Trimming 7-Pole and 8-Pole Field Calculations for Peak Fields of 1.7 T and 2.1 T — Comparison of Tracking Results —

1. Correction to talk on June 28: The 8-pole pole face lowerings are 5.5 mm, slighly increased over the 5 mm in the 7-pole model

2. **7-Pole Wiggler**

   - Adjusted trim coil currents for 2.1 T and 1.7 T to minimize kick and displacement
     ⇒ Optimum trim currents are 1.3 A for 2.1 T and 2.9 A for 1.7 T

3. **8-Pole Wiggler**

   - Adjusted end coil currents for 1.7 T and 2.3 T to minimize kick and displacement
     ⇒ Optimum end coil currents are 74 A for 2.3 T and 51 A for 1.7 T

4. **Comparison of the 7- and 8-Pole Wiggler Fields**

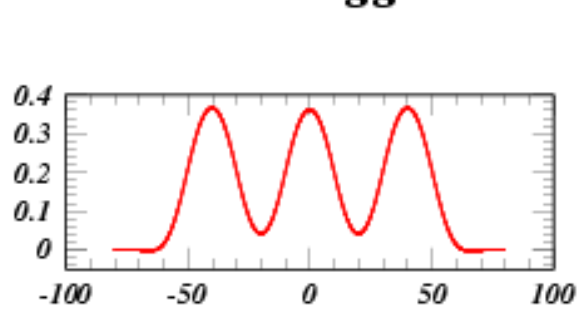
   - The transverse field uniformity is worse at 1.7 T for both the 7-pole and 8-pole wigglers
   - The linear field integrals are smaller and more uniform for the 8-pole wiggler
   - **Tracking comparison with Vector Fields tracking**
     ⇒ The x-dependence of the kick in the 7-pole wiggler is more severe at 1.7 T than at 2.1 T.
     ⇒ The x-dependence of the kick in the 8-pole wiggler is smaller at 1.7 T than at 2.3 T in the central region.

5. **Computing Resources**

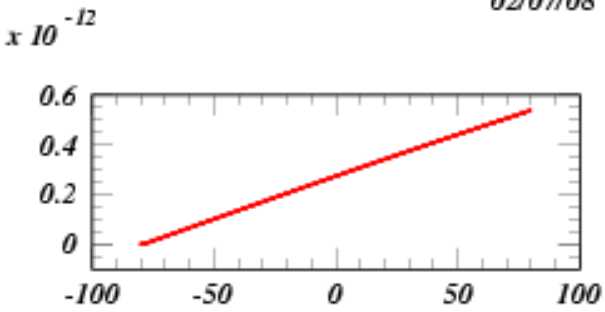
   - Dual-processor PC for OPERA has arrived. Ready for benchmark test.
   - Linux PC for fitting procedure has been spec'd and ordered.

7-Pole Wiggler -- Main: 161 A Trim: 1.3 A

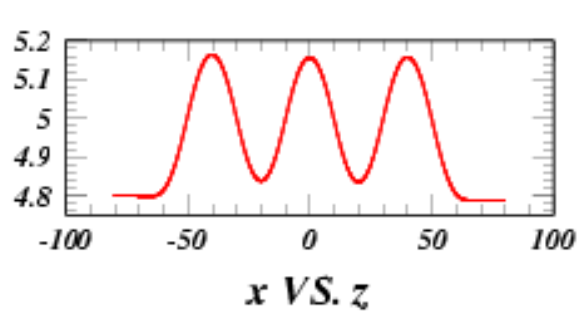
02/07/08 13.42



x VS. z



y VS. z



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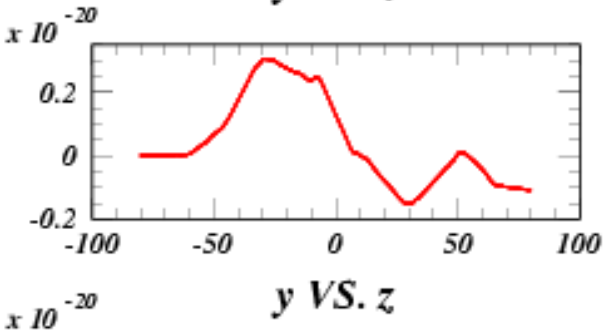
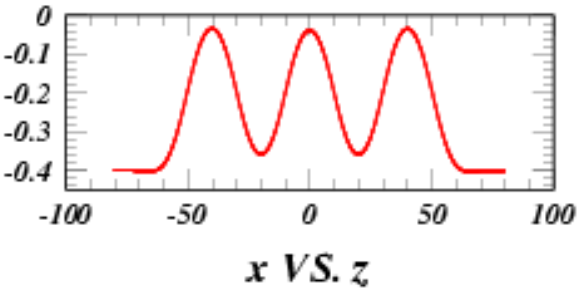
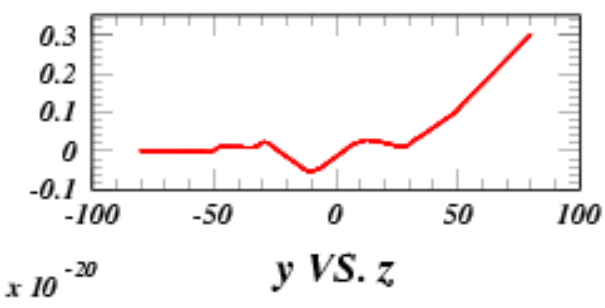


