

**ENTRY NO. 17**

NAME OF MACHINE **MGC**  
 INSTITUTION **Accelerator Laboratory, Åbo Akademi**  
 ADDRESS **Portthansgatan 3, SF-20500 Åbo 50, Finland**  
 TEL **(9)21-654243** TELEX **aabib.62301 sf**  
 IN CHARGE **Mårten Brenner** REPORTED BY **Kjell-Mikael Källman**

**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 **4 x 10<sup>6</sup> FIM**  
 COST, FACILITY, total  
 FUNDED BY **Finnish Government**

**ACCELERATOR STAFF, OPERATION AND DEVELOPMENT**

SCIENTISTS **2** ENGINEERS **1**  
 TECHNICIANS **1** CRAFTS **1**  
 GRAD STUDENTS involved during year **2**  
 OPERATED BY **1** Research staff or **4** Operators  
 OPERATION **3.5** hr/wk. On target **4** hr/wk  
 TIME DISTR. in house **50** %, outside **50** %  
 BUDGET, op & dev **60,000 FIM**

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 FIM**  
 FUNDED BY **Finnish Government**

**MAGNET**

POLE FACE, diameter (compact) **103** cm, R-extraction **46** cm  
 R injection **7.2** cm  
 GAP, min **12.2** cm, Field **16.5** kG  
 max **12** cm, Field **12.5** kG } at **12 x 10<sup>6</sup>**  
 AVERAGE FIELD at R ext **14.5** kG } Amperes turns  
 B max / < B > **1.13**

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

SECTOR ANGLE (SSC) **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 = **q<sup>2</sup>/A<sup>2</sup> 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 **1.2** 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 x 10<sup>-6</sup>** Torr or mbar  
 PUMPS, No, Type, Size **2** diffusion pumps  
**38** cm

**ION SOURCES**

**Hot filament Livingston**

**INJECTION SYSTEM**

**EXTRACTION SYSTEM**

**Electrostatic defl. + magnetic ch.**

**FACILITIES FOR RESEARCH**

SHIELDED AREA, fixed **200** m<sup>2</sup>; movable **m<sup>2</sup>**  
 TARGET STATIONS **3** in **2** rooms  
 STATIONS served at same time, max **1**  
 MAG SPECTROGRAPH, type **PDP 11/10**  
 COMPUTER model  
 OTHER FACILITIES **Scattering chamber**

**CHARACTERISTIC BEAMS**

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

SECONDARY (part/s)

**BEAM PROPERTIES**

MEASURED CONDITIONS  
 PULSE WIDTH **RF deg** **pA** of **MeV** ions  
 PHASE EXC, max **RF deg** **pA** of **MeV** ions  
 EXTRACT eff. **50** % **20** **pA** of **21** MeV ions  
 RESOL ΔE/E **0.3** % **0.4** **pA** of **18** MeV ions  
 EMITTANCE  
 (π mm-mrad) **axial** **pA** of **MeV**  
**rad**

**OPERATING PROGRAMS**, time distribution

BASIC NUCLEAR PHYSICS **25** % SOLID STATES PHYSICS  
 BIOMEDICAL APPLICAT. **30** % ISOTOPE PRODUCTIONS **35** %  
 DEVELOPMENT **10** %

**REFERENCES/NOTES**

- Basargin et al. Proc. 6th Int. Cycl. Conf. Vancouver (1972)
- Am. Inst. Phys. (1972) 102

**PLAN VIEW OF FACILITY, COMMENTS, ETC.**

