

ENTRY NO. CU21 Date August 18, 1992
 Name of Machine MGC-20
 Institution Accelerator Laboratory, Åbo Akademi University
 Address Porthansg. 3, SF-20500 Turku, FINLAND
 Tel +358 21 654 311 Telex 62301 aabib sf Fax +358 21 654 776 EMAIL kschaalen@finabo.fi
 In Charge: Sven-Johan Heselius Reported by: Sven-Johan Heselius and Stefan Johansson

HISTORY

MILESTONE DATES:

Design Model Tests
 Construction Dec. 73 - Oct. 74 First Beam July 1974
 DESIGN/CONSTRUCTION BY: D. V. Efremov Institute of
 in house other Electrophysical Apparatus
 COST: Accelerator Facility 4 MFIM
 FUNDED BY: Finnish Government

STATUS

STAFF: Machine

Scientists 3 Engineers 1
 Technicians 2 Students 5 student operators

Research (in house/external)

Scientists 5 / 7 Engineers 1 /
 Technicians 2 / 1 Students 5 /

BUDGET: Machine 0.7 MFIM Funded by Åbo Akademi
 Research Funded by

TIME DISTRIBUTION:

Basic Research (in house/external) 17 % / 10 %
 Applied Program (in house/external) 18 % / 35 %
 Development 5 % Maintenance 15 %

MAGNET

POLE PARAMETERS:

Diameter 103 cm R_{extract} 45 cm R_{inject} cm
 HILL PARAMETERS: Gap (min) 7.2 cm B_{max} 1.65 T
 (Q AT) Gap (max) cm B_{min} T
 VALLEY PARAMETERS: Gap (min) cm B_{max} T
 (Q AT) Gap (max) 12 cm B_{min} 1.25 T
 AVERAGE FIELD: < B >_{min} T < B >_{max} 1.45 T
 NUMBER OF SECTORS: compact/separated 3 /
 sector angle deg. spiral (max) 35 deg.

FIELD TRIMMING: Trim Coils 4 pairs of concentric
 Harmonic Coils 2 sets
 Other

CURRENT: Main Coils 410 Amps Stability 0.01 %
 Trim Coils ± 10 Amps Stability 0.1 %
 Stored Energy (cryogenic) MJ

WEIGHT: Iron 24 tons Conductor 1.2 tons
 ION ENERGY: Bending Limit E/A = q²/A² MeV/u
 Focussing Limit E/A = q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:

Description: 2 x lambda/4 resonators, push-pull mode
 No. of Gaps/turn 2 dE/dn(max) MeV/q
 Voltage(max) 0.03 MV Harmonic f_{rf}/f_{ion}
 Freq 8.5 - 25.5 MHz Power in(max) 0.05 MW
 Stability: Phase ± 10 ppm Voltage

OTHER CAVITIES (Flattopping or otherwise):

Description:
 Region of Influence: R_{min} cm R_{max} cm
 No. of Gaps/turn dE/dn(max) MeV/q
 Voltage(max) MV Harmonic f_{rf}/f_{ion}
 Freq MHz Power in(max) MW
 Stability: Phase Voltage

VACUUM SYSTEM

OPERATING PRESSURE: 5 x 10⁻⁴ Pa
 PUMPS: No. and type 2 diffusion pumps, 1600 l/s
 with baffles

ION SOURCE(S)

Type	Intensity (mA)	Q	ε _n = βγc (πmm mrad)	Ion Species
(a) Livingston hot filament				
(b)				
(c)				
(d)				

INJECTION SYSTEM

Efficiency %

EXTRACTION SYSTEM

Electrostatic deflector + magnetic channel Efficiency 50 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current (part μA)	
		Internal	External
(a) p	19 MeV	300	50
(b) d	10.5 MeV	300	50
(c) alpha	21 MeV	100	40
(d) He	29 MeV	90	40

Secondary Particles	E (MeV)	part/sec
(a)		
(b)		
(c)		

EXTRACTED BEAM PROPERTIES:

For 0.4 μA of 18 MeV/u protons ions
 ΔE/E 0.3 % Δφ °
 ε_n = βγc x πmm mrad z πmm mrad

FACILITIES FOR RESEARCH

SHIELDED AREA: Fixed 174 m² Moveable m²
 Target Stations: 5 No. Served At Same Time: 1

MAGNETIC SPECTROMETERS:

OTHER FACILITIES: Scattering chamber, facilities for radionuclide production and equipment for PIXE-analyses

REFERENCES/NOTES

- (a) Basargin et al.: Proc. 6th Int. Cycl. Conference
- (b)

PLAN VIEW OF FACILITY, COMMENTS