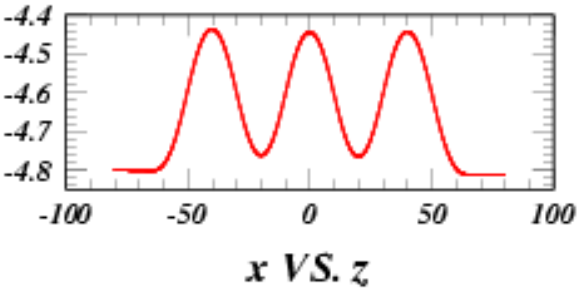
y VS. z



x VS. z



y VS. z



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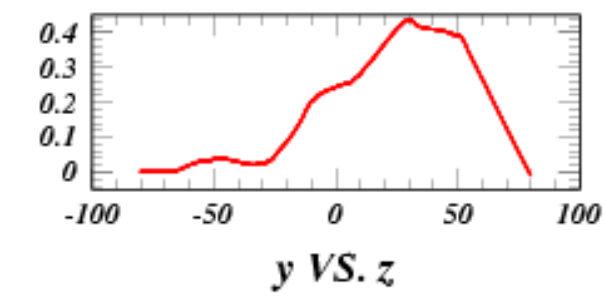
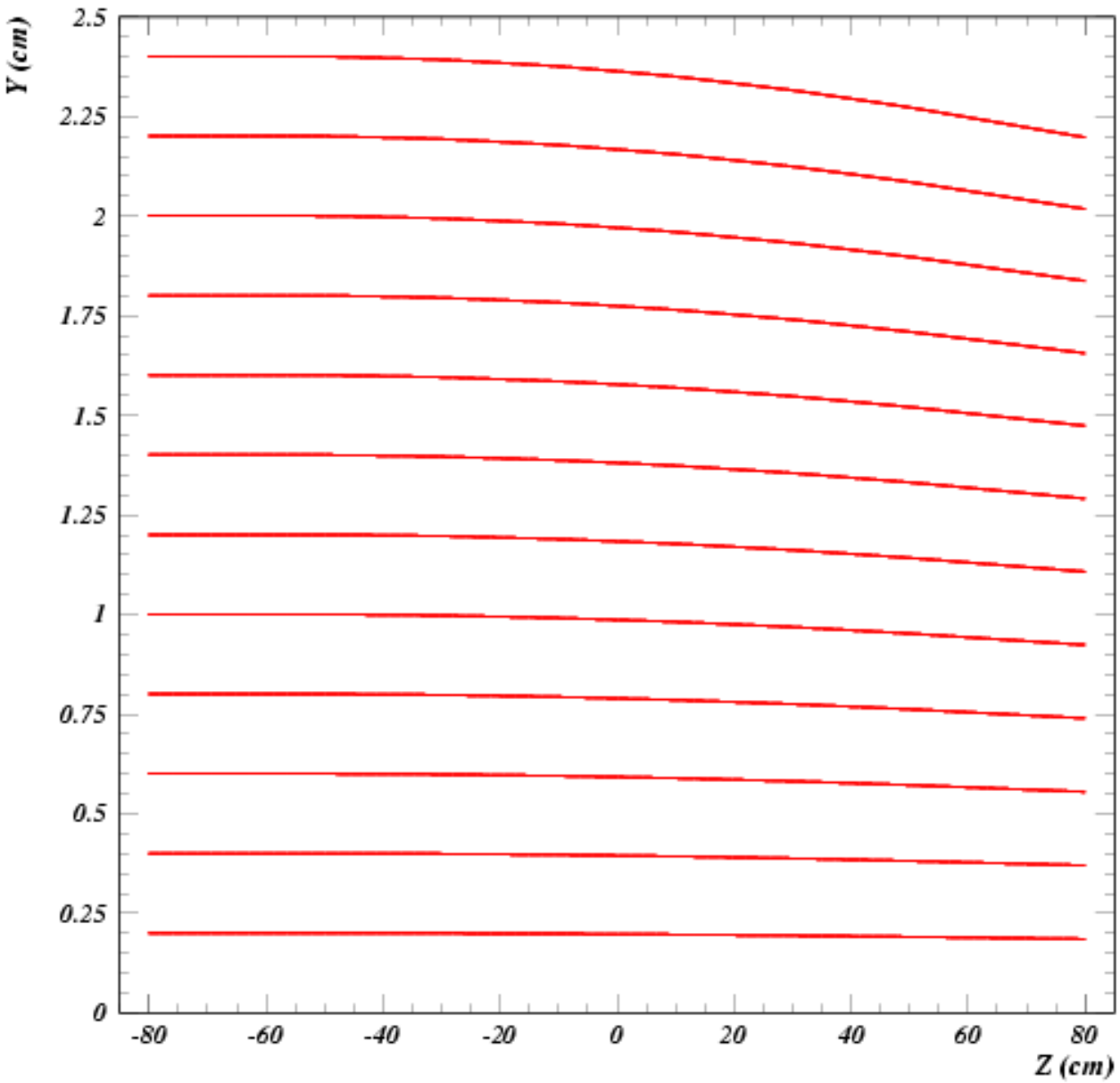


