

ENTRY NO. CM15 Date 30.06.92
 Machine Name MGQ-20
 Manufacturer D.V. Efremov Institute
 Address 189631 St. Petersburg, Russia
 Tel (812) 2655682 Telex
 Fax (812) 2657880 EMAIL
 In Charge: Reported by: Vorogushin

HISTORY AND STATUS
 DATES: Design 1970 First Machine 1974
 SALES: No. Sold/Operational / Currently Available
 COST: Accelerator Facility

MAGNET
 POLE PARAMETERS:
 Diameter 103. cm R_{extract} 45. cm R_{inject} cm
 HILL PARAMETERS: Gap (min) 7.2. cm B_{max} 1.62. T
 (@ 1.2. 10²⁰A/T) Gap (max) 7.2. cm B_{min} T
 VALLEY PARAMETERS: Gap (min) 12.0. cm B_{max} 1.02. T
 (@ 1.2. 10²⁰A/T) Gap (max) 12.0. cm B_{min} T
 AVERAGE FIELD: < B >_{min} 0.65. T < B >_{max} 1.48. T
 NUMBER OF SECTORS: compact/separated 3 /
 sector angle deg. spiral (max) 35. deg.
 FIELD TRIMMING: Trim Coils 4 pairs
 Harmonic Coils 2 sets
 Other
 CURRENT: Main Coils 420. Amps Stability 0.01%
 Trim Coils 15. Amps Stability 0.1%
 Stored Energy (cryogenic) MJ
 WEIGHT: Iron 24. t Conductor 1.2. t
 ION ENERGY: Bending Limit E/A = q²/A² MeV/u
 Focussing Limit E/A = q/A MeV/u

ACCELERATION SYSTEM
 FUNDAMENTAL ACCELERATION:
 Description: 2 dees 180-140 deg.
 No. of Gaps/turn 2 dE/dn(max) 0.12. MeV/q
 Voltage(max) 0.030. MV Harmonic f_{rf}/f_{ion} 1.3
 Freq 8-24. MHz Power in(max) 0.05. MW
 Stability: Phase 5. deg. Voltage 0.1%

VACUUM SYSTEM
 OPERATING PRESSURE: 10⁻⁵
 PUMPS: No. and type 3 diffusion pumps

ION SOURCE(S)
 Type Intensity @ ε_n = βγε Ion Species
 (mA) (π mm mrad)
 (a) hot filament, Levingstone p.d., He³(++)
 (b)

INJECTION SYSTEM
 Efficiency %

EXTRACTION SYSTEM
 electrostatic deflection Efficiency 50 %

CHARACTERISTIC BEAMS
 Accelerated Ions E/A (MeV/u) Current(part. μA)
 Internal External
 (a) p, d, ³He, ⁴He 18.5 200 500
 (b) He³(++) 5.8 50 25
 EXTRACTED BEAM PROPERTIES:
 For 50. μA of 18. MeV/u p ions
 ΔE/E 0.3. % Δφ °rf
 ε_n = βγε x 50. πmm mrad z 15. πmm mrad

REFERENCES/NOTES
 (a)
 (b)

ENTRY NO. CM16 Date July 6, 1992
 Machine Name U-250
 Manufacturer D.V. Efremov Institute
 Address 189631 St. Petersburg, Russia
 Tel (812) 2655682 Telex
 Fax (812) 2657880 EMAIL
 In Charge: V. Glukhikh Reported by: Vorogushin/Muminov

HISTORY AND STATUS
 DATES: Design 1991 First Machine 1994
 SALES: No. Sold/Operational / Currently Available
 COST: Accelerator Facility

MAGNET
 POLE PARAMETERS:
 Diameter 250. cm R_{extract} cm R_{inject} cm
 HILL PARAMETERS: Gap (min) 2.6. cm B_{max} 2.4. T
 (@ AT) Gap (max) 4.5. cm B_{min} T
 VALLEY PARAMETERS: Gap (min) 15. cm B_{max} T
 (@ AT) Gap (max) 15. cm B_{min} 1.4. T
 AVERAGE FIELD: < B >_{min} 1.6. T < B >_{max} 1.9. T
 NUMBER OF SECTORS: compact/separated 4 /
 sector angle 45. deg. spiral (max) / deg.
 FIELD TRIMMING: Trim Coils 7 x 4
 Harmonic Coils
 Other
 CURRENT: Main Coils 900. Amps Stability 10⁻⁵
 Trim Coils 20. Amps Stability 0.01
 Stored Energy (cryogenic) MJ
 WEIGHT: Iron 385t. Conductor 5.4t.
 ION ENERGY: Bending Limit E/A = 204. q²/A² MeV/u
 Focussing Limit E/A = q/A MeV/u

