ENTRY NO. 49

NAME OF MACHINE Philips Cyclotron

INSTITUTION Natuurkundig Laboratorium der Vrije Universiteit

ADDRESS De Boelelaan 1081, 1081 HV Amsterdam, Holland

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IN CHARGE J. Rethmeier REPORTED BY

HISTORY AND STATUS

DESIGN, date Model tests

ENG DESIGN, date

CONSTRUCTION, date

FIRST BEAM, date (or goal) 1965

MAJOR ALTERATIONS

COST, ACCELERATOR

COST, FACILITY, total

FUNDED BY

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 2 ENGINEERS 1

TECHNICIANS CRAFTS

GRAD STUDENTS involved during year 1 à 2

OPERATED BY Research staff or Operators

OPERATION 100 à 120 hr/wk. On target ~ 50 hr./wk

TIME DISTR. in house 90 % Outside 10 %

BUDGET, op & dev 130 K Dfl.

FUNDED BY government

RESEARCH STAFF, not included above

USERS, in house ~10 outside 4

GRAD STUDENTS involved during year

RESEARCH BUDGET, in house

FUNDED BY government

MAGNET

POLE FACE, diameter (compact) 70 cm, R extraction 59 cm

R injection — cm

GAP, min 15 cm, Field kG
min 27 cm, Field kG } at 4.10^5 Ampere turns

AVERAGE FIELD at R ext 14,6 kG

B max/ < B >

NUMBER OF SECTORS { compact 3 / separated } Spiral, max 45 deg

SECTOR ANGLE (SSC) deg

TRIMMING COILS 10

CONDUCTOR, material and type Al, hollow tube

STORED ENERGY (cryogenic) MJ

POWER: main coils max, kW; current stability

trimming coils max, kW; current stability

WEIGHT: Fe tons; coils 8 tons

COOLING system H_2O

ION ENERGY (bending limit) E/A = q^2/a^2 MEV/amu

(focusing limit) E/A = q/a MeV/amu

ACCELERATION SYSTEM

DEES, number 1 180 deg

BEAM APERTURE 2.5 cm; DC Bias .5 kV

TUNED by, coarse course moving fine capacity

RF 6 to short 22 mHz, stable ± 10^{-5}

Orb F to mHz

HARMONICS, RF/Orb F, used

DEE—Gnd, max 50 kV, min gap 2 cm

STABILITY, (pk-pk noise)/(pk RF volt) 3.10^{-4}

ENERGY GAIN, max 100 kV/turn

RF PHASE, stable to ± deg

RF POWEP input, max 85 kW

FREQUENCY MODULATION, rate /s

modulator, type

beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 2.10^{-6} Torr or mbar

PUMPS, No, Type, Size

1 oil diffusion

ION SOURCES Livingston

INJECTION SYSTEM

EXTRACTION SYSTEM

Electrostatic

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 250 m²; movable — m²

TARGET STATIONS 7 in 3

STATIONS served at same time, max 1

MAG SPECTROGRAPH, type split pole (Enge)

COMPUTER model

OTHER FACILITIES proton μ beams
C^{11}, Rb/Kr production

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
p		27	30	20
α		32	15	10
SECONDARY		(part/s)		

BEAM PROPERTIES

MEASURED		CONDITIONS		
PULSE WIDTH	35 RF deg	pμ A of	MeV	ions
PHASE EXC. max	RF deg	pμ A of	MeV	ions
EXTRACT eff	70 %	pμ A of	MeV	ions
RESOL ΔE/E	,3 %	pμ A of	MeV	ions

EMITTANCE (π mm. mrad) { axial / 15 rad } 5 pμ A of 12,9 MeV p

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 75% SOLID STATES PHYSICS

BIOMEDICAL APPLICAT ISOTOPE PRODUCTIONS 10%

Mach. development 15%

REFERENCES/NOTES

1)

2)

PLAN VIEW OF FACILITY, COMMENTS, ε