y VS. z

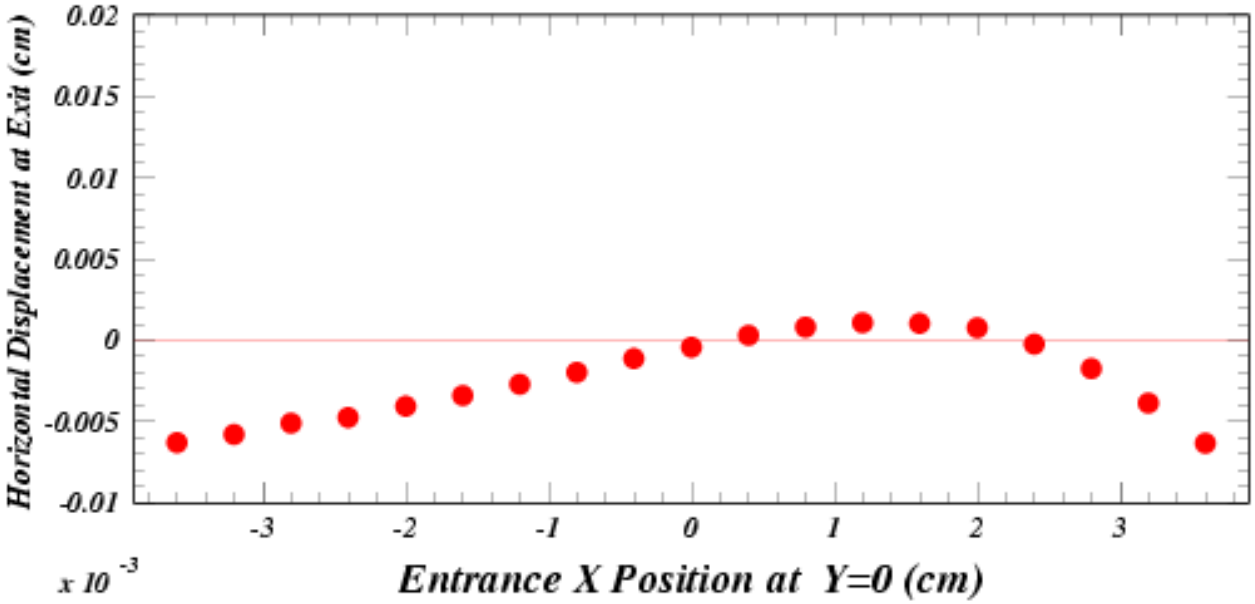
7-Pole Wiggler -- Main: 161 A Trim: 1.3 A

