

ENTRY NO. 59

NAME OF MACHINE KCCH-CYCLOTRON
 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 50 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
 max 19.7 cm, Field kG at 2.88×10^5
 AVERAGE FIELD at R ext 17.6 kG Ampere turns
 B max / < B > 1, 18
 NUMBER OF SECTORS {compact 3 } Spiral, max. 55 deg
 {separated }
 SECTOR ANGLE (SSC) 11 deg
 TRIMMING COILS 10 pairs

CONDUCTOR, material and type Hollow Cu
 STORED ENERGY (cryogenic) MJ
 POWER: main coils 126 max kW: current stability 1×10^{-5}
 trimming coils 10 max kW: current stability 1×10^{-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 = q/A 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 26.8 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 ± 1 deg
 RF POWER input, max 60 kW
 FREQUENCY MODULATION, rate /s
 modulator, type
 beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 5×10^{-6} Torr or mbar
 PUMPS, No, Type, Size
 Diffusion pump, 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 3
 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
Protom	50	50.5	130	85 µA
Deuteron	Not tested yet			
He-3	Not tested yet			
He-4	48	48	60	35 µA
SECONDARY	(part/s)			

BEAM PROPERTIES

MEASURED CONDITIONS
 PULSE WIDTH RF deg µA of MeV ions Not
 PHASE EXC. max RF deg µA of MeV ions measured yet
 EXTRACT eff. 65 % .70 µA of 50.5 MeV H⁺ ions
 RESOL ΔE/E < 1 % .70 µA of 50.5 MeV H⁺ ions
 EMITTANCE
 (π mm-mrad) 13 axial .10 µA of 50.5 MeV Proton
 14 rad

OPERATING PROGRAMS, time distribution

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

REFERENCES/NOTES

- KAERI/RR-495/85
- SCANDITRONIX TECHNICAL SPECIFICATION NOTE

PLAN VIEW OF FACILITY, COMMENTS, ETC.