

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 VAMECO

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: _{min} 1.35 T _{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 q²/A² 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 8.10⁻³

VACUUM SYSTEM

OPERATING PRESSURE: 0.10⁻⁶
 PUMPS: (No. and type) 4 x 700 l/sec ODP

ION SOURCE(S)

Type	Intensity (mA)	@ (π mm mrad)	ε _n = βγc	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. μA)	
		Internal	External
(a) H ⁺	18	100	100
(b) d ⁺	4.5	> 35	> 35

EXTRACTED BEAM PROPERTIES:

For μA of MeV/u ions
 ΔE/E % Δφ *rf
 ε_n = βγc 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: _{min} 1.3 T _{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 q²/A² MeV/u
 Focusing Limit E/A = 19 q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:

Description: RF 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 5.10⁻³

VACUUM SYSTEM

OPERATING PRESSURE: 2.10⁻⁵ mbar
 PUMPS: (No. and type) Two 700 l/s diffusion pumps

ION SOURCE(S)

Type	Intensity (mA)	@ (π mm mrad)	ε _n = βγc	Ion Species
(a) PIG	> 2			H ⁺
(b)				

INJECTION SYSTEM

Efficiency %

EXTRACTION SYSTEM

Efficiency %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current (part. μA)	
		Internal	External
(a) H ⁺	< 18	2000	
(b)			

EXTRACTED BEAM PROPERTIES:

For μA of MeV/u ions
 ΔE/E % Δφ *rf
 ε_n = βγc x π mm mrad z π mm mrad

REFERENCES/NOTES

(a) Yves Jongen et al., EPAC 1994, London
 (b)

NB : INTERNAL TARGETS

DEES CONNECTED AT THE CENTRE