

ENTRY NO: CU-9
Machine Name: MC32NI
Date: 6/17/01 10:35:13 AM
Institution: German Cancer Research Center (DKFZ)
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HISTORY

Designed By: Scanditronix AB, Uppsala, Sweden
Construction Dates: 1989 - 1991
First Beam Date: June 1991
CHARACTERISTIC BEAMS

ions	/ energy(MeV/N)/current(pps)/power(w)
H minus	16 - 32 100 A max.
D minus	4 - 8 100 A max.

transmission efficiency(source to extract beam)

typical: 80% - **best:** 85%

tranverse emittance

emittance definition: (for 32 MeV p)

vertical: 8π mm mrad

horizontal: 9π mm mrad

longitudinal: (Δ) E/E)%xdeg RF

USES

basic research: 10%	therapy: -%
development: 5%	isotope production: 65%
other: 5%	maintenance: 10%
beam tuning: 5%	Total Time: 2500h/year

TECHNICAL DATA

a)magnet: **type:** compact

Kb: MeV/A **Kf:** MeV/A

average field (min/max): 1.92 / 1.62 T

number of magnet sectors:

hill angular width: hill angular width

spiral (max): deg

pole parameters

diameter: 1.35 m

injection radius: m

extraction radius: .30 - .51 m

hill gap: .12 min.m **valley gap:** .18m

trim coils

-number: 3x2

-current(max): 10; 12 A A-turns

harmonic coils

-number: 2xNsectorsx2

-current(max): 5 A A-turns

main coils

number: 1x2

total ampere-turns: A-turns

current: 675 A

stored energy: MJ

weight - iron: 52t **coils:** 3t

power

main coils (total): 82 kW

trim coils (total max): kW

refrigerator (cryogenic): kW

b)RF

acceleration

frequency range: 24.3 fixedMHz

harmonic modes: 2

number of dees: 2

number of cavities: 2

dee angular width: 90degrees

voltage

at injection: 30kV(peak to ground, max)

at extraction: kV(peak to ground, max)

peak: kV(peak to ground, max)

line power(max): 185 kVAkW

stability

phase: deg

voltage: .5%

injection

c)ion source: Dual Penning (cold cathode)

external injection:

components:

source bias voltage: kV

injection energy: MeV/N

buncher:

injection efficiency: %

d)injector:

e)extraction

Carbon Stripper Foil, 1.2 mg/cmE2

efficiency

typical: 95 - 98%

best: 99%

f)vacuum

pumps: 2 oil diff. pumps, 4000 l/s each

achieved vacuum: 2×10^{-5} Pa

REFERENCES

Cyclotrons and Their Applications 1998 Proc. 15th Int. Conf., CAEN, France E. Baron and M. Lieuvain (eds.); IOP 1999, p. 74 - 75 G. Wolber et al.: A new fast-neutron source for radiobiological research. Phys. Med. Biol. 42 (1997) 725 - 733

EXPERIMENTAL FACILITIES

Bam Line System: switchung magnet with 9 ports (1 still free) with 8 beam lines dedicated to radionuclide and fast neutron production and activation of machine parts for wear measurements. 90 vertical bending magnet installed in beam line # 3 with vertical beam line to horizontal target located in the basement.

COMMENTS