

ENTRY NO. C47 Date November, 1995
 Name of Machine U-400
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HISTORY

MILESTONE DATES:
 Design 1973-1977 Model Tests
 Construction 1974-1978 First Beam 1978
 DESIGN/CONSTRUCTION BY:
 in house other
 COST: Accelerator Facility
 FUNDED BY:

STATUS

STAFF: Machine
 Scientists 3 Engineers 5
 Technicians 10 Students 2
 Research (in house/external)
 Scientists / Engineers /
 Technicians / Students /
 BUDGET: Machine Funded by
 Research Funded by
 TIME DISTRIBUTION:
 Basic Research (in house/external) 60.0% / 10.0%
 Applied Program (in house/external) 15.0% / 5.0%
 Maintenance 6.0% Development 4.0%

MAGNET

POLE PARAMETERS:
 Diameter 400 cm R_{extract} 172 cm R_{inject} cm
 HILL PARAMETERS: Gap (min) 4.2 cm B_{max} 2.6 T
 (@ AT) Gap (max) cm B_{min} T
 VALLEY PARAMETERS: Gap (min) cm B_{max} T
 (@ AT) Gap (max) 30 cm B_{min} 1.6 T
 AVERAGE FIELD: $\langle B \rangle_{\text{min}}$ 1.9 T $\langle B \rangle_{\text{max}}$ 2.1 T
 NUMBER OF SECTORS: compact/separated 4 /
 sector angle 42 deg. spiral (max) 0 deg.
 FIELD TRIMMING: Trim Coils 10
 Harmonic Coils 8
 Other
 CURRENT: Main Coils 2500 Amps Stability 10^{-4}
 Trim Coils 600 Amps Stability 10^{-3}
 Stored Energy (cryogenic) MJ
 WEIGHT: Iron 2000 Conductor 30
 ION ENERGY: Bending Limit $E/A = 625$ q²/A² MeV/u
 Focusing Limit $E/A = 35$ q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:
 Description: Two Dees system, MS
 No. of Gaps/turn 4 $dE/dn(\text{max})$ 0.1 MeV/q
 Voltage (max) 0.1 MV Harmonic f_H/f_{ion} 2, 4, 6
 Freq. 5.6 - 12 MHz Power in(max) 0.1 MW
 Stability: Phase Voltage $5 \cdot 10^{-3}$
 OTHER CAVITIES (Flattopping or otherwise):
 Description:
 Region of Influence: R_{min} cm R_{max} cm
 No. of Gaps/turn $dE/dn(\text{max})$ MeV/q
 Voltage (max) MV Harmonic f_H/f_{ion}
 Freq. MHz Power in(max) MW
 Stability: Phase Voltage

VACUUM SYSTEM

OPERATING PRESSURE: 10^{-6} mbar
 PUMPS: (No. and type) 5 oil diffusion pumps
 400 l/s each

ION SOURCE(S)

Type	Intensity (mA)	@ $\epsilon_n = \beta\gamma\epsilon$ (π mm mrad)	Ion Species
(a) Internal PIG			
(b) External ECR (14.5 GHz)			
(c)			
(d)			

INJECTION SYSTEM

Axial injection, spiral inflector Efficiency (1996) %

EXTRACTION SYSTEM

Stripping Efficiency 30-80 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current (part μ A)	
		Internal	External
(a) ${}^7\text{Li}^{1+}$	12.5	25	20
(b) ${}^{34}\text{S}^{4+}$	6.8	2.5	1.2
(c) ${}^{58}\text{Fe}^{6+}$	5.3	3.5	1.2
(d) ${}^{84}\text{Kr}^{7+}$	3.6	0.35	0.15

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

EXTRACTED BEAM PROPERTIES:

For μ A of MeV/u ions
 $\Delta E/E$ 1 % $\Delta\phi$ 30 °rf
 $\epsilon_n = \beta\gamma\epsilon$ x 4 π mm mrad z 8 π mm mrad

FACILITIES FOR RESEARCH

SHIELDED AREA: Fixed: 400 m² Moveable m²
 Target Stations: 15 No. Served At Same Time: 1

MAGNETIC SPECTROMETERS:

OTHER FACILITIES: Electrostatic and gas filled separators

REFERENCES/NOTES

(a)
 (b)

PLAN VIEW OF FACILITY, COMMENTS