ENTRY NO. 38

NAME OF MACHINE Tohoku University Cyclotron DATE July, 1978
INSTITUTION Cyclotron and Radioisotope Center, Tohoku University
ADDRESS Aramaki-Aoba, 980 Sendai, Japan

IN CHARGE S. Morita REPORTED by S. Morita

HISTORY AND STATUS CGR-MeV Model 680

DESIGN, date _____ MODEL tests _____
ENG. DESIGN, date _____
CONSTRUCTION, date 1975 – 1977
FIRST BEAM date (or goal) December, 1977
MAJOR ALTERATIONS none

OPERATION, _____ hr/wk; On Target _____ hr/wk
TIME DIST., in house _____ %, outside _____ %
USERS' SCHEDULING CYCLE _____ weeks
COST, ACCELERATOR _____
COST, FACILITY, total $ 14×10^6
FUNDED BY Japan Ministry of Education

ACCELERATOR STAFF, OPERATION and DEVELOPMENT

SCIENTISTS 4 ENGINEERS _____
TECHNICIANS 3 CRAFTS 1
GRAD STUDENTS involved during year ~6
OPERATED BY 3 Res staff or _____ Operators
BUDGET, op & dev $ 1.0×10^6
FUNDED BY Japan Ministry of Education

RESEARCH STAFF, not included above

USERS, in house _____ outside ~20
GRAD STUDENTS involved during year ~10
RES. BUDGET, in house $ 0.3×10^6
FUNDED BY Japan Ministry of Education

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 800 m^2
movable _____ m^2
TARGET STATIONS 8 in 5 rooms
STATIONS served at same time, max 1
MAG SPECTROGRAPH, type _____
COMPUTER, model MELCOM COSMO500 + MELCOM70/35
OTHER FACILITIES Isotope production, Irradiation of solid, Time-of-flight study (40 m flight path), Mass separator, Beam choppers.

REFERENCES/NOTES

MAGNET

POLE FACE diameter 160 cm; R extraction 68 cm
GAP, min 13 cm; Field 19.0 kG
max 28 cm; Field 10.7 kG
AVERAGE FIELD at R ext 15.6 kG
} at 0.26×10^6 ampere turns
CURRENT STABILITY 20 parts/10^6; $B_{max}/\langle B \rangle$ 1.22
NUMBER OF SECTORS 4 ; SPIRAL, max 50 deg
POLE FACE COIL PAIRS: AVF _____ /sec;
Harmonic correction 4
Rad grad _____ /sec or Circ coils 8
WEIGHT: Fe 100 tons; Coils _____ tons
CONDUCTOR, Material and type _____
STORED ENERGY _____ MJ
COOLING SYSTEM Deionized water
POWER: Main coils 100 max, kW
Trimming coils 26 max, kW
YOKE/POLE AREA _____ %
SECTOR ANGLE (Sep Sec) _____ deg
ION ENERGY (Bending limit) E/A = 50 q^2/A^2 MeV
(Focusing limit) E/A = _____ q/A MeV

ACCELERATION SYSTEM

DEES, number 2 angle 60 deg
BEAM APERTURE 3 cm; DC BIAS 0 kV
TUNED by, coarse M.P. fine M.P.
RF 20 to 40 mHz, stable ± < 1 X /10^6
Orb F 5 to 20 mHz; GAIN, max 200 kV/turn
HARMONICS, RF/Orb F, used 2, 3 and 4
DEE-Gnd, max 50 kV, min gap _____ cm
STABILITY, (pk-pk noise)/(pk RF volt) 10^{-3}
RF PHASE stable to ± 0.5 deg
RF POWER input, max 120 kW
RF PROTECT circuit, speed 10 μsec
Type Ignitron
FREQUENCY MODULATION, rate _____ /sec
MODULATOR, type _____
BEAM PULSE, width _____

VACUUM SYSTEM

PUMPS, No., Type, Size 2 x 8000 l/s
OPERATING PRESSURE 2 μTorr,
PUMPDOWN TIME _____ hrs

