

ENTRY NO. CM13 Date June 19, 1992
 Machine Name 930 AVF CYCLOTRON
 Manufacturer Sumitomo Heavy Industries, Ltd.
 Address 10-11, Kiba 5-chome, Koto-ku, Tokyo 135, Japan
 Tel (03) 3820-6588 Telex
 Fax (03) 3820-6452 EMAIL
 In Charge: Reported by: T. Tachikawa

HISTORY AND STATUS

DATES: Design First Machine
 SALES: No. Sold/Operational 5 / 5 Currently Available Yes
 COST: Accelerator Facility

MAGNET

POLE PARAMETERS:
 Diameter 215.6 cm R_{extract} 92.3 cm R_{inject} cm
 HILL PARAMETERS: Gap (min) cm B_{max} 1.96 T
 (@ 408,000 AT) Gap (max) 16.6 cm B_{min} T
 VALLEY PARAMETERS: Gap (min) cm B_{max} 1.13 T
 (@ 408,000 AT) Gap (max) 40.5 cm B_{min} T
 AVERAGE FIELD: < B >_{min} T < B >_{max} 1.64 T
 NUMBER OF SECTORS: compact/separated 4 /
 sector angle deg. spiral (max) 53 deg.
 FIELD TRIMMING: Trim Coils 12 pairs
 Harmonic Coils 4 pairs
 Other
 CURRENT: Main Coils 900 Amps Stability $\pm 1 \times 10^{-6}$
 Trim Coils 100-800 Amps Stability $\pm 2 \times 10^{-4}$
 Stored Energy (cryogenic) MJ
 WEIGHT: Iron 220 tons Conductor 9 tons
 ION ENERGY: Bending Limit E/A = $\frac{110}{95} q^2/A^2$ MeV/u
 Focussing Limit E/A = $\frac{95}{95} q/A$ MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:
 Description: 2-90° dees with 2/4 cavities
 No. of Gaps/turn 4 dE/dn(max) 0.17 MeV/q
 Voltage(max) 0.060 MV Harmonic f_{rf}/f_{ion} 1.2, 3
 Freq 10.6-22.0 MHz Power in(max) 2 x 0.07 MW
 Stability: Phase ± 0.5 deg Voltage $\pm 1 \times 10^{-3}$

VACUUM SYSTEM

OPERATING PRESSURE: 5×10^{-7} Torr
 PUMPS: No. and type 4 cryo pumps + 1 turbo pump

ION SOURCE(S)

Type	Intensity (mA)	@ $\epsilon_n = \beta\gamma\epsilon$ (π mm mrad)	Ion Species
(a)	Na standard source		
(b)	Both heavy and light ion sources are available		

INJECTION SYSTEM

Axial injection, Spiral inflector. Efficiency 10-20 %

EXTRACTION SYSTEM

Electrostatic + Magnetic. Efficiency 60-70 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current (part. μ A)	
		Internal	External
(a) H ⁺	90	25	10
(b) D ⁺	35	68	41

EXTRACTED BEAM PROPERTIES:

For 3 μ A of 4.4 MeV/u Ar⁸⁺ ions
 $\Delta E/E$ % $\Delta\phi$ °rf
 $\epsilon_n = \beta\gamma\epsilon$ x 1.4 π mm mrad z 1.0 π mm mrad

REFERENCES/NOTES

(a) Proc. of the Int. Conf. on Evolution in Beam Applications...
 (b) Takasaki, Japan, 1991, P270-274

ENTRY NO. CM14 Date 30.06.92
 Machine Name PIC-10
 Manufacturer D.V. Efremov Institute
 Address 189631 St. Petersburg, Russia
 Tel (812) 2655682 Telex
 Fax (812) 2657880 EMAIL
 In Charge: Reported by: Vorogushin

HISTORY AND STATUS

DATES: Design 1991 First Machine 1993
 SALES: No. Sold/Operational / Currently Available
 COST: Accelerator Facility

MAGNET

POLE PARAMETERS:
 Diameter 73 cm R_{extract} 32.5 cm R_{inject} cm
 HILL PARAMETERS: Gap (min) 5.0 cm B_{max} 1.70 T
 (@ AT) Gap (max) 5.0 cm B_{min} T
 VALLEY PARAMETERS: Gap (min) 10.0 cm B_{max} 1.20 T
 (@ 10,0 AT) Gap (max) cm B_{min} T
 AVERAGE FIELD: < B >_{min} 1.48 T < B >_{max} 1.48 T
 NUMBER OF SECTORS: compact/separated 4 /
 sector angle deg. spiral (max) 0 deg.
 FIELD TRIMMING: Trim Coils none
 Harmonic Coils none
 Other
 CURRENT: Main Coils 380 Amps Stability 0.01%
 Trim Coils Amps Stability
 Stored Energy (cryogenic) MJ
 WEIGHT: Iron 7.5 t Conductor 1.05 t
 ION ENERGY: Bending Limit E/A = q^2/A^2 MeV/u
 Focussing Limit E/A = q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:
 Description: 2 dees 45 deg
 No. of Gaps/turn 4 dE/dn(max) 0.10 MeV/q
 Voltage(max) 0.035 MV Harmonic f_{rf}/f_{ion} 2
 Freq 45 + 5 MHz Power in(max) 0.009 MW
 Stability: Phase 5 deg Voltage 0.1%

VACUUM SYSTEM

OPERATING PRESSURE: 5×10^{-6}
 PUMPS: No. and type 2 diffusion pumps

ION SOURCE(S)

Type	Intensity (mA)	@ $\epsilon_n = \beta\gamma\epsilon$ (π mm mrad)	Ion Species
(a)	PIG	H	
(b)			

INJECTION SYSTEM

Efficiency %

EXTRACTION SYSTEM

charge exchange foil. Efficiency 100 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current (part. μ A)	
		Internal	External
(a) H	11	50	50
(b)			

EXTRACTED BEAM PROPERTIES:

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

REFERENCES/NOTES

(a) ...
 (b) ...