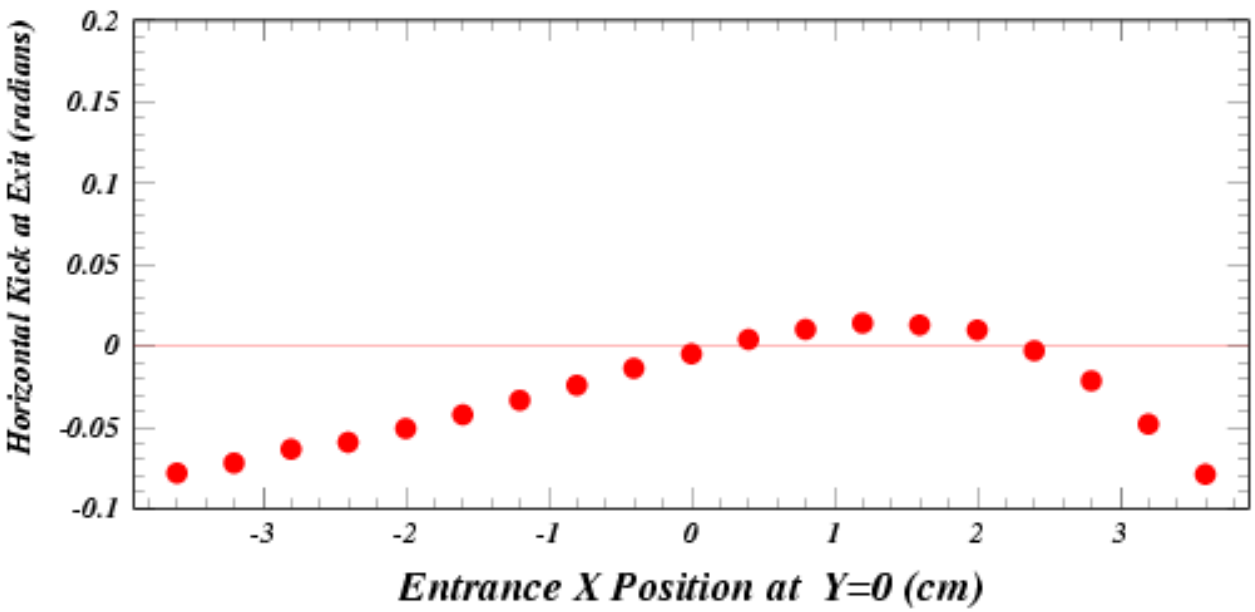
02/07/08 13.42



02/07/08 13.42

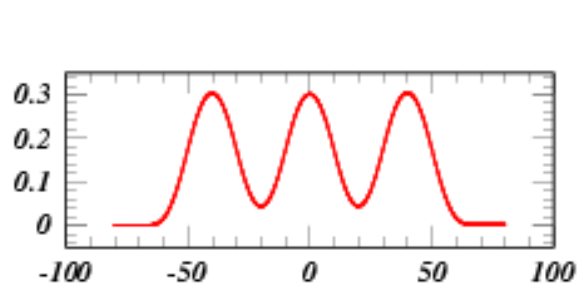
7-Pole Wiggler -- Main: 161 A Trim: 1.3 A



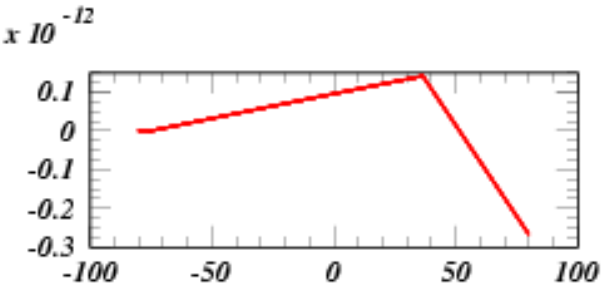


7-Pole Wiggler -- Main: 110 A Trim: 2.9 A

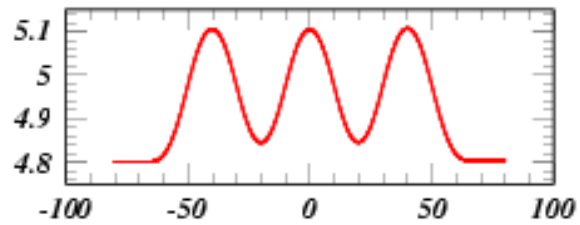
02/07/08 13.43



x VS. z



y VS. z



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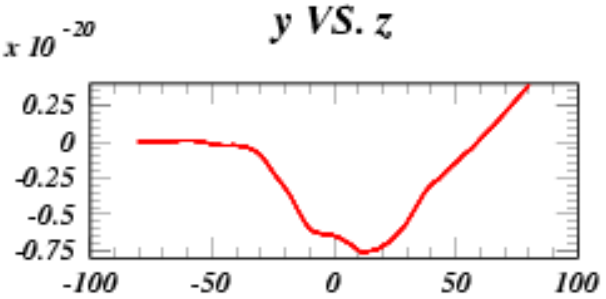

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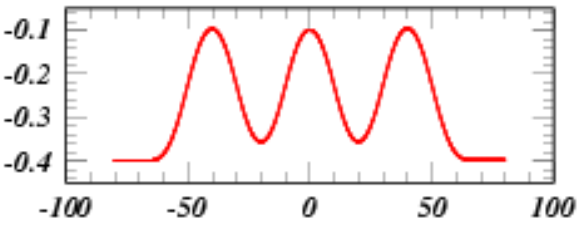