ION SOURCES/INJECTION SYSTEM

Internal axial Livingstone-type

EXTRACTION SYSTEM

Deflector + two magnetic channels

CONTROL SYSTEM

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CHARACTERISTIC BEAMS

	Particle	Goal (MeV)	Achieved (MeV)
ENERGY	p	3~39.5	same
	d	5~25	"
	^{3}He	7~65	"
	α	10~50	"
CURRENT		(μA)	(μA)
Internal			
External	p	50 (max)	100
	d	50 (max)	60
	^{3}He	40 (max)	40
		(part/s)	(part/s)
Secondary			

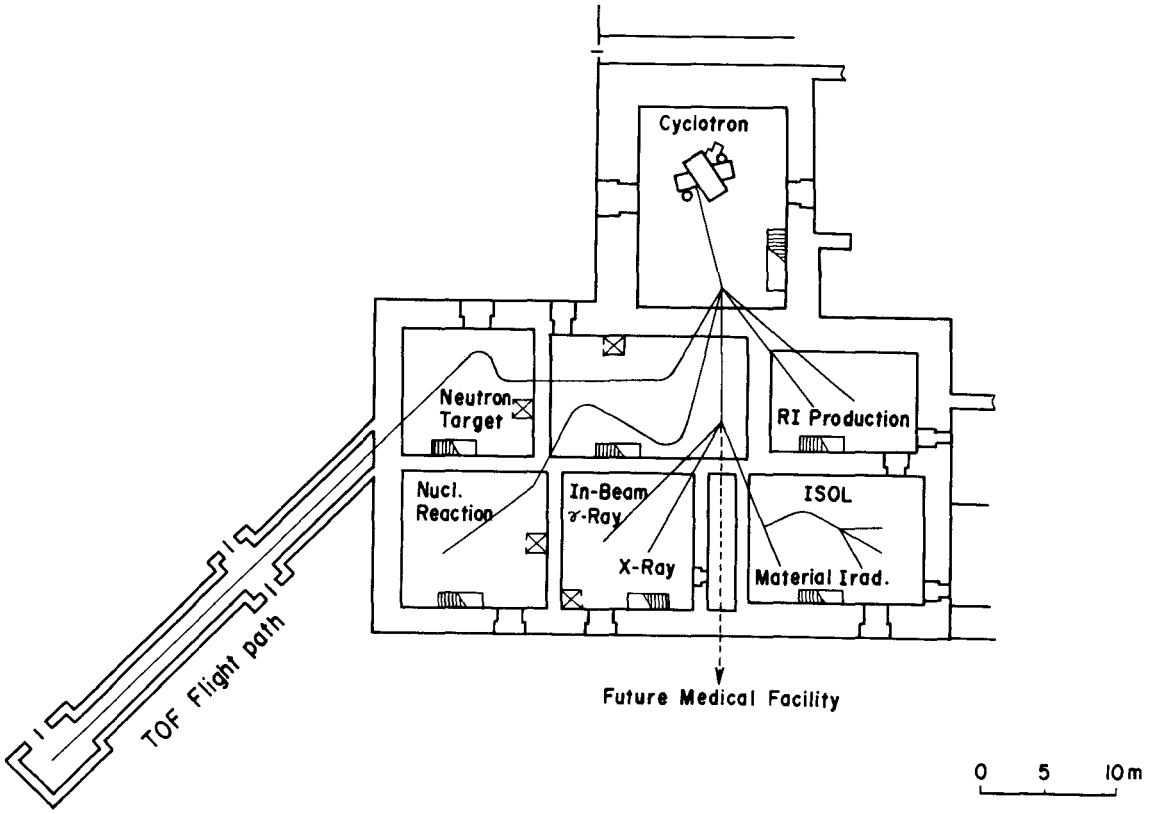
BEAM PROPERTIES

	Measured	Conditions
Pulse Width	____ RF deg	____ μA of ____ MeV ____
Phase Exc, max	____ RF deg	____ μA of ____ MeV ____
Extract Eff	72 %	50 μA of 40 MeV p
Res, ΔE/E	0.5 %	20 μA of 35 MeV α
Emittance (mm-mrad)	21 axial, 30 radial	40 μA of 40 MeV p

OPERATING PROGRAMS, time dist

Basic Nuclear Physics ____ %
Solid State Physics ____ %
Bio-Medical Applications ____ %
Isotope Production ____ %
Development ____ %
____ %
____ %

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, OPERATION SUMMARY, ADDITIONAL REFERENCES



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