ENTRY NO. 55

NAME OF MACHINE ... RIKEN Ring Cyclotron
INSTITUTION ... RIKEN
ADDRESS ... Wako-shi, Saitama, 351-01 JAPAN
TEL ... 0484-62-1111 ... TELEX ... 296-2818 RIKEN J
IN CHARGE ... H. Kamitsubo ... REPORTED BY ... S. Motonaga

HISTORY AND STATUS

DESIGN, date ... 1975 ... Model tests ... 1977
ENG DESIGN, date ... 1975 – 1980
CONSTRUCTION, date ... 1980 – 1986
FIRST BEAM, date (or goal) ... 1986
MAJOR ALTERATIONS
COST, ACCELERATOR ... ¥ 40 × 10^8
COST, FACILITY, total ... ¥ 137 × 10^8
FUNDED BY ... Science and Technology Agency

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS ... and ... ENGINEERS ... 26
TECHNICIANS ... CRAFTS ...
GRAD STUDENTS involved during year ...
OPERATED BY ... Research staff or ... Operators
OPERATION ... hr/wk. On target ... hr/wk
TIME DISTR. in house ... %, outside ... %
BUDGET, op & dev ...
FUNDED BY ...

RESEARCH STAFF, not included above

USERS, in house ... outside ...
GRAD STUDENTS involved during year ...
RESEARCH BUDGET, in house ...
FUNDED BY ...

MAGNET

POLE FACE, diameter (compact) ... cm, R-extraction ... 356 ... cm
R injection ... 89 ... cm
GAP, min ... 8 ... cm, Field ... 16.7 ... kG
max ... cm, Field ... kG } at ... 1.28 × 10^5 ... Ampere turns
AVERAGE FIELD at R ext ... 9.7 ... kG
B max/<B> ... 1.8
NUMBER OF SECTORS { compact ... separated ... 4 ... } Spiral, max ... deg
SECTOR ANGLE (SSC) ... 50 ... deg
TRIMMING COILS ... 29 × 4 pairs
CONDUCTOR, material and type ... copper
STORED ENERGY (cryogenic) ... MJ
POWER: main coils ... 480 ... max kW: current stability ≤0.001%
trimming coils ... 215 ... max kW: current stability ≤0.05 %
WEIGHT: Fe ... 2100 ... tons: coils ... 16 ... tons
COOLING system ... Demineralized water
ION ENERGY (Bending limit) E/A = ... 540 ... q^2/A^2 MeV/amu
(Focusing limit) E/A = ... q/A MeV/amu

ACCELERATION SYSTEM

DEES, number ... 2 ... angle ... 23.5 ... deg
BEAM APERTURE ... 5 ... cm; DC Bias ... kV
TUNED by, coarse Movable box ... fine Capacitive trimmer
RF ... 20 ... to ... 45 ... MHz, stable ± ... 10^{-8}
Orb F ... 1.9 ... to ... 7.5 ... MHz
HARMONICS, RF/Orb F, used ... 9, 5(10,11)
DEE–Gnd, max ... 250 ... kV, min gap ... 10 ... cm
STABILITY, (pk-pk noise)/(pk RF volt) ... 10^{-4}
ENERGY GAIN, max ... 1000 ... kV/turn
RF PHASE, stable to ± ... 1 ... deg
RF POWER input, max. ... 2 × 300 ... kW
FREQUENCY MODULATION, rate ... /s
modulator, type ...
beam pulse, width ...

VACUUM SYSTEM

OPERATING PRESSURE ... ≤1 × 10^{-7} ... Torr or mbar
PUMPS, No, Type, Size ... 10. cryopumps. 10,000 ℓ/s ...
... 4. cryopanels. 5,000 ℓ/s ...

ION SOURCES

INJECTION SYSTEM

EXTRACTION SYSTEM

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed ... 4,000 ... m^2; movable ... m^2
TARGET STATIONS ... 18 ... in ... 8 ... rooms
STATIONS served at same time, max ... 2
MAG SPECTROGRAPH, type ...
COMPUTER model ...
OTHER FACILITIES ...

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
P	210 MeV			
^{3}He	185 MeV/A			
C	135 MeV/A			
U	13 MeV/A			
SECONDARY			(part/s)	

BEAM PROPERTIES

MEASURED		CONDITIONS
PULSE WIDTH ...	RF deg ...	pμA of ... MeV ... ions
PHASE EXC. max ...	RF deg ...	pμA of ... MeV ... ions
EXTRACT eff. ...	% ...	pμA of ... MeV ... ions
RESOL ΔE/E ...	% ...	pμA of ... MeV ... ions
EMITTANCE		
(π mm-mrad) ...	axial	pμA of ... MeV ...
...	rad	

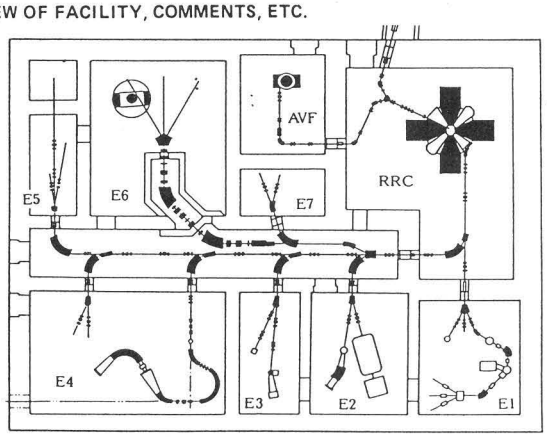
OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS ... SOLID STATES PHYSICS ...
BIOMEDICAL APPLICAT. ... ISOTOPE PRODUCTIONS ...

REFERENCES/NOTES

1) H. Kamitsubo: This conference

PLAN VIEW OF FACILITY, COMMENTS, ETC.



E1: IGISOL(Ion Guided Isotope Separator On line)
E2: Multi-Particle Correlation Spectrometer
Highly-Ionized Atom Spectrometer
E3: Pion Spectrometer
Irradiation System for Short-lived Isotope Production
E4: High-Resolution Charged-Particle Spectrometer with Neutron TOF System
E5: Biomedical Irradiation System
E6: RIPS(RIKEN Projectile Fragment Separator)
E7: Material Irradiation System

All compornents were assembled by the summer of 1986. Acceleration test of an beam is scheduled to stert after the permission for the operation by Science and Technology agency. The first beam (Ar +12) will be expected at the end of this year.