

ENTRY NO. 45

NAME OF MACHINE _____ DATE 12/7/78
 INSTITUTION Cyclotron and Isotope Labs., Philips-Duphar B.V.
 ADDRESS 1755 LE PETTEN, The Netherlands

IN CHARGE J.F. van den Bosch REPORTED by J.G. van der Baan

HISTORY AND STATUS

DESIGN, date _____ MODEL tests _____
 ENG. DESIGN, date _____
 CONSTRUCTION, date 1963-1964
 FIRST BEAM date (or goal) protons, June '64
 MAJOR ALTERATIONS 1966
Multi-particle machine
 OPERATION, 80 hr/wk; On Target 75 hr/wk
 TIME DIST., in house 100 %, outside -- %
 USERS' SCHEDULING CYCLE -- weeks
 COST, ACCELERATOR \$ 1 x 10⁶
 COST, FACILITY, total _____
 FUNDED BY privately, Philips-Duphar B.V.

ACCELERATOR STAFF, OPERATION and DEVELOPMENT

SCIENTISTS 1 ENGINEERS 1
 TECHNICIANS 5 CRAFTS 4
 GRAD STUDENTS involved during year --
 OPERATED BY -- Res staff or 2 Operators
 BUDGET, op & dev --
 FUNDED BY privately, Philips-Duphar B.V.

RESEARCH STAFF, not included above

USERS, in house -- outside none
 GRAD STUDENTS involved during year --
 RES. BUDGET, in house --
 FUNDED BY privately, Philips-Duphar B.V.

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 130 m²
 movable -- m²
 TARGET STATIONS 1 in internal ~~external~~
 STATIONS served at same time, max --
 MAG SPECTROGRAPH, type --
 COMPUTER, model Philips P855M

OTHER FACILITIES

Radionuclide production

REFERENCES/NOTES

Hagedoorn, H.L. and Verster, M.F.C., report 63-19 (1963), p. 228-235

MAGNET

POLE FACE diameter 140 cm; R extraction 57 cm
 GAP, min 16 cm; Field _____ kG } at 503 X 10⁶
 max 30 cm; Field _____ kG } ampere turns
 AVERAGE FIELD at R ext 15.3 kG
 CURRENT STABILITY 50 parts/10⁶; B_{max}/⟨B⟩ _____
 NUMBER OF SECTORS 3; SPIRAL, max 48 deg
 POLE FACE COIL PAIRS: AVF -- /sec;
 Harmonic correction _____
 Rad grad _____ /sec or Circ coils 2
 WEIGHT: Fe 90 tons; Coils 5 tons
 CONDUCTOR, Material and type Al
 STORED ENERGY _____ MJ
 COOLING SYSTEM water
 POWER: Main coils 160 max, kW
 Trimming coils _____ max, kW
 YOKE/POLE AREA 106 %
 SECTOR ANGLE (Sep Sec) _____ deg
 ION ENERGY (Bending limit) E/A = 30 q²/A² MeV
 (Focusing limit) E/A = 30 q/A MeV

ACCELERATION SYSTEM

DEES, number 1 angle 180 deg
 BEAM APERTURE 3.5 cm; DC BIAS 0.75 kV
 TUNED by, coarse MS fine trim cap.
 RF 10 to 21 MHz, stable ± 50 /10⁶
 Orb F 7 to 21 MHz; GAIN, max 100 kV/turn
 HARMONICS, RF/Orb F, used 1 st or 3 rd
 DEE-Gnd, max 50 kV, min gap _____ cm
 STABILITY, (pk-pk noise)/(pk RF volt) 0.001
 RF PHASE stable to ± _____ deg
 RF POWER input, max 90 kW
 RF PROTECT circuit, speed _____ μsec
 Type Series Triode
 FREQUENCY MODULATION, rate _____ /sec
 MODULATOR, type _____
 BEAM PULSE, width _____

VACUUM SYSTEM

PUMPS, No., Type, Size 1 Oil Diff. 5000 l/sec, 1 Roots p., 1 Backing p. 100 m³/h
 OPERATING PRESSURE 5-10 μTorr,
 PUMPDOWN TIME 2 hrs

ION SOURCES/INJECTION SYSTEM

Internal, hooded arc, 800 V, 8 A

EXTRACTION SYSTEM

electrostatic

CONTROL SYSTEM

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CHARACTERISTIC BEAMS

	Particle	Goal (MeV)	Achieved (MeV)
ENERGY	H1	28	30
	H2	15	16
	He3	45	48
	He4	30	32
CURRENT		(μ A)	(μ A)
	Internal	300	400
	H2	300	400
	He3	--	--
External	He4	200	--
Secondary		(part/s)	(part/s)

BEAM PROPERTIES

	Measured	Conditions
Pulse Width	RF deg _____ μ A of _____ MeV _____	
Phase Exc, max	RF deg _____ μ A of _____ MeV _____	
Extract Eff	80 % 25 μ A of 30 MeV p	
Res, $\Delta E/E$	% _____ μ A of _____ MeV _____	
Emittance		
	(mm-mrad) { _____ axial } _____ μ A of _____ MeV _____	
	{ _____ radial }	

OPERATING PROGRAMS, time dist

Basic Nuclear Physics	--	%
Solid State Physics	--	%
Bio-Medical Applications	--	%
Isotope Production	25	%
Development	5	%
		%
		%

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