

Harmonic Modes: 1, 2

Number of Dees: 3

Number of Cavities: 6

Dee Angular Width (deg.):60

Voltage

At Injection (peak to ground, KV): 20-90

At Extraction (peak to ground, KV): 20-90

Peak (peak to ground, KV): 20-90

Line Power (max, KW): 240

Phase Stability (deg.): 0.1

Voltage Stability (%): 0.01

(c)Injection

Ion Source: ECRIS

Source Bias Voltage (kV): 2-15

External Injection: axial

Buncher Type: 1st & 2nd harm., 1 gap

Injection Energy (MeV/n): 0.0005-0.007

Component: 3 dipoles, 5 solenoids

Injection Efficiency (%): 10-25

Injector:

(d)Extraction

Elements, Characteristic: 2 electrostatic deflectors, 5 passive moveable magnetic channels, and 1 passive fixed magnetic channel.

Typical Efficiency (%): 50-60

Best Efficiency (%): 90

(e)Vacuum

Pumps: 3 turbos & 3 internal LHe cryopanel

Achieved Vacuum (Pa): 10E-5

REFERENCES

EXPERIMENTAL FACILITIES

Neutron Ion Multidetector (NIMROD), BaF2 Array, MDM-2 Spectrometer, Momentum Achromat Recoil Spectrometer (MARS), Radiation Effects Facility

COMMENTS