

ENTRY NO:C43
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Machine Name: PSI 590 MeV Ring Cyclotron
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History

Designed by: H.A. Willax + PSI-team
Construction Dates: 1968-74
First Beam Date: 1974
Characteristic Beams
p, 590 MeV, <=2 mA, 1.2 MW
Transmission Efficiency (source to extracted beam)
Typical (%): 99.97
Best (%):

Emittance

Emittance Definition: rms
Vertical (pi mm mrad): 1
Horizontal (pi mm mrad): 1
Longitudinal (dE/E[%] x RF[deg.]): 0.4

USES

Basic Research (%): 70
Development (%): 3
Therapy (%): parasitic
Isotope Production (%):
Other Application (%): parasitic
Maintenance (%): 11
Beam Tuning (%): 5
Total Time (h/year): 6000

TECHNICAL DATA

(a)Magnet

Type: separated sectors
Kb (MeV): 592
Kf (MeV): 592
Average Field (min./max. T): 0.58 - 0.78
Number of Sectors: 8
Hill Angular Width (deg.): 18
Spiral (deg.): 35
Pole Diameter (m): 9
Injection Radius (m): 2.1
Extraction Radius (m): 4.45
Hill Gap (m): 0.05 - 0.09
Valley Gap (m):
Trim Coils
Number: 2 x 18
Maximum Current (A-turns): 30 / 200 A
Harmonic Coils
Number: 2 x 5 + 2x8
Maximum Current (A-turns): 200 A
Main Coils
Number: 2 x 8
Total Ampere Turns: 1.5 e5
Maximum Current (A): 930
Stored Energy (MJ):
Total Iron Weight (tons): 1960
Total Coil Weight (tons): 28
Power
Main Coils (total KW): 620
Trim Coils (total, maximum, KW): 30
Refrigerator (cryogenic, KW):

(b)RF

Acceleration
Frequency Range (MHz): 50.633
Harmonic Modes: 6
Number of Dees:

Number of Cavities: 4 + 1 flattop
Dee Angular Width (deg.):
Voltage
At Injection (peak to ground, KV): 500
At Extraction (peak to ground, KV): 630
Peak (peak to ground, KV): 730
Line Power (max, KW): 4 x 520
Phase Stability (deg.): 0.01
Voltage Stability (%): 0.03

(c)Injection

Ion Source:
Source Bias Voltage (kV):
External Injection: radial, magnetic channel and el. stat. inflector
Buncher Type:
Injection Energy (MeV/n): 72
Component:
Injection Efficiency (%): 99.93
Injector: PSI Injector 2 Cyclotron

(d)Extraction

Elements, Characteristic: el. stat. channel, septum magnet
Typical Efficiency (%): 99.97
Best Efficiency (%): 99.98

(e)Vacuum

Pumps: Kryo
Achieved Vacuum (Pa): 2.7 e-4

REFERENCES Contributions to these Proceedings by H.R. Fitze, A. Adelman, A. Mezger

EXPERIMENTAL FACILITIES

pi- and mu-meson areas, n-Spallation Source SINQ, Gantry, Irradiation Facility

COMMENTS