ACCELERATION SYSTEM
 FUNDAMENTAL ACCELERATION:
 Description: 2 dees 42 deg.
 No. of Gaps/turn dE/dn(max) MeV/q
 Voltage(max) 0.075. MV Harmonic f_{rf}/f_{ion} 1.2, 3, 4
 Freq 8-19. MHz Power in(max) 0.150. MW
 Stability: Phase 1. deg. Voltage 0.1%

VACUUM SYSTEM
 OPERATING PRESSURE: 10⁻⁶
 PUMPS: No. and type 2 diff. pumps 10m³/sec

ION SOURCE(S)
 Type Intensity @ ε_n = βγε Ion Species
 (mA) (π mm mrad)
 (a) pig 600 30 ²H⁺
 (b) heavy ions to 84Kr ¹⁸F⁺

INJECTION SYSTEM
 axial inter injection Efficiency %

EXTRACTION SYSTEM
 stripping foil, electrostatic DEFL Efficiency 50-95 %

CHARACTERISTIC BEAMS
 Accelerated Ions E/A (MeV/u) Current(part. μA)
 Internal External
 (a) ²H⁺, ³H⁺, ⁴H⁺ 40-12, 5 500
 (b) C¹², ¹³C, ¹⁴C, ¹⁶O, ¹⁸O, ²⁰Ne, ²²Ne, ²⁴Mg, ²⁶Mg, ²⁸Si, ³⁰Si, ³²S, ³⁴S, ³⁶Ar, ³⁸Ar, ⁴⁰Ar, ⁴²Ca, ⁴⁴Ca, ⁴⁶Ca, ⁴⁸Ca, ⁵⁰Ti, ⁵²Ti, ⁵⁴Ti, ⁵⁶Ti, ⁵⁸Ti, ⁶⁰Cr, ⁶²Cr, ⁶⁴Cr, ⁶⁶Cr, ⁶⁸Cr, ⁷⁰Zn, ⁷²Zn, ⁷⁴Zn, ⁷⁶Zn, ⁷⁸Zn, ⁸⁰Zn, ⁸²Zn, ⁸⁴Kr, ⁸⁶Kr, ⁸⁸Kr, ⁹⁰Kr, ⁹²Kr, ⁹⁴Kr, ⁹⁶Kr, ⁹⁸Kr, ¹⁰⁰Kr, ¹⁰²Kr, ¹⁰⁴Kr, ¹⁰⁶Kr, ¹⁰⁸Kr, ¹¹⁰Kr, ¹¹²Kr, ¹¹⁴Kr, ¹¹⁶Kr, ¹¹⁸Kr, ¹²⁰Kr, ¹²²Kr, ¹²⁴Kr, ¹²⁶Kr, ¹²⁸Kr, ¹³⁰Kr, ¹³²Kr, ¹³⁴Kr, ¹³⁶Kr, ¹³⁸Kr, ¹⁴⁰Kr, ¹⁴²Kr, ¹⁴⁴Kr, ¹⁴⁶Kr, ¹⁴⁸Kr, ¹⁵⁰Kr, ¹⁵²Kr, ¹⁵⁴Kr, ¹⁵⁶Kr, ¹⁵⁸Kr, ¹⁶⁰Kr, ¹⁶²Kr, ¹⁶⁴Kr, ¹⁶⁶Kr, ¹⁶⁸Kr, ¹⁷⁰Kr, ¹⁷²Kr, ¹⁷⁴Kr, ¹⁷⁶Kr, ¹⁷⁸Kr, ¹⁸⁰Kr, ¹⁸²Kr, ¹⁸⁴Kr, ¹⁸⁶Kr, ¹⁸⁸Kr, ¹⁹⁰Kr, ¹⁹²Kr, ¹⁹⁴Kr, ¹⁹⁶Kr, ¹⁹⁸Kr, ²⁰⁰Kr, ²⁰²Kr, ²⁰⁴Kr, ²⁰⁶Kr, ²⁰⁸Kr, ²¹⁰Kr, ²¹²Kr, ²¹⁴Kr, ²¹⁶Kr, ²¹⁸Kr, ²²⁰Kr, ²²²Kr, ²²⁴Kr, ²²⁶Kr, ²²⁸Kr, ²³⁰Kr, ²³²Kr, ²³⁴Kr, ²³⁶Kr, ²³⁸Kr, ²⁴⁰Kr, ²⁴²Kr, ²⁴⁴Kr, ²⁴⁶Kr, ²⁴⁸Kr, ²⁵⁰Kr
 EXTRACTED BEAM PROPERTIES:
 For 500 μA of 40. MeV/u ²H⁺ ions
 ΔE/E 0.1-1. % Δφ °rf
 ε_n = βγε x 50. πmm mrad z 20. πmm mrad

REFERENCES/NOTES
 (a)
 (b)