

ENTRY No. 56

NAME OF MACHINE RCNP Ring Cyclotron DATE
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IN CHARGE I. Miura REPORTED BY I. Miura

HISTORY AND STATUS

DESIGN, date 1985 Model tests
ENG DESIGN, date 1986-1988
CONSTRUCTION, date 1986-1991
FIRST BEAM, date (or goal) 1991
MAJOR ALTERATIONS

COST, ACCELERATOR
COST, FACILITY, total
FUNDED BY

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
SCIENTISTS 98 ENGINEERS 14
TECHNICIANS 44 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 400 cm
R injection 200 cm
GAP, min cm, Field kG
max 6 cm, Field 17.5 kG at 1.4x10^5
AVERAGE FIELD at R ext 7.6 kG Ampere turns
B max/ <B> 2.3

NUMBER OF SECTORS {compact separated 6} Spiral, max 30 deg
SECTOR ANGLE (ISS) 22-27 deg
TRIMMING COILS 36x6 pairs

CONDUCTOR, material and type (OFHC) copper
STORED ENERGY (cryogenic) MJ
POWER: main coils 450 max, kW; current stability 3x10^-5
trimming coils 350 max, kW; current stability 1x10^-5
WEIGHT: Fe 2100 tons; coils 32 tons
COOLING system Demin. water
ION ENERGY (bending limit) E/A = 400 q^2/a^2 MeV/amu
(focusing limit) E/A = >400 q^2/a^2 MeV/amu

ACCELERATION SYSTEM

DEES, number \*\*3; angle single gap type deg
BEAM APERTURE 3 cm; DC Bias kV
TUNED by, coarse tuning panel fine Inductive
RF 30 to 52 MHz, stable +/- 10^-6
Orb F 2 to 17.3 MHz
HARMONICS, RF/Orb F, used 6, 10, 12, 18
DEE - Gnd, max kV, min gap 20 cm
STABILITY, (pk-pk noise)/(pk RF volt) 10^-4
ENERGY GAIN, max 1500 kV/turn
RF PHASE, stable to +/- 0.1 deg
RF POWER input, max 250x3 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 2x10^-7 Torr or mbar
PUMPS, No, Type, Size
6 Cryo. pumps 500phi, 3 Cryo. pumps 350phi
3 Diff. pumps 350phi, Roughing pumps

ION SOURCES

Internal: Livingstone type, Cold Cathod PIG (pulsed)
External: Atomiv Beam type Polarized Ion Source

\*\*Additional Flattop Cavity 90x155 MHz 150 kV

INJECTION SYSTEM

2 inflector + 2 magnetic channel

EXTRACTION SYSTEM

2 deflector + 2 magnetic channel

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 3600 m^2; movable 0 m^2

TARGET STATIONS 5 in 3 rooms

STATIONS served at same time, max 1 (future 2)

MAG SPECTROGRAPH, type QQDD, 54 kgm, p/Ap = 39000

COMPUTER model

OTHER FACILITIES

Beam Circulation Ring with 200 MeV H2 injection
100 m TOF Tunnel and 0v90 degree Beam Swinger

CHARACTERISTIC BEAMS

Table with columns: PARTICLE, ENERGY (MeV) Goal, Achieved, CURRENT (pA) Internal, External. Rows for p, d, He, He.

SECONDARY

(part/s)

BEAM PROPERTIES

MEASURED CONDITIONS
PULSE WIDTH <10 RF deg pA of MeV ions
PHASE EXC, max RF deg pA of MeV ions
EXTRACT eff 100% pA of MeV ions
RESOL delta E/E 10^-4% pA of MeV ions
EMITTANCE
(pi mm. mrad) {axial, rad} pA of MeV ions

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS

REFERENCES/NOTES

Status Reports on RCNP Ring Cyclotron Facility, Proc. of this Conf.
Proposal for Cyclotron Cascade Project, Proc. of 11th Conf..
The RCNP Ring Cyclotron, Proc. of 3rd Japan-China Symp. on Acc., RIKEN (JAPAN) 1987.

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

