

ENTRY NO. CM3 Date October 9, 1995
 Machine Name CYCLONE 18/9
 Manufacturer ION BEAM APPLICATIONS (IBA)
 Address Rue J. Lenoir 6 - 1348 Louvain-la-Neuve, BELGIUM
 Tel 32-10-47.58.11 Telex
 Fax 32-10-47.58.10 E-MAIL
 In Charge: Yves JONGEN Reported by: Françoise VAMECQ

HISTORY AND STATUS

DATES: Design 01/04/90 First Machine 03/92
 SALES: No. Sold/Operational 8 / 4 Currently Available Y
 COST: Accelerator Facility

MAGNET

POLE PARAMETERS:

Diameter 108 cm $R_{extract}$ 48 cm R_{inject} 3 cm

HILL PARAMETERS: Gap (min) 3 cm B_{max} 2.1 T

(@ 112,000 AT) Gap (max) 3 cm B_{min} 2.1 T

VALLEY PARAMETERS: Gap (min) 67 cm B_{max} 0.6 T

(@ AT) Gap (max) 67 cm B_{min} 0.6 T

AVERAGE FIELD: $\langle B \rangle_{min}$ 1.35 T $\langle B \rangle_{max}$ 1.35 T

NUMBER OF SECTORS: compact/separated 4 /

sector angle 57 deg. spiral (max) deg.

FIELD TRIMMING: Trim Coils None

Harmonic Coils None

Other Iron edges (movable for deuterons)

CURRENT: Main Coils 200 Amps Stability 10^{-4}

Trim Coils N/A Amps Stability N/A

Stored Energy (cryogenic) N/A MJ

WEIGHT: Iron 20 Tons Conductor Copper 2 Tons

ION ENERGY: Bending Limit E/A = 20 q^2/A^2 MeV/u

Focusing Limit E/A = 20 q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:

Description: 2 x 30° Dees on lambda/4 straight stems

No. of Gaps/turn 4 dE/dn(max) 0.104 MeV/q

Voltage (max) 0.032 MV Harmonic f_r/f_{ion} 2p/4d

Freq 42 MHz Power in(max) 0.010 MW

Stability: Phase Dees connected Voltage $8 \cdot 10^{-3}$

VACUUM SYSTEM

OPERATING PRESSURE: 0.10^{-6}

PUMPS: (No. and type) 4 x 700 l/sec ODP

ION SOURCE(S)

Type	Intensity (mA)	@ (mm mrad)	$\epsilon_n = \beta\gamma\epsilon$ (mm mrad)	Ion Species
(a) PIG	1 DC			H ⁻
(b) PIG	1 DC			d ⁻

INJECTION SYSTEM

2 internal sources Efficiency 10 %

EXTRACTION SYSTEM

Carbon Stripper Efficiency 100 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current (part. μ A)	
		Internal	External
(a) H ⁺	18	100	100
(b) d ⁺	4.5	> 35	> 35

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) EPAC 1990, Y. Jongen, Nice 1990
- (b)

ENTRY NO. CM4 Date October 9, 1995
 Machine Name CYCLONE 18+
 Manufacturer ION BEAM APPLICATIONS (IBA)
 Address Rue J. Lenoir 6 - 1348 Louvain-la-Neuve, BELGIUM
 Tel 32-10-47.58.11 Telex
 Fax 32-10-47.58.10 E-MAIL
 In Charge: Yves JONGEN Reported by: Pascal COHILIS

HISTORY AND STATUS

DATES: Design 1991 First Machine 1992
 SALES: No. Sold/Operational 4 / 2 Currently Available Y
 COST: Accelerator Facility

MAGNET

POLE PARAMETERS:

Diameter 108 cm $R_{extract}$ 48 cm R_{inject} 1 cm

HILL PARAMETERS: Gap (min) 3 cm B_{max} 2.0 T

(@ AT) Gap (max) 3 cm B_{min} 1.4 T

VALLEY PARAMETERS: Gap (min) 60 cm B_{max} 0.9 T

(@ AT) Gap (max) 60 cm B_{min} 0.3 T

AVERAGE FIELD: $\langle B \rangle_{min}$ 1.3 T $\langle B \rangle_{max}$ 1.37 T

NUMBER OF SECTORS: compact/separated 4 /

sector angle 58 deg. spiral (max) deg.

FIELD TRIMMING: Trim Coils

Harmonic Coils

Other

CURRENT: Main Coils 185 Amps Stability

Trim Coils Amps Stability

Stored Energy (cryogenic) MJ

WEIGHT: Iron 34000 kg Conductor 2000 kg

ION ENERGY: Bending Limit E/A = 19 q^2/A^2 MeV/u

Focusing Limit E/A = 19 q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:

Description: BF Cavities in Opposite Valleys

No. of Gaps/turn 4 dE/dn(max) 0.17 MeV/q

Voltage (max) 0.05 MV Harmonic f_r/f_{ion} 4

Freq 42 MHz Power in(max) 0.035 MW

Stability: Phase Voltage $5 \cdot 10^{-3}$

VACUUM SYSTEM

OPERATING PRESSURE: $2 \cdot 10^{-5}$ mbar

PUMPS: (No. and type) Two 700 l/s diffusion pumps

ION SOURCE(S)

Type	Intensity (mA)	@ (mm mrad)	$\epsilon_n = \beta\gamma\epsilon$ (mm mrad)	Ion Species
(a) PIG	> 2			H ⁺
(b)				

INJECTION SYSTEM

Efficiency %

EXTRACTION SYSTEM

Efficiency %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current (part. μ A)	
		Internal	External
(a) H ⁺	< 18	2000	
(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) Yves Jongen, et al., EPAC 1994, London
- (b)