

ENTRY NO. CU33 Date June 30/92
 Name of Machine MGC-20 Cyclotron
 Institution ATOMKI
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 In Charge: A. Valek Reported by: A. Valek

HISTORY
 MILESTONE DATES:
 Design 1982-84 Model Tests August 1985
 Construction First Beam
 DESIGN/CONSTRUCTION BY:
 in house other SRIEA, St. Petersburg, CIS
 COST: Accelerator 80 MHUF Facility 250 MHUF
 FUNDED BY: Hungarian Academy of Sciences

STATUS
 STAFF: Machine
 Scientists 1 Engineers 2
 Technicians 6 Students
 Research (in house/external)
 Scientists 25 / 10 Engineers /
 Technicians 4 / 4 Students 2 /
 BUDGET: Machine 7.5 MHUF Funded by ATOMKI
 Research 20 MHUF Funded by var. sources
 TIME DISTRIBUTION:
 Basic Research (in house/external) 25 % / 12 %
 Applied Program (in house/external) 17 % / 23 %
 Development 2 % Maintenance 21 %

MAGNET
 POLE PARAMETERS:
 Diameter 103 cm R_{extract} 45 cm R_{inject} cm
 HILL PARAMETERS: Gap (min) 7.2 cm B_{max} 1.8 T
 (@ 0.12e6 AT) Gap (max) 7.2 cm B_{min} T
 VALLEY PARAMETERS: Gap (min) 12 cm B_{max} T
 (@ 0.12e6 AT) Gap (max) 12 cm B_{min} 0.4 T
 AVERAGE FIELD: < B >_{min} 0.5 T < B >_{max} 1.45 T
 NUMBER OF SECTORS: compact/separated 3 /
 sector angle 89 deg. spiral (max) 35 deg.
 FIELD TRIMMING: Trim Coils 4
 Harmonic Coils 6
 Other
 CURRENT: Main Coils 400 Amps Stability 1e-4
 Trim Coils 10 Amps Stability 1e-4
 Stored Energy (cryogenic) MJ
 WEIGHT: Iron 24 tons Conductor 1.2 tons
 ION ENERGY: Bending Limit E/A = 20 q²/A² MeV/u
 Focussing Limit E/A = q/A MeV/u

ACCELERATION SYSTEM
 FUNDAMENTAL ACCELERATION:
 Description: moving panels, push-pull mode
 No. of Gaps/turn 2 dE/dn(max) 0.12 MeV/q
 Voltage(max) 0.035 MV Harmonic f_{rf}/f_{ion} 1.3
 Freq 8-24 MHz Power in(max) 0.14 MW
 Stability: Phase Voltage 1e-4
 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: 1x10⁻³ Pa
 PUMPS: No. and type 3 oil diffusion

ION SOURCE(S)
 Type Intensity @ ε_n = βγc Ion Species
 (mA) (πmm mrad)
 (a) Penning 0.6 p, d
 (b)
 (c)
 (d)

INJECTION SYSTEM
 Efficiency %

EXTRACTION SYSTEM
 electrostatic deflector Efficiency 40-60 %

CHARACTERISTIC BEAMS
 Accelerated Ions E/A (MeV/u) Current(part μA)
 Internal External
 (a) p 3.5-20 100 50
 (b) d 2 -10 100 50
 (c) alpha 5 -20 40 20
 (d) He⁺⁺ 6 -27 30 15
 Secondary Particles E (MeV) part/sec
 (a)
 (b)
 (c)

EXTRACTED BEAM PROPERTIES:
 For 35 μA of 18 MeV/u p ions
 ΔE/E 0.3 % Δφ 40 °rf
 ε_n = βγc x 15 πmm mrad z πmm mrad

FACILITIES FOR RESEARCH
 SHIELDED AREA: Fixed m² Moveable 550 m²
 Target Stations: 10 No. Served At Same Time: 1

MAGNETIC SPECTROMETERS:
 OTHER FACILITIES: Isotope production,
 Be neutron source

REFERENCES/NOTES
 (a)
 (b)

