Entry: C34 **Date:** June 11,1998

Machine Name: RCNP AVF Cyclotron **Institution:** RCNP Osaka University

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HISTORY

Design by: RCNP osaka university

Construction time:1971-1973

First beam: 1974

CHARACTERISTIC BEAMS

ions / energy (MeV/n) / current (pps) / power (W) :

- -pol p / 80 / $3x10^{13}$
- -^{3}He / 53 / $3x10^{13}$
- -^{4}He / 35 / $3x10^{13}$
- -$^{18}O^{6+}$ / 13.7 / $1x10^{13}$

transmission efficiency (total)

- **typical:** 70 **%** - **best:** 100 **%**

transverse emittance (rms)

- **vertical:**3 π mmmrad
- **horizontal:**6 π mmmrad

longitudinal emittance (rms) 0.1% 12deg ΔE/E.deg RF

USES

basic research: 32 **%** **therapy:** **%**

development: 27 **%** **isotope production:** **%**

other applications: **%** **maintenance:** 33 **%**

beam tuning: 7 **%**

total time: 6900 **h/year**

TECHNICAL DATA

a) magnet

type:normal conductor compact

Kb: 140 **MeV/A** **Kf:** 80 **MeV/A**

average field (min-max): 1.6 **T**

number of magnet sectors: 3

- **angle:** **deg**
- **spiral (max):** 52 **deg**

pole parameters

- **diameter:** 2.3 **m**
- **injection radius:** **m**
- **extraction radius:** 1.0 **m**

hill gap: 0.207 **m** **valley gap:** 0.347 **m**

field trimming

- **trim coils**
  - **number:** 16
  - **current (max):** 1400 **A**
- **harmonic coils**
  - **number:** 5 / sector
  - **current (max):** 200 **A**
- **others**
  - **number:**
  - **current (max):** **A**

main coils:

- **number:**
- **Ampere-turns:** $4x10^{5}$ **A.T.**
- **current:** 1430 **A**

stored energy: **MJ**

weight : - **iron:** 400 **t** - **coils:** 13 **t**

power

- **main coils (total):** 450 **kW**
- **trim coils (total max):** 265 **kW**
- **refrigerator (cryogenic):** **kW**

b) RF

- **acceleration**
  - **frequency range:** 6 - 18 **MHz**
  - **harmonic modes:** 1 and 3
  - **number of dees:** 1
  - **angular aperture:** 180 **deg**
  - **voltage:-** **average (min-max):** 80 **kV**
    - **variation with radius:**
    -
  - **power in (max):** 400 **kW**
  - **stability:** - **phase:** 0.1 .. **deg** - **voltage:** 0.01 .. **%**
- **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:**
- **external (radial/axial):** axial
  - **elements:** Atomic polarized ion source, and ECR
    Inflector
  - **source voltage:**15 **kV**
  - **injection energy:** **MeV/n**
  - **buncher:** f+2f+3f
- **injection efficiency:** 12 **%**

d) ion sources/injector

e) extraction

- **elements, characteristics:**
  - electric static deflector
  -
  -
  -
- **efficiency**
  - **typical:** 90 **%** - **best:** 100 **%**

f) vacuum

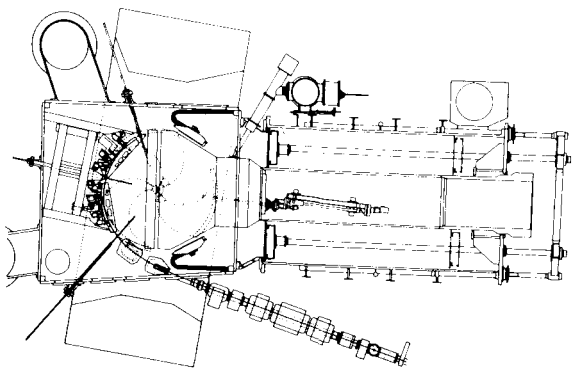
- **pumps:** 3 Diff, pumps
- **achieved vacuum:** $4x10^{5}$ **Pa**

REFERENCES

EXPERIMENTAL FACILITIES

Injection system to the ring cyclotoron

PLAN VIEW OF FACILITY



COMMENTS