ENTRY NO. C64 **Date** June 26, 1992

Name of Machine: Texas A&M K500 Cyclotron

Institution: Texas A&M University

Address: College Station, Texas USA 77843-3366

Tel (409) 845-1411 Telex (510) 892-7689 Fax (409) 845-1899 EMAIL OFFICE@TAMCOMP

In Charge: J. B. Natowitz Reported by: R. C. Rogers

HISTORY

MILESTONE DATES:
Design 1980 Model Tests
Construction 1982-1988 First Beam June 15, 1988

DESIGN/CONSTRUCTION BY:
in house 80% other 20%

COST: Accelerator $8,500,000 Facility $36,000,000

FUNDED BY: Texas A&M University, Welch Foundation

STATUS

STAFF: Machine
Scientists 3 Engineers 5
Technicians 20 Students
Research (in house/external)
Scientists 20 / Engineers 34 /
Technicians / Students /

BUDGET: Machine $2,000,000 Funded by State of Texas, DOE
Research $1,500,000 Funded by DOE, Welch, NSF

TIME DISTRIBUTION:
Basic Research (in house/external) 90 % / 10 %
Applied Program (in house/external) % /
Development 14 % Maintenance 25 %

MAGNET

POLE PARAMETERS:
Diameter 142 cm $R_{extract}$ 67 cm R_{inject} 0.8 cm
HILL PARAMETERS: Gap (min) 6.35 cm B_{max} 5.8 T
(@ $4.7X10^6$ AT) Gap (max) -- cm B_{min} -- T
VALLEY PARAMETERS: Gap (min) 91.4 cm B_{max} 4.3 T
(@ $4.7X10^6$ AT) Gap (max) -- cm B_{min} -- T
AVERAGE FIELD: $< B >_{min}$ T $< B >_{max}$ 4.9 T
NUMBER OF SECTORS: compact/separated 3 /
sector angle 60° deg. spiral (max) 113.5 deg.
FIELD TRIMMING: Trim Coils 13
Harmonic Coils 2
Other
CURRENT: Main Coils 800 Amps Stability $2X10^{-5}$
Trim Coils 400 Amps Stability $1X10^{-4}$
Stored Energy (cryogenic) 22 MJ
WEIGHT: Iron 100 Conductor NbTi in Cu
ION ENERGY: Bending Limit E/A = 520 q^2/A^2 MeV/u
Focussing Limit E/A = 160 q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:
Description: 3, 53° DEES
No. of Gaps/turn 6 dE/dn(max) 0.24 MeV/q
Voltage(max) 0.08 MV Harmonic f_{rf}/f_{ion} 1,2
Freq 9-28 MHz Power in(max) 0.24 MW
Stability: Phase $< 0.1^0$ Voltage 10^{-4}

OTHER CAVITIES (Flattopping or otherwise):
Description:
Region of Influence: R_{min} cm R_{max} cm
No. of Gaps/turn dE/dn(max) MeV/q
Voltage(max) MV Harmonic f_{rf}/f_{ion}
Freq MHz Power in(max) MW
Stability: Phase Voltage

VACUUM SYSTEM

OPERATING PRESSURE: $6X10^{-8}$ to $2X10^{-7}$ Torr
PUMPS: No. and type 3 turbomolecular, 1 cryopanel,
2 cryopanels to be added late 1992

ION SOURCE(S)

	Type	Intensity (mA)	@	$\epsilon_n = \beta\gamma\epsilon$ (πmm mrad)	Ion Species
(a)	Ext RT ECR	.019		–	$^{14}N^{6+}$
(b)		.001			$^{181}Ta^{27+}$
(c)					
(d)					

INJECTION SYSTEM

Axial, Buncher, Spiral, Inflector Efficiency .4-.20 %

EXTRACTION SYSTEM

Electrostatic + Magnetic Efficiency .15-.50 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current(part μA) Internal	External
(a) D^+	65	0.06	0.015
(b) $^{12}C^{5+}$	50	0.012	0.003
(c) $^{40}Ar^{14+}$	40	0.0005	0.00025
(d) $^{181}Ta^{24+}$	6	0.004	0.001

	Secondary Particles	E (MeV)	part/sec
(a)			
(b)			
(c)			

EXTRACTED BEAM PROPERTIES:
For μA of MeV/u ions
$\Delta E/E$ % $\Delta\phi$ °rf
$\epsilon_n = \beta\gamma\epsilon$ x πmm mrad z πmm mrad

FACILITIES FOR RESEARCH

SHIELDED AREA: Fixed 720 m^2 Moveable m^2
Target Stations: 9 No. Served At Same Time: 1
MAGNETIC SPECTROMETERS: 3
OTHER FACILITIES: Neutron Ball, 4π Charged Particle Detector (HILI+CsI Ball), BaF2 Array

REFERENCES/NOTES

(a)
(b)

PLAN VIEW OF FACILITY, COMMENTS