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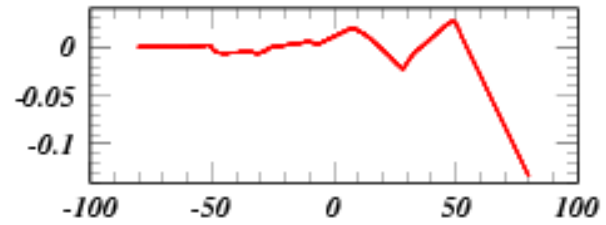
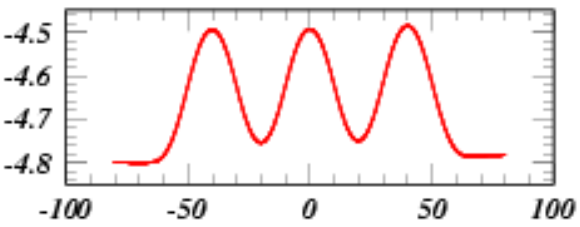
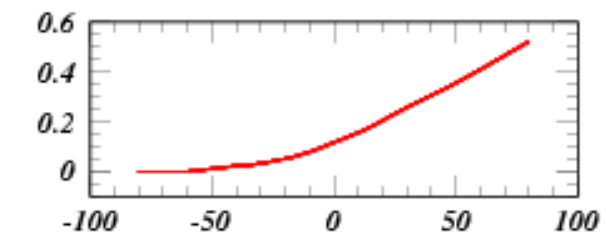


