

**ENTRY NO:** C-45  
**Machine Name:** Texas A&M K500 Cyclotron  
**Date:** 6/14/01 10:45:26 AM  
**Institution:** Texas A&M University  
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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	3.3E10	11

#### transmission efficiency(source to extract beam)

typical: 6% - best: 12.9%

#### transverse emittance

**emittance definition:** RMS

vertical:  $5\pi$  mm mrad

horizontal:  $5\pi$  mm mrad

longitudinal:  $(\Delta) E/E) \% \times \text{deg RF}$

#### USES

<b>basic research:</b> 41%	<b>therapy:</b> 0%
<b>development:</b> 12%	<b>isotope production:</b> 0%
<b>other:</b> 18%	<b>maintenance:</b> 18%
<b>beam tuning:</b> 11%	<b>Total Time:</b> 8000h/year

#### TECHNICAL DATA

**a)magnet:** type: Compact superconducting

Kb: 520MeV/A Kf: 160MeV/A

average field (min/max): 3.1/4.9 T

number of magnet sectors: 3

hill angular width: 60hill angular width

spiral (max): 169.4 deg

#### pole parameters

diameter: 1.42 m

injection radius: 0.008 m

extraction radius: 0.67 m

hill gap: 0.0635m valley gap: 0.914m

#### trim coils

-number: 13x2

-current(max): 4000 A-turns

#### harmonic coils

-number: 2xNsectorsx2

-current(max): 4000 A-turns

#### main coils

number: 2x2

total ampere-turns: 4.4E6 A-turns

current: 800 A

stored energy: 16.9MJ

weight - iron: 100t coils: t

#### power

main coils (total): kW

trim coils (total max): 200 kW

refrigerator (cryogenic): 0.2 kW

#### b)RF

#### acceleration

frequency range: 9-28MHz

**harmonic modes:** 1, 2

**number of dees:** 3

**number of cavities:** 6

**dee angular width:** 60degrees

#### voltage

at injection: 20-90kV(peak to ground, max)

at extraction: 20-90kV(peak to ground, max)

peak: 20-90kV(peak to ground, max)

**line power(max):** 240kW

#### stability

**phase:** 0.1 deg

**voltage:** 0.01%

#### injection

**c)ion source:** ECRIS

**external injection:** axial

**components:** 3 dipoles, 5 solenoids

**source bias voltage:** 2-15kV

**injection energy:** 0.0005-0.007MeV/N

**buncher:** 1st & 2nd harm., 1 gap

**injection efficiency:** 10-25%

#### d)injector:

#### e)extraction

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

#### efficiency

typical: 50-60%

best: 90%

#### f)vacuum

**pumps:** 3 turbos & 3 internal LHe cryopanel

**achieved vacuum:** 10E-5Pa

#### REFERENCES

#### EXPERIMENTAL FACILITIES

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

#### COMMENTS