

ENTRY No. CU59

NAME OF MACHINE IMS(IKAKEN) Cyclotron DATE 6-MAR-1989
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HISTORY AND STATUS

DESIGN, date Model tests
ENG DESIGN, date TCC model CS-30
CONSTRUCTION, date 1971-1973
FIRST BEAM, date (or goal) Aug. 1973
MAJOR ALTERATIONS replacement of magnet coil (1976)

COST, ACCELERATOR about \$1M(1973)
COST, FACILITY, total about \$1M(1973)
FUNDED BY Japanese Government

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
SCIENTISTS 1 ENGINEERS
TECHNICIANS 3 CRAFTS

GRAD STUDENTS involved during year
OPERATED BY Research staff or Operators
OPERATION 50 hr/wk, On target 40 hr/wk
TIME DISTR. in house 90 % Outside 10 %
BUDGET, op & dev \$0.14M(1986)
FUNDED BY Japanese Government

RESEARCH STAFF, not included above
USERS, in house 6 outside 10
GRAD STUDENTS involved during year 0
RESEARCH BUDGET, in house
FUNDED BY

MAGNET
POLE FACE, diameter (compact) 96 cm, R extraction 42 cm
R injection cm
GAP, min 5 cm, Field 20 kG
max 10 cm, Field 12 kG at 0.2 X 10^6
AVERAGE FIELD at R ext 16 kG Ampere turns
B max / 1.25

NUMBER OF SECTORS {compact 3 separated} Spiral, max 60deg
SECTOR ANGLE (ISSC) deg
TRIMMING COILS 2 (inner & outer) /sec.

CONDUCTOR, material and type
STORED ENERGY (cryogenic) MJ
POWER: main coils 60 max, kW; current stability 10^-5
trimming coils max, kW; current stability

WEIGHT: Fe 23 tons; coils 1 tons
COOLING system demineralized water
ION ENERGY (bending limit) E/A = q^2/a^2 MeV/amu
(focusing limit) E/A = .30 q^2/a^2 MeV/amu

ACCELERATION SYSTEM
DEES, number 2; angle 90 deg
BEAM APERTURE 4 cm; DC Bias -1.5 kV
TUNED by, coarse phor, bar fine v.c.
RF 14 to 26 MHz, stable +/- 10/10^6
Orb F to MHz
HARMONICS, RF/Orb F, used
DEE - Gnd, max 30 kV, min gap 1 cm
STABILITY, (pk-pk noise)/(pk RF volt) 0.1%
ENERGY GAIN, max kV/turn
RF PHASE, stable to +/- 5 deg
RF POWER input, max 75 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width

VACUUM SYSTEM
OPERATING PRESSURE less than 10^-5 Torr or mbar
PUMPS, No, Type, Size One diffusion pump (30 cm dia)

ION SOURCES
PIG type

INJECTION SYSTEM Internal only
EXTRACTION SYSTEM DC deflector + mag-channel

FACILITIES FOR RESEARCH
SHIELDED AREA, fixed 330 m^2; movable 0 m^2
TARGET STATIONS 6 in 4 rooms
STATIONS served at same time, max 1
MAG SPECTROGRAPH, type
COMPUTER model YAX 11/750, PDP-11/34 & Lecrpy 8500
OTHER FACILITIES Isotopes production
Neutron therapy
PIXE & Proton CT / Microbeam

CHARACTERISTIC BEAMS
PARTICLE ENERGY (MeV) CURRENT (uA)
Goal Achieved Internal External
p .26 .70
d .14 .150
He .38 .70
a .28 .50
SECONDARY Be (d,n) (part/s)
E_n=6 MeV

BEAM PROPERTIES
MEASURED CONDITIONS
PULSE WIDTH 10 RF deg 1 uA of .28 MeV a. ions
PHASE EXC, max RF deg uA of MeV ions
EXTRACT eff .60 % 100 uA of .14 MeV d. ions
RESOL DE/E .1 % 1 uA of .14 MeV d. ions
EMITTANCE
(x mm. mrad) {10. axial} 1 uA of .14 MeV d. ions
{14. rad}

OPERATING PROGRAMS, time distribution
BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS 10%
BIOMEDICAL APPLICAT. 60% ISOTOPE PRODUCTIONS 20%
Development 10%

REFERENCES/NOTES
1) Y. Yoshida et al. Nucl. Instr. & Meth., vol. 138, pp.579-788 (1976).

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

