

ENTRY No. 62

NAME OF MACHINE KCCH-CYCLOTRON DATE
INSTITUTION KOREA CANCER CENTER HOSPITAL, KAERI
ADDRESS 215-4 GONGNEUNG-DONG DOBONG-KU, SEOUL
TEL. 974-2501 TELEX KCCHOSP.K27764
IN CHARGE REPORTED BY CYCLOTRON LAB. KCCH

HISTORY AND STATUS

DESIGN, date '82. 4 Model tests
ENG DESIGN, date '83. 1
CONSTRUCTION, date '84. 5
FIRST BEAM, date (or goal) '86. 1. 25
MAJOR ALTERATIONS

COST, ACCELERATOR 3,280,000 US \$
COST, FACILITY, total about 8,000,000 US \$
FUNDED BY KOREA CANCER CENTER HOSPITAL

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
SCIENTISTS 2 ENGINEERS 3
TECHNICIANS 3 CRAFTS

GRAD STUDENTS involved during year
OPERATED BY Research staff or 6 Operators
OPERATION 50 hr/wk, On target 18 hr/wk
TIME DISTR. in house 100 % Outside %

BUDGET, op & dev 200,000 \$/yr
FUNDED BY KOREA CANCER CENTER HOSPITAL

RESEARCH STAFF, not included above
USERS, in house 2 outside
GRAD STUDENTS involved during year
RESEARCH BUDGET, in house NOT DECIDED
FUNDED BY

MAGNET
POLE FACE, diameter (compact) 143 cm, R extraction 57 cm
R injection cm
GAP, min 11 cm, Field 20.5 kG } at 2.88x10⁵
max 19.7 cm, Field kG }
AVERAGE FIELD at R ext 17.6 kG } Ampere turns
B max/ 1.18

NUMBER OF SECTORS { compact 3 } Spiral, max 55 deg
SECTOR ANGLE (SSC) deg
TRIMMING COILS 10 pairs

CONDUCTOR, material and type Hollow Cu
STORED ENERGY (cryogenic) MJ
POWER: main coils 126 max, kW; current stability 1x10⁻⁵
trimming coils 10 max, kW; current stability 1x10⁻⁵

WEIGHT: Fe 88.2 tons; coils 3.8 tons
COOLING system 90 L/min T=18-20°C
ION ENERGY (bending limit) E/A = 50 q²/a² MeV/amu
(focusing limit) E/A = q²/a² MeV/amu

ACCELERATION SYSTEM
DEES, number 2; angle 90 deg
BEAM APERTURE 2 cm; DC Bias 10 kV
TUNED by, coarse coaxial stem fine movable flap
RF 15.5 to 26.8 MHz, stable ±
Orb F 7.75 to 26.3 MHz
HARMONICS, RF/Orb F, used 1, 2
DEE - Gnd, max 40 kV, min gap 2 cm
STABILITY, (pk-pk noise)/(pk RF volt) 10⁻³
ENERGY GAIN, max 160 kV/turn
RF PHASE, stable to ± 10 deg
RF POWER input, max 60 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width

VACUUM SYSTEM
OPERATING PRESSURE 5x10⁻⁶ Torr or mbar
PUMPS, No, Type, Size
Diffusion pumps, 2, DIFC400 (BALZERS)
4000 L/sec
ION SOURCES
P. I. G. COLD CATHODE

INJECTION SYSTEM

EXTRACTION SYSTEM

Electrostatic Deflector + Electromagnetic Channel

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 180 m²; movable 25 m²

TARGET STATIONS 4 in 2 rooms

STATIONS served at same time, max

MAG SPECTROGRAPH, type

COMPUTER model PDP 11/23+

OTHER FACILITIES

NEUTRON THERAPY (NT 50)

MEDICAL MICROTRON (MM 22)

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (µA)	
	Goal	Achieved	Internal	External
Proton	50	50.5	130	85 µA
Deuteron				
He-3	not tested yet			
He-4	48	48	60	35 µA

SECONDARY (part/s)

BEAM PROPERTIES

MEASURED	CONDITIONS			
	PULSE WIDTH	PHASE EXC, max	EXTRACT eff	RESOL ΔE/E
RF deg	µA of MeV ions	RF deg	µA of MeV ions	%
	50.5 MeV H ⁺ ions	70	50.5 MeV H ⁺ ions	<1

EMITTANCE
(π mm. mrad) { .13 axial } ... 10 µA of 50.5 MeV proton ions
{ .14 rad }

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS 2hr/day
NEUTRON THERAPY 8hr/day

REFERENCES/NOTES

- 1) KAERI/RR-495/85
- 2) SCANDITRONIX TECHNICAL SPECIFICATION NOTE

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS