

ENTRY No. 56

NAME OF MACHINE Stockholm 225-cm cyclotron DATE July, 1981
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HISTORY AND STATUS

DESIGN, date 1946 Model tests 1946 (RF)
 ENG DESIGN, date 1946
 CONSTRUCTION, date 1946
 FIRST BEAM, date (or goal) 1951 (full radius)
 MAJOR ALTERATIONS New RF system in operation since 1973

COST, ACCELERATOR
 COST, FACILITY, total
 FUNDED BY Sw. Govt., Sw. Atom. Com., Wallenberg Found.

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
 SCIENTISTS 2 ENGINEERS and
 TECHNICIANS 10 CRAFTS 2

GRAD STUDENTS involved during year
 OPERATED BY Research staff or x Operators
 OPERATION ~ 110 (a) hr/wk, On target ~ 90 hr/wk
 TIME DISTR. in house % , Outside %
 BUDGET, op & dev
 FUNDED BY Sw. Govt., Sw. Nat. Sci. Res. Council

RESEARCH STAFF, not included above
 USERS, in house ~ 15 outside ~ 25
 GRAD STUDENTS involved during year
 RESEARCH BUDGET, in house
 FUNDED BY Sw. Govt., Sw. Nat. Sci. Res. Council

MAGNET

POLE FACE, diameter (compact) 225 cm, R extraction 90 cm
 R injection cm
 GAP, min 33 cm, Field 16 (b) kG }
 max cm, Field kG } at
 AVERAGE FIELD at R ext kG } Ampere turns
 B max/ < B >

NUMBER OF SECTORS { compact } Spiral, max .. deg
 separated }
 SECTOR ANGLE (SSC) deg
 TRIMMING COILS

CONDUCTOR, material and type Cu bars, hollow
 STORED ENERGY (cryogenic) MJ
 POWER: main coils 125 (b) max, kW ; current stability 10 ppm
 trimming coils max, kW ; current stability
 WEIGHT: Fe 370 tons ; coils 27 tons
 COOLING system deionized water
 ION ENERGY (bending limit) E/A = 104 q²/a² MeV/amu
 (focusing limit) E/A = q/a MeV/amu

ACCELERATION SYSTEM

DEES, number 2 ; angle 180 deg
 BEAM APERTURE 12-5 cm ; DC Bias 0 kV
 TUNED by, coarse short pl+cap fine trim cap
 RF 7 to 10 MHz, stable ± 0.01 ppm
 Orb F 7 to 10 MHz
 HARMONICS, RF/Orb F, used 8
 DEE - Gnd, max 120 kV, min gap cm
 STABILITY, (pk-pk noise)/(pk RF volt) ≤ 0.2%
 ENERGY GAIN, max kV/turn
 RF PHASE, stable to ± deg
 RF POWER input, max 250 kW
 FREQUENCY MODULATION, rate /s
 modulator, type
 beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 5 · 10⁻⁶ Torr or mbar
 PUMPS, No, Type, Size 3 oil diff. pumps (one 50 cm,
 two 40 cm)

ION SOURCES

Internal PIG source, indirectly heated cathode

- (a) Operation ~ 25 wks/year
- (b) Max field used, max attainable 20 kG.

INJECTION SYSTEM

EXTRACTION SYSTEM

electrostatic deflector

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 0 m² ; movable 625 m²
 TARGET STATIONS 6 in 5 rooms
 STATIONS served at same time, max
 MAG SPECTROGRAPH, type
 COMPUTER model VAX 11/780 and PDP 11/55
 OTHER FACILITIES external pulsing up to 1 μsec

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (μA)	
	Goal	Achieved	Internal	External
4 He ²⁺	30-65	35-60		0.5
12 C ⁴⁺	96-135	106-130		0.01
14 C ⁵⁺	112-186	124-151		0.001
20 Ne ⁶⁺	160-188	176		0.0001

SECONDARY

(part/s)

BEAM PROPERTIES

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

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS main SOLID STATES PHYSICS
 BIOMEDICAL APPLICAT. yes ISOTOPE PRODUCTIONS yes

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS