Entry: C 12

Machine Name: U-120M
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HISTORY

Design by: JIRN DUBNA RUSSIA
Construction time:
First beam: AUGUST 1977

CHARACTERISTIC BEAMS

ions / energy (MeV/n) / current (pps) / power (W) :
- p/37/6 x 10^{14}/3000; H^-/10-37/1.6 x 10^{14}/400
- d/10/4 x 10^{14}/2000
- $3He^{++}$/18/1.3 x 10^{14}/1080
- $4He^{++}$/10/1.3 x 10^{14}/800

transmission efficiency (total)
- **typical:** 50 % - **best:** 70 %

transverse emittance (rms)
- **vertical:** 2.5 π mmmrad
- **horizontal:** 11 π mmmrad

longitudinal emittance (rms) ..... ΔE/E.deg RF

USES

basic research: 15 % **therapy:** ..... %
development: 14 % **isotope production:** 55 %
other applications: ..... % **maintenance:** 8 %
beam tuning: 8 %
total time: 1200 h/year

TECHNICAL DATA

a) magnet
type:
Kb: 40 MeV/A **Kf:** ..... MeV/A
average field (min-max): 1.0 - 1.85 T
number of magnet sectors: 4
- **angle:** ..... deg
- **spiral (max):** 70 deg

pole parameters
- **diameter:** 1.2 m
- **injection radius:** 0.018 m
- **extraction radius:** 0.5 m

hill gap: 0.082 m **valley gap:** 0.12 m
field trimming
- **trim coils**
  - **number:** 18
  - **current (max):** 500 A
- **harmonic coils**
  - **number:** 1 x 4
  - **current (max):** 200 A
- **others**
  - **number:**
  - **current (max):** ..... A

main coils:
- **number:** 1
- **Ampere-turns:** 0.4 x 10^6 A.T.
- **current:** 600 A

stored energy: ..... MJ
weight : - iron: 110 t **- coils:** 11.6 t
power
- **main coils (total):** 180 kW
- **trim coils (total max):** 150 kW
- **refrigerator (cryogenic):** ..... kW

b) RF
- acceleration
- **frequency range:** 10 - 26 MHz
- **harmonic modes:** 1
- **number of dees:** 1
- **angular aperture:** 180 deg
- **voltage:- average (min-max):** 30 - 50 kV
  - **variation with radius:**
  -
- **power in (max):** 150 kW
- **stability: - phase:** ..... deg **- voltage:** 1 %

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

c) injection
- internal source **PIG - cold cathodes**
- external (radial/axial): axial injector
- **elements:** 3 solenoids - B channels
- **source voltage:** 15 - 30 kV
- **injection energy:** max. 0.03 MeV/n
- **buncher:** first harmonic

- injection efficiency: 5 - 12 %

d) ion sources/injector
H^- CUSP

e) extraction
- elements, characteristics:
- p/35 MeV/4 - 10 μA; H^-/10 - 37 MeV/50 - 10 μA
- d/20 MeV/4 - 10 μA
- $3He^{++}$/54 MeV/2 - 6 μA
- $4He^{++}$/40 MeV/2 - 6 μA
-

- efficiency
- **typical:** 25 % **- best:** 35 %

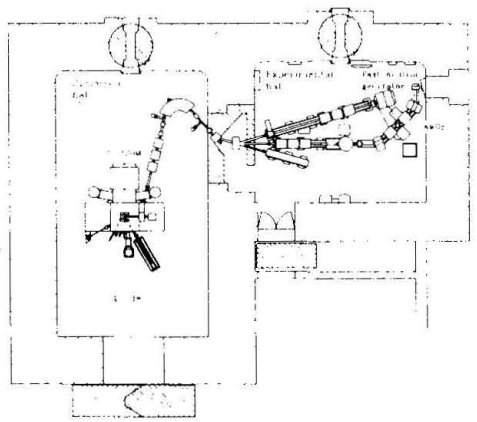
f) vacuum
- **pumps:** 2 x 2000 l/s + 1 x 800 l/s
- **achieved vacuum:** 1 x 10^{-4} Pa

REFERENCES

EXPERIMENTAL FACILITIES

Achromatic magnetooptical system (AMOS) 90°, 5 m
Fast neutron generator (6 x 10^{12}n/s)

PLAN VIEW OF FACILITY



COMMENTS