y VS. z



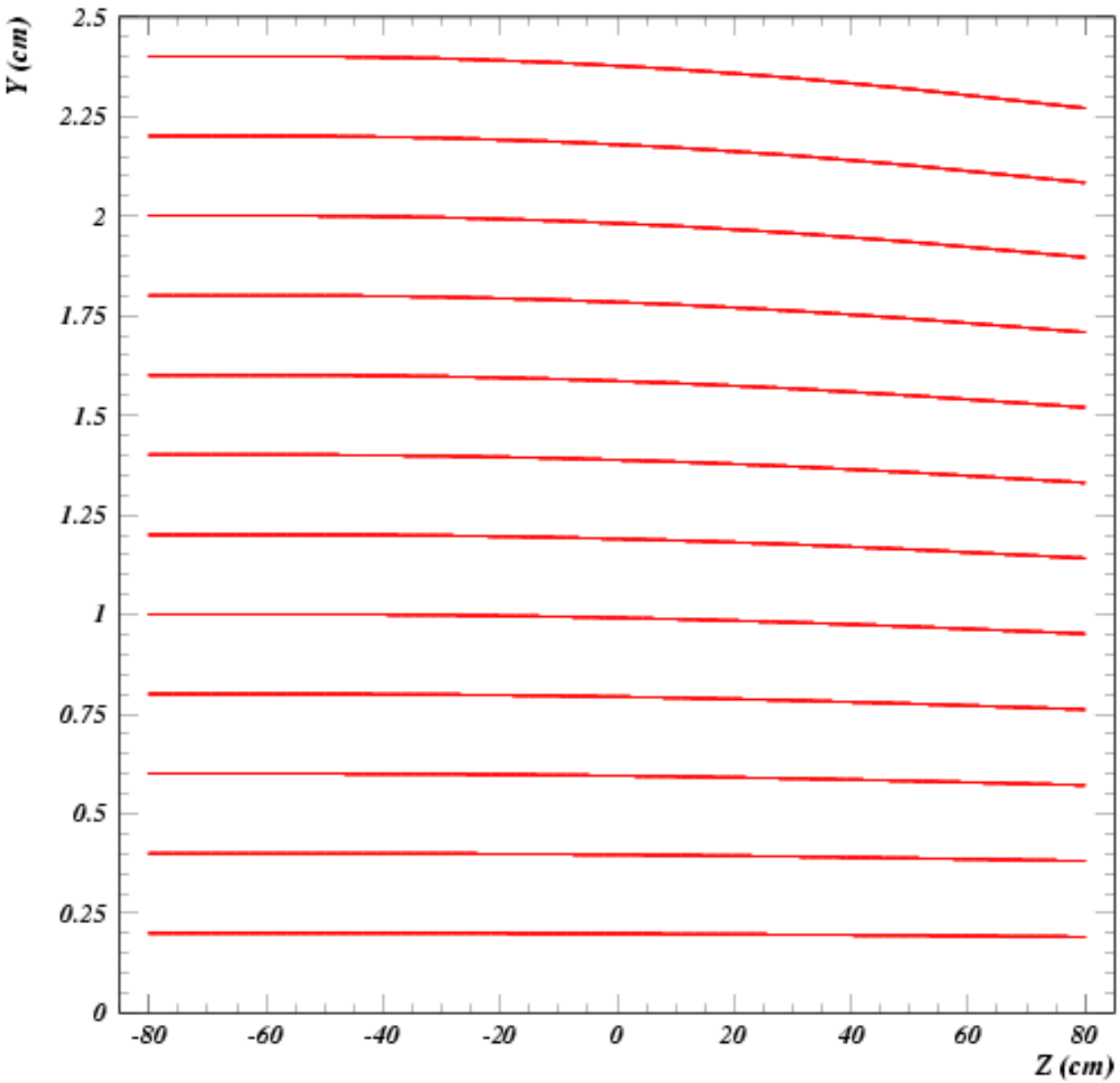
x VS. z



y VS. z

7-Pole Wiggler -- Main: 110 A Trim: 2.9 A

02/07/08 13.43



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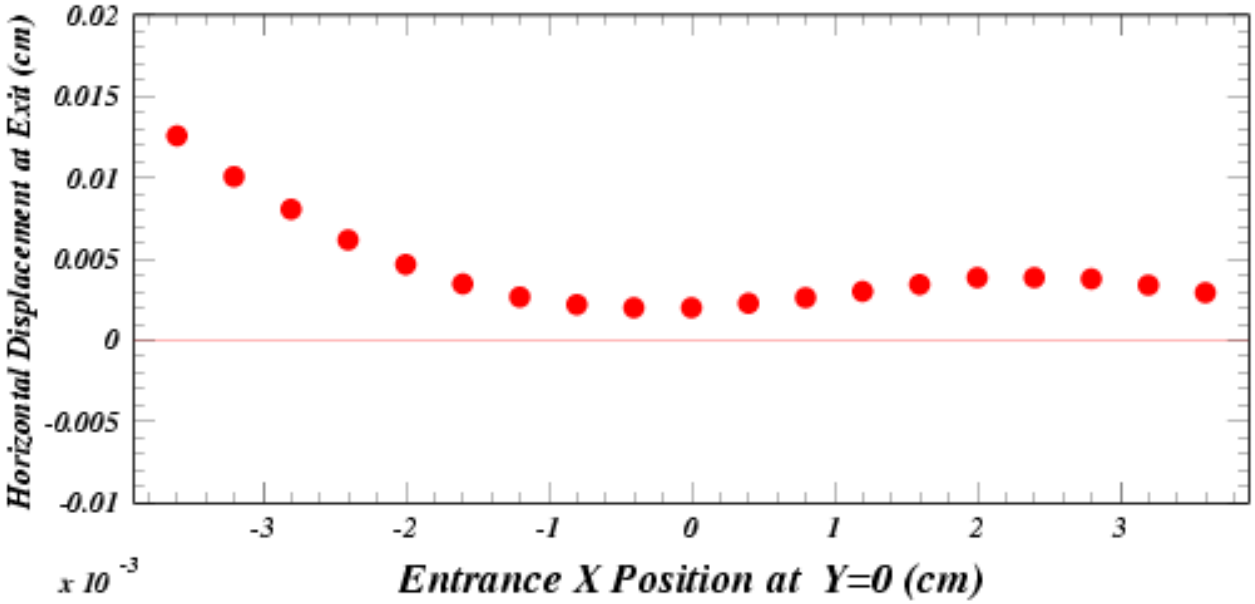
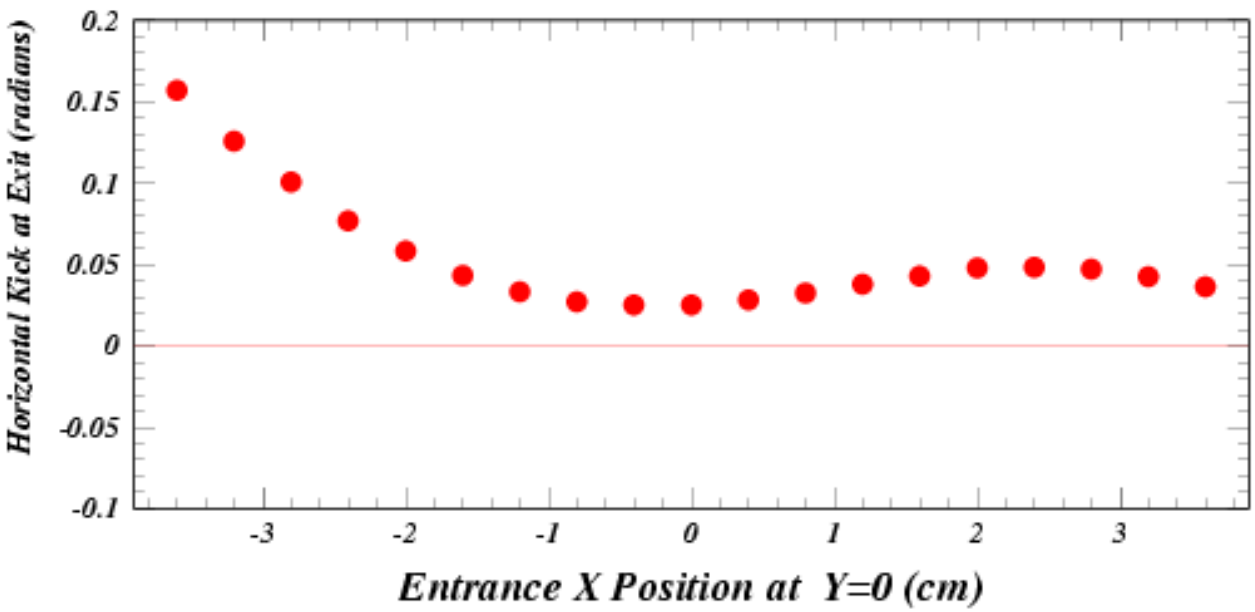
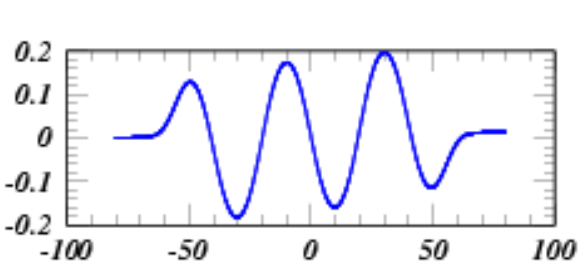
7-Pole Wiggler -- Main: 110 A Trim: 2.9 A

