

ENTRY NO. C33 Date 18 June, 1992
 Name of Machine JAERI AVF Cyclotron
 Institution Takasaki Radiation Chemistry Research Establishment, Japan Atomic Energy Research Institute
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HISTORY
MILESTONE DATES:
 Design Model Tests
 Construction 1988-1991 First Beam March, 1991
DESIGN/CONSTRUCTION BY:
 in house other
COST: Accelerator Facility
FUNDED BY: The Science and Technology Agency

STATUS
STAFF: Machine
 Scientists 5 Engineers 5
 Technicians 8 Students
 Research (in house/external)
 Scientists 40 / 80 Engineers /
 Technicians / Students / 20
BUDGET: Machine 170 MYEN Funded by Sci. Tec. Age.
 Research 200 MYEN Funded by Sci. Tec. Age.
TIME DISTRIBUTION:
 Basic Research (in house/external) 5 % / 5 %
 Applied Program (in house/external) 35 % / 25 %
 Development 20 % Maintenance 10 %

MAGNET
POLE PARAMETERS:
 Diameter 216 cm R_{extract} 92.3 cm R_{inject} cm
HILL PARAMETERS: Gap (min) 16.6 cm B_{max} 2.10 T
 (@ 432000 AT) Gap (max) cm B_{min} T
VALLEY PARAMETERS: Gap (min) 40.5 cm B_{max} T
 (@ 432000 AT) Gap (max) cm B_{min} 1.21 T
AVERAGE FIELD: < B >_{min} 1.66 T < B >_{max} 1.69 T
NUMBER OF SECTORS: compact/separated 4 /
 sector angle deg. spiral (max) 53 deg.
FIELD TRIMMING: Trim Coils 12 pairs
 Harmonic Coils 8 pairs
 Other
CURRENT: Main Coils 900 Amps Stability ±1x10⁻⁵
 Trim Coils Amps Stability ±2x10⁻⁴
 Stored Energy (cryogenic) MJ
WEIGHT: Iron 220 tons Conductor 9 tons
ION ENERGY: Bending Limit E/A = 110 q²/A² MeV/u
 Focussing Limit E/A = 95 q/A MeV/u

ACCELERATION SYSTEM
FUNDAMENTAL ACCELERATION:
 Description:
 No. of Gaps/turn 4 dE/dn(max) 0.16 MeV/q
 Voltage(max) 0.06 MV Harmonic f_{rf}/f_{ion} 1, 2, 3
 Freq 10.6-22.0 MHz Power in(max) 0.05 MW
 Stability: Phase ±0.5 deg. Voltage ±1x10⁻³
OTHER CAVITIES (Flattopping or otherwise):
 Description:
 Region of Influence: R_{min} cm R_{max} cm
 No. of Gaps/turn dE/dn(max) MeV/q
 Voltage(max) MV Harmonic f_{rf}/f_{ion}
 Freq MHz Power in(max) MW
 Stability: Phase Voltage

VACUUM SYSTEM
OPERATING PRESSURE: 2 x 10⁻⁵ Pa
PUMPS: No. and type Turbo molecular pump (2000L/s, 1 set)
 Cryogenic pump (4000L/s for N₂, 4 sets)

ION SOURCE(S)

Type	Intensity (mA)	Φ (πmm mrad)	ε _n = βγε (πmm mrad)	Ion Species
(a) cusp	1.3	300		H ⁺
(b) cusp	1.0			D ⁺
(c) ECR	0.16	100		40Ar ⁸⁺
(d) ECR	0.012			84Kr ¹⁸⁺

INJECTION SYSTEM
 Axial injection, spiral inflector Efficiency 20 %

EXTRACTION SYSTEM
 Deflector, Magnetic channel Efficiency 80 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current (part μA)	
		Internal	External
(a) proton	90		10
(b) deuteron	17.5		40
(c) 4He ²⁺	25		10
(d) 40Ar ⁸⁺	4.4		3.0

Secondary Particles	E (MeV)	part/sec
(a) neutron	Be(d,n)	
(b)	Be(p,n)	
(c)		

EXTRACTED BEAM PROPERTIES:
 For 5 μA of 4.4 MeV/u 40Ar⁸⁺ ions
 ΔE/E % Δφ °rf
 ε_n = βγε x 14.0 πmm mrad z 9.9 πmm mrad

FACILITIES FOR RESEARCH
SHIELDED AREA: Fixed 4000 m² Moveable 0 m²
 Target Stations 18 No. Served At Same Time 1
MAGNETIC SPECTROMETERS:
OTHER FACILITIES:
 On-line isotope separator
 Beam chopping system, Beam scanner
 Fast neutron production

REFERENCES/NOTES
 (a)
 (b)

