

ENTRY NO. C1 Date OCTOBER 1995
 Name of Machine CYCLONE
 Institution Université Catholique de Louvain
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 In Charge: G. RYCKEWAERT Reported by: M. LOISELET

HISTORY

MILESTONE DATES:

Design 1969 Model Tests 1969
 Construction 1969-1971 First Beam 1972

DESIGN/CONSTRUCTION BY:

in house other CGR-MEV
 COST: Accelerator 3×10^6 US \$ Facility 6.5×10^6 US \$
 FUNDED BY: Univ. de Louvain, IISN (State)

STATUS

STAFF: Machine
 Scientists 4 Engineers 4
 Technicians 11 Students
 Research (in house/external)

Scientists / Engineers /
 Technicians / Students /

BUDGET: Machine Funded by
 Research Funded by

TIME DISTRIBUTION:

Basic Research (in house/external) 53 % / %
 Applied Program (in house/external) 24 % / %
 Maintenance 10 % Development 13 %

MAGNET

POLE PARAMETERS:

Diameter 215.6 cm R_{extract} 93 cm R_{inject} cm

HILL PARAMETERS: Gap (min) 1.65 cm B_{max} 2.15 T
 (@ 4×10^5 AT) Gap (max) cm B_{min} T

VALLEY PARAMETERS: Gap (min) 4.05 cm B_{max} 1.15 T
 (@ 4×10^5 AT) Gap (max) cm B_{min} T

AVERAGE FIELD: $\langle B \rangle_{\text{min}}$ 0.6 T $\langle B \rangle_{\text{max}}$ 1.6 T

NUMBER OF SECTORS: compact/separated 4 /
 sector angle variable deg. spiral (max) 53 deg.

FIELD TRIMMING: Trim Coils 12 pairs
 Harmonic Coils 2 x 4 pairs

Other
 CURRENT: Main Coils 1100 Amps Stability 10^{-5}
 Trim Coils 300-500-700 Amps Stability 10^{-3}
 Stored Energy (cryogenic) MJ

WEIGHT: Iron 200 tons Conductor 6 tons

ION ENERGY: Bending Limit E/A = 110 q^2/A^2 MeV/u
 Focusing Limit E/A = 80 q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:

Description: moving panels; 2 dees 86 deg.
 No. of Gaps/turn 4 $dE/dn(\text{max})$ 0.200 MeV/q
 Voltage (max) 0.050 MV Harmonic $f_{\text{rf}}/f_{\text{ion}}$ 1, 2, 3, 6
 Freq 108-23 MHz Power in (max) 0.200 MW
 Stability: Phase 0.1 deg. Voltage 10^{-4}

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 $f_{\text{rf}}/f_{\text{ion}}$
 Freq MHz Power in (max) MW
 Stability: Phase Voltage

VACUUM SYSTEM

OPERATING PRESSURE: $2 \cdot 10^{-6}$
 PUMPS: (No. and type) 2 oil diffusion 12,000 l/s
 2 cryopumps 3,600 l/s

ION SOURCE(S)

Type	Intensity (mA)	@ $\epsilon_n = \beta\gamma\epsilon$ (π mm mrad)	Ion Species
(a) Livingston			p, d, α
(b) ECR 2 stages			heavy ions
(c) ECR 1 stage			radioactive ions
(d)			

INJECTION SYSTEM

axial injection Efficiency (max) 16 %

EXTRACTION SYSTEM

dc electrostatic + magn. chan. Efficiency (max) 80 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current (part μA)	
		Internal	External
(a) p	85/65		5/25
(b) α	110		15
(c) heavy ions	110 Q2/A		
(d) radioact. ions	$^6\text{He}, ^{13}\text{N}, ^{18}\text{F}, ^{19}\text{Ne}, ^{35}\text{Ar}$		

Secondary Particles	E (MeV)	part/sec
(a) n from p + Be at 65 MeV		10^{11}
(b)		
(c)		

EXTRACTED BEAM PROPERTIES:

For 15 μA of 65 MeV/u H. ions
 $\Delta E/E$ 0.3 % $\Delta\phi$ 1 ns $\epsilon_n = \beta\gamma\epsilon$ x 23 π mm mrad z 15 π mm mrad

FACILITIES FOR RESEARCH

SHIELDED AREA: Fixed: 490 m^2 Moveable 1300 m^2

Target Stations: 11 No. Served At Same Time: 1

MAGNETIC SPECTROMETERS:

OTHER FACILITIES: hot cells - neutrontherapy (multi-leaves collimator) - protontherapy - on line mass separator (LISOL) - radioactive beams

REFERENCES/NOTES

(a)
 (b)

PLAN VIEW OF FACILITY, COMMENTS