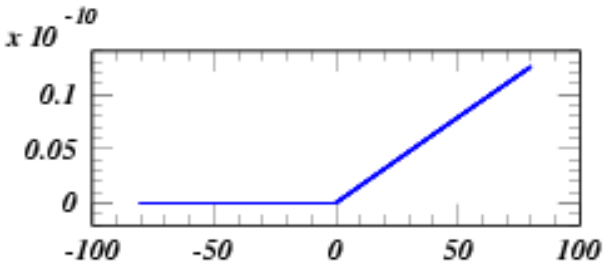




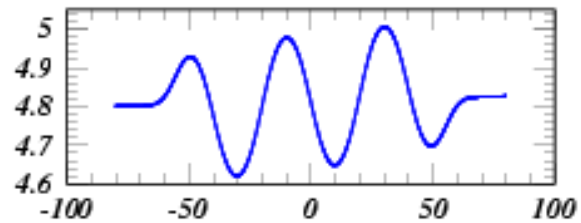
8-Pole Wiggler -- Main: 181 A End: 74 A 02/07/08 13.40



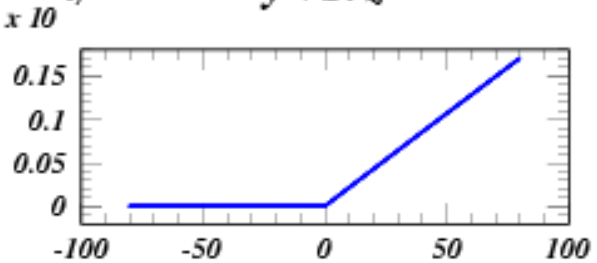
x VS. z



y VS. z



x VS. z



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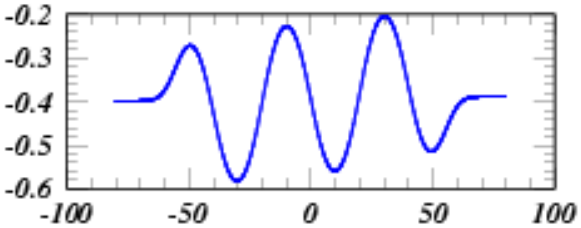

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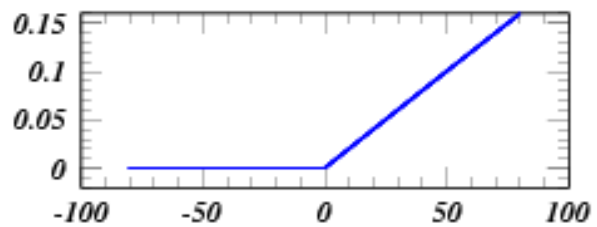
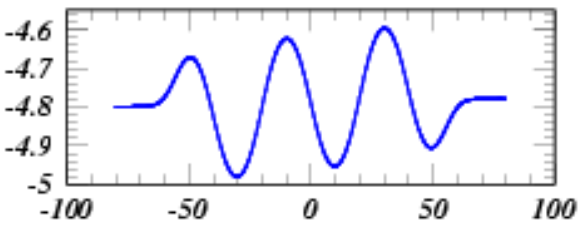


