ENTRY NO:C01
Date: 14 Feb 2005 09:29:19
Machine Name: CYCLONE 110
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History
Designed by: Thomson-CSF
Construction Dates: 1969-1972
First Beam Date: 1972
Characteristic Beams

Protons	20-75 MeV/N	2 10exp14 pps	1500W
deutons	2.3-27 MeV/N	2 10exp14 pps	1500W
heavy ions	0.6-27 MeV/N	1 10exp13 pps	
radioactive ions	0.6-5 MeV/N	1 10exp9 pps	

Transmission Efficiency (source to extracted beam)
Typical (%): 0.5 - 10
Best (%): 16
Emittance
Emittance Definition: RMS
Vertical (pi mm mrad): 15
Horizontal (pi mm mrad): 23
Longitudinal (dE/E[%] x RF[deg.]): 0.3(%) X 6(deg.)
USES
Basic Research (%): 49.4
Development (%): 3.2
Therapy (%):
Isotope Production (%):
Other Application (%): 38.2
Maintenance (%): 8.5 + 0.6 (unscheduled shutdown)
Beam Tuning (%): included
Total Time (h/year): 4052 (in 2004)

TECHNICAL DATA
(a)Magnet
Type: Compact
Kb (MeV): 110
Kf (MeV): 80
Average Field (min./max. T): 0.6-1.6
Number of Sectors: 4
Hill Angular Width (deg.): variable
Spiral (deg.): 53
Pole Diameter (m): 2.156
Injection Radius (m):
Extraction Radius (m): 0.923
Hill Gap (m): 0.165
Valley Gap (m): 0.405
Trim Coils
Number: 12 X 2 (for upper and lower poles)
Maximum Current (A): 700
Harmonic Coils
Number: 2 X 4 (sectors) X 2 (for upper and lower poles)
Maximum Current (A): 15
Main Coils
Number: 1 X 2 (for upper and lower poles)
Total Ampere Turns: 400000
Maximum Current (A): 1100
Stored Energy (MJ):
Total Iron Weight (tons): 200
Total Coil Weight (tons): 6
Power
Main Coils (total KW): 300
Trim Coils (total, maximum, KW): 100
Refrigerator (cryogenic, KW):

(b)RF
Acceleration
Frequency Range (MHz): 10.6-23
Harmonic Modes: 1, 2, 3, 6
Number of Dees: 2
Number of Cavities: 2
Dee Angular Width (deg.): 86
Voltage
At Injection (peak to ground, KV): 35
At Extraction (peak to ground, KV): 35
Peak (peak to ground, KV): 35
Line Power (max, KW): 50
Phase Stability (deg.): 0.1
Voltage Stability (%): 0.01

(c)Injection
Ion Source: Filament / ECR
Source Bias Voltage (kV): 6-15
External Injection: Axial
Buncher Type: double gap sinusoidal
Injection Energy (MeV/n): variable
Component:
Injection Efficiency (%): 5-20
Injector:

(d)Extraction
Elements, Characteristic: Electrostatic deflector
Active magnetic channel
Passive focusing channel
Typical Efficiency (%): 60
Best Efficiency (%): 85

(e)Vacuum
Pumps: Oil diffusion + Cryopumps
Achieved Vacuum (Pa): 10-4

REFERENCES

EXPERIMENTAL FACILITIES
LEDA : solid state detector array
LISOL : Leuven Isotope Separator On Line
DEMON : Detecteur Modulaire de Neutrons
HIF : Heavy ions Irradiation Facility
LIF: Light ion Irradiation Facility
NIF: Neutron Irradiation Facility

COMMENTS