

ENTRY NO: C-24
Machine Name: JAERI AVF Cyclotron
Date: 5/25/01 1:24:01 AM
Institution: Japan Atomic Energy Research Institute
Address 1233 Watanuki, Takasaki, Gunma, 370-1292 JAPAN
In Charge of Cyclotron: Y. Nakamura
Telephone: 27-346-9631
Fax: 27-346-9690
Person Reporting: Y. Nakamura
Web: <http://www.taka.jaeri.go.jp>
E-mail: nakamura@taka.jaeri.go.jp

HISTORY

Designed By: Sumitomo Heavy Industries, Ltd.
Construction Dates: 1988-1991
First Beam Date: 17 March, 1991
CHARACTERISTIC BEAMS

ions	/ energy(MeV/N)/current(pps)/power(w)
H+	90.0 10 emicroA
4He2+	25.0 10
12C5+	18.3 0.25
40Ar13+	11.5 0.03
129Xe23+	3.5 0.20
197Au31+	2.5 0.022

transmission efficiency(source to extract beam)
typical: 15% - **best:** 30%
tranverse emittance
emittance definition: 80 %
vertical: 13π mm mrad
horizontal: 9π mm mrad
longitudinal: (Δ) E/E) %xdeg RF

USES

basic research: 17% **therapy:** 0%
development: 6% **isotope production:** 5%
other: 54% **maintenance:** %
beam tuning: 18% **Total Time:** 3200h/year

TECHNICAL DATA

a)magnet: **type:** Compact: H
Kb: 110MeV/A **Kf:** 95MeV/A
average field (min/max): 1.67 T
number of magnet sectors: 4
hill angular width: hill angular width
spiral (max): 53 deg
pole parameters
diameter: 2.156 m
injection radius: m
extraction radius: 0.923 m
hill gap: 0.166m **valley gap:** 0.405m
trim coils
 -number: 12x2
 -current(max): 800 A A-turns
harmonic coils
 -number: 2xNsectorsx2
 -current(max): 50 A A-turns
main coils
number: 1x2
total ampere-turns: 432000 A-turns
current: 900 A
stored energy: MJ
weight - iron: 220t **coils:** 5t
power
main coils (total): 250 kW
trim coils (total max): 52 kW
refrigerator (cryogenic): kW
b)RF
acceleration
frequency range: 10.6-22.0MHz

harmonic modes: 1, 2, 3
number of dees: 2
number of cavities: 1
dee angular width: 86degrees
voltage
 at injection: 60 (max)kV(peak to ground, max)
 at extraction: 57 (max)kV(peak to ground, max)
 peak: 60 (max)kV(peak to ground, max)
line power(max): 50kW
stability
phase: +- 0.5 deg
voltage: +- 0.1%
injection
c)ion source: CUSP, ECR1, H-ECR
external injection: Axial (bottom)
components: Spiral inflector
source bias voltage: 3-20kV
injection energy: MeV/N
buncher: Twin gaps, sine wave
injection efficiency: %
d)injector:
e)extraction
 Electrostatic deflector: 60 kV (max) Electromagnetic coil: 1430 A (max) Passive-type field gradient corrector: Remote control
efficiency
typical: 60%
best: 88%

f)vacuum
pumps: CRYO: 4000 L/s x 4 set, TMP: 2000 L/s x 1 set
achieved vacuum: 1.2 x 10⁻⁵Pa

REFERENCES

- 1) Y. Nakamura, T. Nara, T. Agematsu, et. al., JAERI-Review, 2000-024, pp 288-290 (2000)
- 2) H. Tamura, K. Arakawa, Y. Nakamura, et. al., Proc. 12th Sympo. Accel. Sci. Technol., Wako, Japan, pp 171-173 (1999)
- 3) K. Arakawa, Y. Nakamura, W. Yokota, et. al., JAERI-Review, 99-025, pp 254-256 (1999)
- 4) K. Arakawa, M. Fukuda, Y. Nakamura, et. al., Proc. 15th Int. Conf. Cyclo. Applic., Caen, France, pp 617-620 (1998)

EXPERIMENTAL FACILITIES

On-line Isotope Separator (ISOL) Wide-area Ion Irradiation Chamber Positron Emitting Tracer Imaging System (PETIS) Heavy Ion Microbeam System Quasi-Monoenergetic Neutron Source Beam Chopping system (Pulsed type + sinusoidal type) Beam Scanner (Triangular wave)

COMMENTS

