

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<sub>extract</sub> 45. cm R<sub>inject</sub> cm  
 HILL PARAMETERS: Gap (min) 7.2 cm B<sub>max</sub> 1.62 T  
 (@ 1.2.10<sup>20</sup> AT) Gap (max) 7.2 cm B<sub>min</sub> T  
 VALLEY PARAMETERS: Gap (min) 12.0 cm B<sub>max</sub> 1.02 T  
 (@ 1.2.10<sup>20</sup> AT) Gap (max) 12.0 cm B<sub>min</sub> T  
 AVERAGE FIELD: < B ><sub>min</sub> 0.65 T < B ><sub>max</sub> 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 = q<sup>2</sup>/A<sup>2</sup> 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<sub>rf</sub>/f<sub>ion</sub> 1.3  
 Freq 8-24 MHz Power in(max) 0.05 MW  
 Stability: Phase ± 5 deg Voltage 0.1%

VACUUM SYSTEM  
 OPERATING PRESSURE: 10<sup>-5</sup>  
 PUMPS: No. and type 3 diffusion pumps

ION SOURCE(S)  
 Type Intensity @ ε<sub>n</sub> = βγc Ion Species  
 (mA) (π mm mrad)  
 (a) hot filament, Levingstone p.d., He<sup>3</sup>(++)  
 (b)

INJECTION SYSTEM  
 Efficiency %

EXTRACTION SYSTEM  
 electrostatic deflection Efficiency 50 %

CHARACTERISTIC BEAMS  
 Current(part. μA)  
 Accelerated Ions E/A (MeV/u) Internal External  
 (a) p, d, <sup>3</sup>H, <sup>4</sup>He 18.5 200 500  
 (b) He<sup>3</sup>(++) 5.8 50 25  
 EXTRACTED BEAM PROPERTIES:  
 For 50 μA of 18 MeV/u p ions  
 ΔE/E 0.3 % Δφ °rf  
 ε<sub>n</sub> = βγc 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<sub>extract</sub> cm R<sub>inject</sub> cm  
 HILL PARAMETERS: Gap (min) 2.6 cm B<sub>max</sub> 2.4 T  
 (@ ..... AT) Gap (max) 4.5 cm B<sub>min</sub> T  
 VALLEY PARAMETERS: Gap (min) 15 cm B<sub>max</sub> T  
 (@ ..... AT) Gap (max) 15 cm B<sub>min</sub> 1.4 T  
 AVERAGE FIELD: < B ><sub>min</sub> 1.6 T < B ><sub>max</sub> 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<sup>-5</sup>  
 Trim Coils 20 Amps Stability 0.01  
 Stored Energy (cryogenic) MJ  
 WEIGHT: Iron 385t Conductor 5.4t  
 ION ENERGY: Bending Limit E/A = 204 q<sup>2</sup>/A<sup>2</sup> 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<sub>rf</sub>/f<sub>ion</sub> 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<sup>-6</sup>  
 PUMPS: No. and type 2 diff. pumps 10m<sup>3</sup>/sec

ION SOURCE(S)  
 Type Intensity @ ε<sub>n</sub> = βγc Ion Species  
 (mA) (π mm mrad)  
 (a) pig 600 30 <sup>2+</sup>H  
 (b) heavy ions to 84Kr <sup>18+</sup>

INJECTION SYSTEM  
 axial inter injection Efficiency %

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

CHARACTERISTIC BEAMS  
 Current(part. μA)  
 Accelerated Ions E/A (MeV/u) Internal External  
 (a) <sup>2+</sup>H, <sup>3+</sup>H, <sup>4+</sup>He 40-12, 5 500  
 (b) C → 84Kr 12.5-1.9 5-100  
 EXTRACTED BEAM PROPERTIES:  
 For 500 μA of 40 MeV/u <sup>2+</sup>H ions  
 ΔE/E 0.1-1 % Δφ °rf  
 ε<sub>n</sub> = βγc x 50 πmm mrad z 20 πmm mrad

REFERENCES/NOTES  
 (a)  
 (b)