

ENTRY No. 46

NAME OF MACHINE 480 CYCLOTRON DATE
 INSTITUTION Nihon Medi-Physics Co., Ltd. Chiba Facility
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HISTORY AND STATUS

DESIGN, date Model tests
 ENG DESIGN, date Sumitomo, CGR MeV 480 PF
 CONSTRUCTION, date Nov. 1984
 FIRST BEAM, date (or goal) Jun. 1985
 MAJOR ALTERATIONS

COST, ACCELERATOR
 COST, FACILITY, total
 FUNDED BY

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
 SCIENTISTS ENGINEERS 5
 TECHNICIANS 7 CRAFTS

GRAD STUDENTS involved during year
 OPERATED BY Research staff or 11 Operators
 OPERATION 100 hr/wk, On target 90 hr/wk
 TIME DISTR. in house 100 % , 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) 115 cm, R extraction 48 cm
 R injection cm
 GAP, min 8.6 cm, Field 20 kG }
 max 14.1 cm, Field 15.7 kG } at 171,200
 AVERAGE FIELD at R ext 15.6 kG } Ampere turns
 B max/

NUMBER OF SECTORS { compact 4 } Spiral, max .. deg
 separated .. deg
 SECTOR ANGLE (SSC) deg

TRIMMING COILS Harmonic Coils 4 pairs
 Circular Coils 6 pairs
 CONDUCTOR, material and type OF Cu, hollow conductor

STORED ENERGY (cryogenic) MJ
 POWER: main coils .66 max, kW ; current stability 2×10^{-5}
 trimming coils .2 max, kW ; current stability 5×10^{-4}

WEIGHT : Fe 28 tons ; coils 1 tons
 COOLING system Deionized Water 300l/m at 6 kg/cm²
 ION ENERGY (bending limit) E/A = q^2/a^2 MeV/amu
 (focusing limit) E/A = q^2/a^2 MeV/amu

ACCELERATION SYSTEM

DEES, number 2 ; angle 83 deg
 BEAM APERTURE 2.21 cm ; DC Bias 10 kV
 TUNED by, coarse Shorting plate fine Compensator
 RF to 24.0 fixed MHz, stable $\pm 10^{-7}$
 Orb F to MHz
 HARMONICS, RF/Orb F, used H=1 (proton)
 DEE - Gnd, max 40 kV, min gap 2.16 cm
 STABILITY, (pk-pk noise)/(pk RF volt) $\pm 10^{-3}$
 ENERGY GAIN, max 99 kV/turn
 RF PHASE, stable to ± 0.1 deg
 RF POWER input, max 65 kW
 FREQUENCY MODULATION, rate /s
 modulator, type
 beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 2×10^{-5} Torr or mbar
 PUMPS, No, Type, Size 2000 J/s D.P., 1 set

ION SOURCES

Axial Livingstones Type

INJECTION SYSTEM

EXTRACTION SYSTEM

Deflector, Gradient connector

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed .84 m² ; movable m²
 TARGET STATIONS 5 in rooms
 STATIONS served at same time, max
 MAG SPECTROGRAPH, type
 COMPUTER model Intel 310
 OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (pA)	
	Goal	Achieved	Internal	External
p		30	200	80

SECONDARY

(part/s)

BEAM PROPERTIES

MEASURED	CONDITIONS	
	MEASURED	CONDITIONS
PULSE WIDTH RF deg	μ A of MeV ions	
PHASE EXC, max RF deg	μ A of MeV ions	
EXTRACT eff 75 %	50 μ A of 28 MeV p ions	
RESOL $\Delta E/E$ %	μ A of MeV ions	
EMITTANCE		

(π mm. mrad) { axial } μ A of MeV ions
 { rad }

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS .. SOLID STATES PHYSICS ..
 BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS 100%

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS