

ENTRY NO. 51

NAME OF MACHINE NUCLEAR SCIENCE RESEARCH FACILITY
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IN CHARGE

REPORTED BY HIDEKUNI TAKEKOSHI

HISTORY AND STATUS

DESIGN, date 1951 Model tests

ENG DESIGN, date 1952

CONSTRUCTION, date 1953

FIRST BEAM, date (or goal) 1955

MAJOR ALTERATIONS all were renewed except main magnet. (1968)

COST, ACCELERATOR 1.5 million US\$

COST, FACILITY, total 0.75 million US\$

FUNDED BY government

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 7 ENGINEERS 1
 TECHNICIANS 0 CRAFTS 3
 GRAD STUDENTS involved during year

OPERATED BY 1 Research staff or 1 Operators
 OPERATION 25 hr/wk. On target 20 hr/wk
 TIME DISTR. in house 100 %, outside %
 BUDGET, op & dev 100 k US\$

FUNDED BY government

RESEARCH STAFF, not included above

USERS, in house 50 hr/year outside 150 hr/year
 GRAD STUDENTS involved during year 50 hr/year
 RESEARCH BUDGET, in house 50 k US\$
 FUNDED BY government

MAGNET

POLE FACE, diameter (compact) 105 cm, R-extraction 47 cm
 R injection

GAP, min 13.0 cm, Field

max 14.4 cm, Field 17.5 kG } at 350×10^3
 AVERAGE FIELD at R ext

B max / < B >

NUMBER OF SECTORS { compact

SECTOR ANGLE (SSC)

TRIMMING COILS

CONDUCTOR, material and type

STORED ENERGY (cryogenic)

POWER: main coils 75 max kW: current stability 5×10^{-4}
 trimming coils

WEIGHT: Fe 71.3 tons: coils 8.5 tons
 COOLING system oil circulating
 ION ENERGY (Bending limit) E/A = 28 q^2/A^2 MeV/amu
 (Focusing limit) E/A =

ACCELERATION SYSTEM

DEES, number 1 angle 180 deg
 BEAM APERTURE 1×5 cm; DC Bias

TUNED by, coarse shorting plate, fine loop coupler
 RF 11 to 15 MHz, stable \pm 10^{-4}
 Orb F

HARMONICS, RF/Orb F, used

DEE-Gnd, max 100 kV, min gap 2.0 cm
 STABILITY, (pk-pk noise)/(pk RF volt) 0.02 %
 ENERGY GAIN, max 200 kV/turn
 RF PHASE, stable to \pm

RF POWER input, max. 30 kW
 FREQUENCY MODULATION, rate

VACUUM SYSTEM

OPERATING PRESSURE 1.5×10^{-5} Torr or mbar
 PUMPS, No, Type, Size oil diffusion pump, 10,000 l/sec.
oil diffusion pump, 800 l/sec.
mechanical pump, 3,000 l/min.

ION SOURCES

low voltage arc type

INJECTION SYSTEM

EXTRACTION SYSTEM

electrostatic deflector

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 300 m^2 ; movable

TARGET STATIONS 3 in 1 rooms
 STATIONS served at same time, max 1
 MAG SPECTROGRAPH, type broad range spectrometer
 COMPUTER model HP 2100A
 OTHER FACILITIES three dimensional scattering chamber,
neutron irradiation system, biological irradiation
system, PIXE measurement system

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (μA)	
	Goal	Achieved	Internal	External
H_2^+		<u>7</u>	<u>40</u>	<u>8</u>
D^+		<u>14</u>	<u>100</u>	<u>16</u>
He^{++}		<u>28</u>	<u>10</u>	<u>1.2</u>
SECONDARY			(part/s)	

BEAM PROPERTIES

MEASURED	CONDITIONS	
	RF deg	μA of MeV ions
PULSE WIDTH		
PHASE EXC. max		
EXTRACT eff.	<u>20</u> %	<u>100</u> μA of <u>14</u> MeV D^+ ions
RESOL $\Delta E/E$		
EMITTANCE		
(π mmi-mrad)		

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 20 % SOLID STATES PHYSICS 10 %
 BIOMEDICAL APPLICAT. 20 % ISOTOPE PRODUCTIONS 30 %
 CHEMICAL ANALYSIS 20 %

REFERENCES/NOTES

- Bulletin of The Institute for Chemical Research, 39, 368 (1961)
- " 52, 87 (1974)

PLAN VIEW OF FACILITY, COMMENTS, ETC.

