ENTRY No. 58

NAME OF MACHINE .. RIKEN Ring Cyclotron .. DATE May 1989
INSTITUTION ..... RIKEN
ADDRESS ..... Wako-shi, Saitama, 351-01, JAPAN
TEL 0484-62-1111 ..... TELEX ... 296-2818 RIKEN J
IN CHARGE H. Kamitsubo ..... REPORTED BY Y. Yano

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 ..... ENGINEERS
TECHNICIANS ..... CRAFTS
GRAD STUDENTS involved during year
OPERATED BY 5 ..... Research staff or 5 ..... Operators
OPERATION 116 hr/wk, On target 104 hr/wk
TIME DISTR. in house 50 %, Outside 50 %
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 ..... cm, Field ..... kG
max 8 cm, Field 16.7 kG
AVERAGE FIELD at R ext 9.7 kG
} at 1.28×10^5 Ampere turns
B max/ <B> 1.8
NUMBER OF SECTORS { compact ..... / separated 4 } Spiral, max .. deg
SECTOR ANGLE (SSC) 50 deg
TRIMMING COILS 29 x 4 pairs
CONDUCTOR, material and type copper hollow conductor
STORED ENERGY (cryogenic) ..... MJ
POWER : main coils 480 max, kW ; current stability $<5 \times 10^{-6}$
trimming coils ..... max, kW ; current stability $<5 \times 10^{-5}$
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^2/a^2 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 2.0 to 4.5 mHz, stable $\pm 10^{-8}$
Orb F 1.9 to 7.5 mHz
HARMONICS, RF/Orb F, used 5, 9, 10
DEE - Gnd, max 250 kV, min gap 10-4 cm
STABILITY, (pk-pk noise)/(pk RF volt) 10
ENERGY GAIN, max 1000 kV/turn
RF PHASE, stable to $\pm$ 1 deg
RF POWER input, max 2 x 300 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE $<1 \times 10^{-7}$ Torr or mbar
PUMPS, No, Type, Size 10 Cryopumps 10,000 ℓ/s x 10
4 Cryopanels 5,000 ℓ/s x 4

ION SOURCES

INJECTION SYSTEM

EXTRACTION SYSTEM

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 4000 m² ; movable ..... m²
TARGET STATIONS 14 in 7 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
^{12}C		500		0.04
^{40}Ar		1000		0.05
^{64}Zn		1320		0.0005
^{84}Kr		890		0.004
SECONDARY			(part/s)	

BEAM PROPERTIES

MEASURED		CONDITIONS
PULSE WIDTH 4	RF deg 0.02	pμ A of 1000 MeV ^{40}Ar ions
PHASE EXC, max	RF deg	pμ A of MeV ions
EXTRACT eff 100. %	(typ.) 0.1	pμ A of 400 MeV ^{40}Ar ions
RESOL ΔE/E 0.1 %	0.05	pμ A of 500 MeV ^{12}C ions

EMITTANCE
(π mm. mrad) { .3 axial / .3 rad } ..... pμA of ..... MeV ... ions

OPERATING PROGRAMS, time distribution
BASIC NUCLEAR PHYSICS .. SOLID STATES PHYSICS ....
BIOMEDICAL APPLICAT. .... ISOTOPE PRODUCTIONS ....

REFERENCES/NOTES

1) Y. Yano: This conference

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS