

ENTRY No. 47

NAME OF MACHINE DATE July 1980
 INSTITUTION Kernfysisch Versnellend Instituut
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HISTORY AND STATUS

DESIGN, date 1963 Model tests 1964-1966
 ENG DESIGN, date 1966-1968
 CONSTRUCTION, date 1968-1970
 FIRST BEAM, date (or goal) 1970
 MAJOR ALTERATIONS central region (1970)
 axial injection (1982)
 COST, ACCELERATOR \$ 4.10⁶
 COST, FACILITY, total
 FUNDED BY Groningen University

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 2 ENGINEERS 1
 TECHNICIANS 10 CRAFTS 2
 GRAD STUDENTS involved during year
 OPERATED BY Research staff or 8 Operators
 OPERATION 130 hr/wk, On target 110 hr/wk
 TIME DISTR. in house 82 % , Outside 18 %
 BUDGET, op & dev
 FUNDED BY Groningen University and foundation F.O.M.

RESEARCH STAFF, not included above

USERS, in house 15 outside
 GRAD STUDENTS involved during year 11
 RESEARCH BUDGET, in house
 FUNDED BY Groningen University and foundation F.O.M.

MAGNET

POLE FACE, diameter (compact) 280 cm, R extraction 121 cm
 R injection cm
 GAP, min 22.4 cm, Field 20 kG }
 max 45 cm, Field 10 kG } at 560000
 AVERAGE FIELD at R ext 16 kG } Ampere turns
 B max/ 1.25

NUMBER OF SECTORS { compact 3 } Spiral, max 56 deg
 { separated }

SECTOR ANGLE (SSC) deg
 TRIMMING COILS 12 concentric
 5 harmonic
 CONDUCTOR, material and type copper
 STORED ENERGY (cryogenic) MJ
 POWER : main coils 360 max, kW ; current stability <10-5
 trimming coils 100 max, kW ; current stability <10-3
 WEIGHT : Fe 650 tons ; coils 29 tons
 COOLING system demin water
 ION ENERGY (bending limit) E/A = 160 q²/a² MeV/amu
 (focusing limit) E/A = q/a MeV/amu

ACCELERATION SYSTEM

DEES, number 1 ; angle 180 deg
 BEAM APERTURE 2.5 cm ; DC Bias 700 V
 TUNED by, coarse moving short, fine trim cap
 RF 4.7 to 13.9 MHz, stable ± 5.10⁻⁶
 Orb F 13.9 MHz
 HARMONICS, RF/Orb F, used 1,3
 DEE - Gnd, max 70 kV, min gap 0.6 cm
 STABILITY, (pk-pk noise)/(pk RF volt) 2.10⁻⁴
 ENERGY GAIN, max 140 kV/turn
 RF PHASE, stable to ± deg
 RF POWER input, max 150 kW
 FREQUENCY MODULATION, rate /s
 modulator, type
 beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 2-4.10⁻⁶ Torr or mbar
 PUMPS, No, Type, Size 2 oil diffusion
 1 cryo (7000 l/s)

ION SOURCES

..... Livingston (2 types)

INJECTION SYSTEM

axial (construction) see comments

EXTRACTION SYSTEM

electrostatic 55°

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed m² ; movable 450 m²
 TARGET STATIONS 8 in 7 rooms
 STATIONS served at same time, max 1
 MAG SPECTROGRAPH, type Q3D
 COMPUTER model VAX 11-780, 2 * PDP-15
 OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)	CURRENT (µA)	
		Achieved	Internal External
P	12 - 65		
α	25 - 140		
¹² C	50 - 200		
¹⁴ N	70 - 210		

SECONDARY (part/s)

BEAM PROPERTIES

MEASURED	CONDITIONS
PULSE WIDTH 4-40 RF deg	µA of MeV ions
PHASE EXC, max RF deg	µA of MeV ions
EXTRACT eff < 50 %	µA of MeV ions
RESOL ΔE/E 0.2 %	µA of MeV ions
EMITTANCE	
(π mm. mrad) { 10 axial } { 7 rad }	µA of MeV ions

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 84 SOLID STATES PHYSICS
 BIOMEDICAL APPLICAT. 6 ISOTOPE PRODUCTIONS

REFERENCES/NOTES

- 1) 8 half-time operators
- 2) PDP 15 scheduled for replacement

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

- 1) axial injection: in construction
 - periodic focusing structure, using permanent magnets
 - hyperboloidal inflector
 - bump coils for beam centring
- 2) ECR ion source: to be delivered in 1982
- 3) polarized ion source: > 1983