Entry: C36 **Date**: Junc..5,..1998

Machine Name: RIKEN.AVF.Cyclotron.(715.CYCLOTRON-RIKEN) **Institution**: The.Institute.of.Physical.and.Chemical Research(RIKEN).

Address: Wako-shi,Saitama.351-0198,.Japan

In Charge of the cyclotron: .....M.Kase

Tel: .....+81-48-462-1111 **Web**: ....http://www.rarf.riken.go.jp/rarf/

Fax: .....+81-48-461-5301 **E-mail**: ...kase@rikaxp.riken.go.jp

---

HISTORY

Design by: .....RIKEN/SHI

Construction time:.....1987-1989

First beam: .....April...1989

CHARACTERISTIC BEAMS

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

- ..P../..4-14.5../..6×10^{13}../..40-150
- ..d../..4-9.5../..6×10^{13}../..80-200
- ..^{12}C,..^{14}N,..^{16}O,..^{20}Ne../..4-7../..1×10^{13}../..300
- ..^{40}Ar../..4.5-5.2../..3×10^{12}../..100

transmission efficiency (total)

- **typical**: .....10.....% - **best**: .....20.....%

transverse emittance (rms)

- **vertical**:.....0.9.....π mmmrad
- **horizontal**:.....0.9.....π mmmrad

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

USES

basic research: ..... % **therapy**: ..... %

development: ..... % **isotope production**: .... %

other applications: ..... % **maintenance**: ..... %

beam tuning: ..... %

total time: ..... h/year

TECHNICAL DATA

a) magnet

type: .....AVF

Kb: .....70..q^2../..A^2.... MeV/A **Kf**: ..... MeV/A

average field (min-max): .....0.5-1.7..... T

number of magnet sectors: .....4.....

- **angle**: ..... deg
- **spiral (max)**:.....50..... deg

pole parameters

- **diameter**: .....1.726..... m
- **injection radius**: .....0.0163..... m
- **extraction radius**: .....0.714..... m

hill gap: .....0.128..... m **valley gap**: ....0.30..... m

field trimming

- **trim coils**
  - **number**: .....9..pairs.....
  - **current (max)**: .....70-300..... A
- **harmonic coils**
  - **number**: .....4..pairs.....
  - **current (max)**: ..... A
- **others**
  - **number**: .....
  - **current (max)**: ..... A

main coils: .....

- **number**: .....1..pairs.....
- **Ampere-turns**: .....320000..... A.T.
- **current**: .....1113..... A

stored energy: ..... MJ

weight : - iron: .....102..... t - **coils**: .....5.3.....t

power

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

b) RF

- acceleration

- **frequency range**: .....12-24..... MHz
- **harmonic modes**: .....2,.3.....
- **number of dees**: .....2.....
- **angular aperture**: .....85..... deg
- **voltage:- average (min-max)**: .....50..... kV
  - **variation with radius**: .....
  - -
- **power in (max)**: .....30×.2..... kW
- **stability: - phase**: ±0.2 deg - **voltage**: ±0.05 .. %

- 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): .....

- **elements**: .....Solenoid,..Spiral..Inflector.....
  .....
- **source voltage**:.....Max..10.....kV
- **injection energy**:..... MeV/n
- **buncher**: .....saw-tooth(1-3f).....

- injection efficiency: .....20-30..... %

d) ion sources/injector

.....ECR.....

.....PIS.....

e) extraction

- elements, characteristics:

- .....Electrostatic..deflector.....
- .....Magnetic..channel.....
- .....Passive..focusing..channel.....
- .....

- efficiency

- **typical**: .....40..... % - **best**: .....70..... %

f) vacuum

- **pumps**: .....1500 ℓ /S.....TMP×.1 .....
  ..400 ℓ /S..cryopump×1..6500 ℓ /S..cryopump×1...
- **achieved vacuum**: .....1.5×.10^{-10}..... Pa

REFERENCES

..A.Goto..et..al.:Proc.12th..Int.Cyclo...Conf,51(1989).....

..A.Goto..et..al.:ibid.,439(1989).....

.....

EXPERIMENTAL FACILITIES

.....

.....

.....

PLAN VIEW OF FACILITY

Same as that of the RRC

COMMENTS

.....This.cyclotron.is.used.as.an.injector.of.the.RIKEN.Ring....

.....Cyclotron.....

.....Stand-Alone.use.of.this.cyclotron.is.also.made.for.isotopes.

.....production.for.Hoess.bauer.spectroscopy.and.loser.nuclear...

.....spectroscopy,.production.test.of.slow.positrons,.....

.....measurement.of.nuclear.fusion.cross.sections,.etc.....