

ENTRY No. 14

NAME OF MACHINE MGC DATE 81-08-12
 INSTITUTION Acceleratorlaboratoriet vid Åbo Akademi
 ADDRESS Porthansgatan 3-5 20500 Åbo 50 FINLAND
 TEL 921/335133/243 TELEX
 IN CHARGE Mårten Brenner REPORTED BY Jan Arhippainen

HISTORY AND STATUS

DESIGN, date Model tests
 ENG DESIGN, date
 CONSTRUCTION, date Dec. 1973 to Oct. 1974
 FIRST BEAM, date (or goal) July 1974 int/ext
 MAJOR ALTERATIONS

COST, ACCELERATOR 4x10⁶ Fmk
 COST, FACILITY, total
 FUNDED BY Finnish Government

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
 SCIENTISTS 1 ENGINEERS 1
 TECHNICIANS 2 CRAFTS 1

GRAD STUDENTS involved during year
 OPERATED BY 1 Research staff or 4 Operators
 OPERATION 35 hr/wk, On target hr/wk
 TIME DISTR. in house 50 % Outside 50 %
 BUDGET, op & dev 60.000 Fmk

FUNDED BY Finnish Government

RESEARCH STAFF, not included above
 USERS, in house 9 outside 10
 GRAD STUDENTS involved during year 5
 RESEARCH BUDGET, in house 100.000 Fmk
 FUNDED BY Finnish Government

MAGNET
 POLE FACE, diameter (compact) 103 cm, R extraction 46. cm
 R injection cm
 GAP, min 7.2 cm, Field 16.5 kG }
 max 12.0 cm, Field 12.5 kG } at 1.2x10⁶
 AVERAGE FIELD at R ext 14.5 kG } Ampere turns
 B max/ 1.13

NUMBER OF SECTORS { compact 3 } Spiral, max 35 deg
 separated

SECTOR ANGLE (SSC) deg
 TRIMMING COILS 4 pairs of concentric
 2 sets of harmonic

CONDUCTOR, material and type Cu tube
 STORED ENERGY (cryogenic) MJ
 POWER: main coils 35 max, kW ; current stability 0,01%
 trimming coils 1 max, kW ; current stability 0,1%

WEIGHT: Fe 24 tons ; coils 1,2 tons
 COOLING system Demineralized water
 ION ENERGY (bending limit) E/A = q²/a² MeV/amu
 (focusing limit) E/A = q/a MeV/amu

ACCELERATION SYSTEM

DEES, number 2 ; angle 140 deg
 BEAM APERTURE 1.9 cm ; DC Bias kV
 TUNED by, coarse panels fine capacitors
 RF 8.5 to 26 mHz, stable ± 10 ppm
 Orb F to mHz
 HARMONICS, RF/Orb F, used 1:st and 3:rd
 DEE - Gnd, max 35 kV, min gap 0,4 cm
 STABILITY, (pk-pk noise)/(pk RF volt) 0.001
 ENERGY GAIN, max 120 kV/turn
 RF PHASE, stable to ± 5 deg
 RF POWER input, max 80 kW
 FREQUENCY MODULATION, rate /s
 modulator, type
 beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 5 Torr or mbar
 PUMPS, No, Type, Size 2 diffusion pumps. Ø 35cm

ION SOURCES

Hot-filament Livingston

INJECTION SYSTEM

EXTRACTION SYSTEM electrostatic defl.+ magnetic ch.

FACILITIES FOR RESEARCH
 SHIELDED AREA, fixed 200 m² ; movable m²
 TARGET STATIONS 3 in 2 rooms
 STATIONS served at same time, max 1
 MAG SPECTROGRAPH, type pdp-11/10E
 COMPUTER model
 OTHER FACILITIES Scattering Chamber

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (µA)	
	Goal	Achieved	Internal	External
p	18	19	300	50
d	10	10	300	50
³ He	20	21	100	40
	24	29	90	37

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 50 % 20 µA of 21 MeV ions
 RESOL ΔE/E 0.3 % 0.4 µA of 18 MeV p ions
 EMITTANCE
 (π mm. mrad) { axial } µA of MeV ions
 { rad }

OPERATING PROGRAMS, time distribution
 BASIC NUCLEAR PHYSICS 25% SOLID STATES PHYSICS
 BIOMEDICAL APPLICAT. 30% ISOTOPE PRODUCTIONS 35%
 DEVELOPMENT 10%

REFERENCES/NOTES

Basargin, etc. Proc. 6th Intern. Cycl. Conf. Vancouver (1972)
 Am. Inst. Phys. (1972) 102

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

