

Entry: **CU67**
 Machine Name: NIRM Compact Cyclotron
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HISTORY

Design by: The Japan Steel Works, Ltd.
 Construction time: 1983-1985
 First beam: 1985

CHARACTERISTIC BEAMS

ions / energy (MeV/n) / current (pps) / power (W) :
 - p / 17 MeV/n / 50 μ A / 850
 - d / 10 MeV/n / 50 μ A / 500
 - He-3 / 8.6 MeV/n / 20 μ A / 520
 - α / 5 MeV/n / 20 μ A / 400
 transmission efficiency (total)
 - typical: % - best: %
 transverse emittance (rms)
 - vertical: 42. π mmmrad
 - horizontal: 9.5. π mmmrad
 longitudinal emittance (rms) $\Delta E/E$.deg RF

USES

basic research: 80 % therapy: %
 development: % isotope production: %
 other applications: % maintenance: 20. %
 beam tuning: %
 total time: 2,000 h/year

TECHNICAL DATA

a) magnet
 type: Ordinary Bitter Type
 Kb: MeV/A Kf: MeV/A
 average field (min-max): 1.5 T
 number of magnet sectors: 4
 - angle: 45 deg
 - spiral (max): 0. deg
 pole parameters
 - diameter: 1.01 m
 - injection radius: m
 - extraction radius: 0.42 m
 hill gap: 0.07 m valley gap: 0.13 m
 field trimming
 - trim coils
 - number: 3
 - current (max): 50 A
 - harmonic coils
 - number: 2
 - current (max): 50 A
 - others
 - number: -
 - current (max): - A
 main coils:
 - number: 2 (one set)
 - Ampere-turns: 1.2×10^5 A.T.
 - current: 360 A
 stored energy: MJ
 weight : - iron: 30 t - coils: 1 t
 power
 - main coils (total): 36 kW
 - trim coils (total max): 2.5 kW
 - refrigerator (cryogenic): kW
 b) RF
 - acceleration
 - frequency range: 31.3, 43.5, 47. MHz
 - harmonic modes: 2nd, 4th
 - number of dees: 2
 - angular aperture: 45. deg

- voltage:- average (min-max): 40. kW
 - variation with radius:
 - power in (max): 40. kW
 - stability: - phase: deg - voltage: 1. %

- other cavities

- purpose:
 - frequency range: MHz
 - region of influence: m
 - voltage (max): kW
 - power in (max): kW
 - stability:- phase: deg - voltage: %

c) injection

- internal source: Hot Cathode Horizontal
 - external (radial/axial):
 - elements:
 - source voltage: kW
 - injection energy: MeV/n
 - buncher:
 - injection efficiency: %

d) ion sources/injector

e) extraction

- elements, characteristics:
 - Electrical Deflector
 - Gap 5 mm
 - Max Voltage -50 kV
 - efficiency
 - typical: 50 % - best: 60 %

f) vacuum

- pumps: Oil Diffusion Pump
 Capacity 2000 l/sec (air)
 - achieved vacuum: 1×10^{-4} Pa

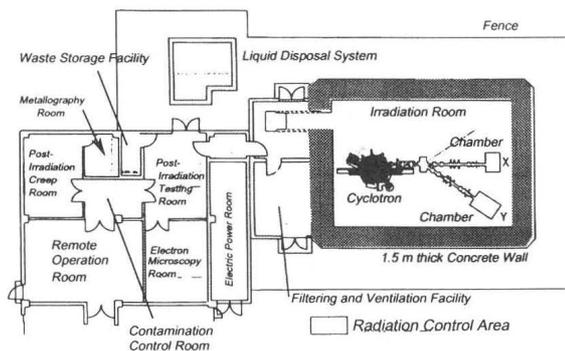
REFERENCES

H. Shiraishi et al., Proc. of the 11th Int. Conf. on Cyclotron and their Applications, 1986, pp.571.

EXPERIMENTAL FACILITIES

In-Beam Mechanical Testing Equipments
 Post-Irradiation Mechanical Testing Equipments
 Electron Microscopes

PLAN VIEW OF FACILITY



COMMENTS

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