y VS. z



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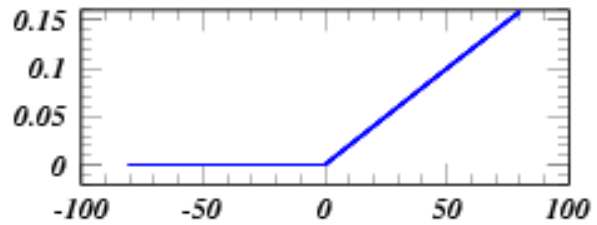
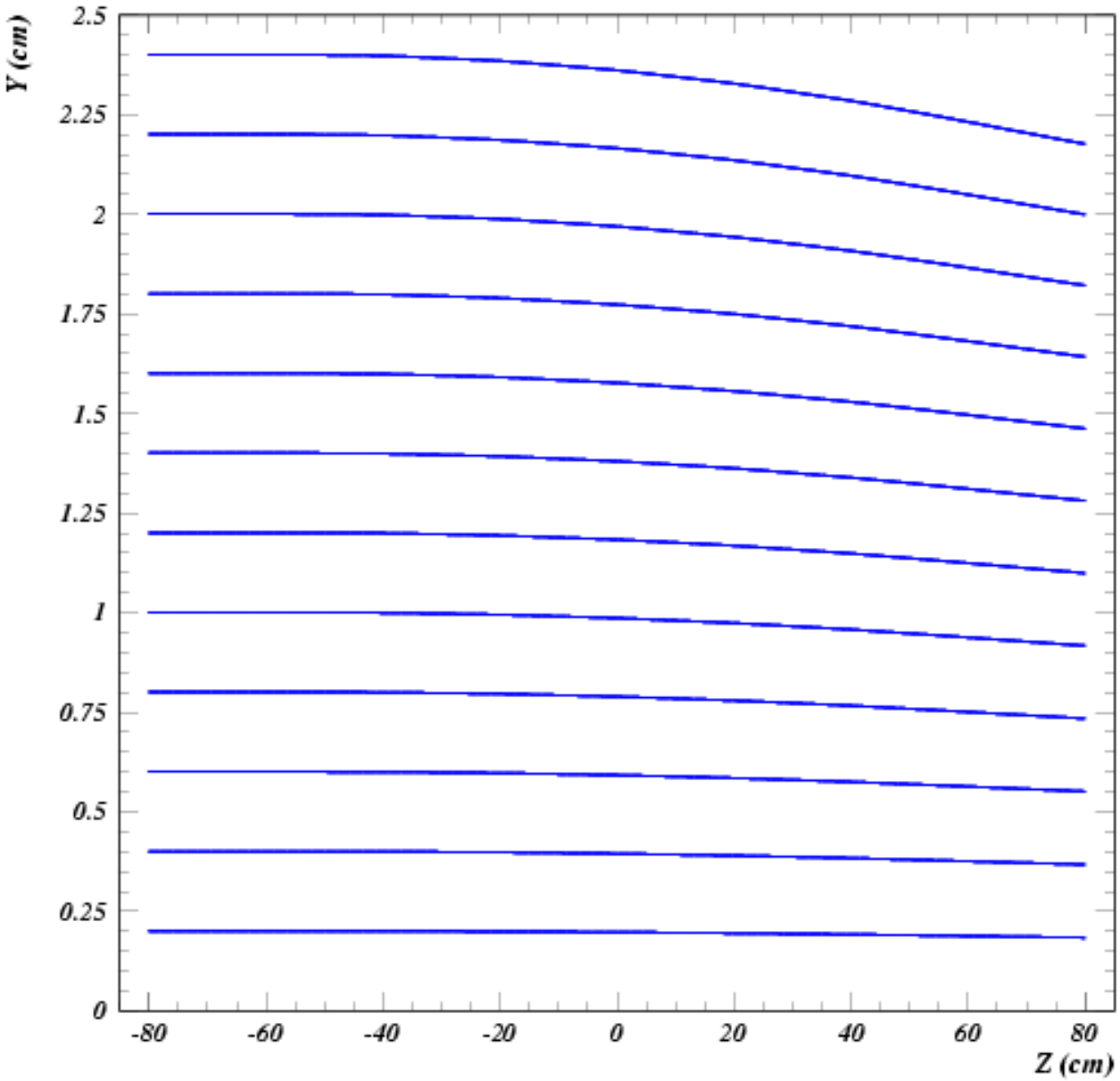


y VS. z

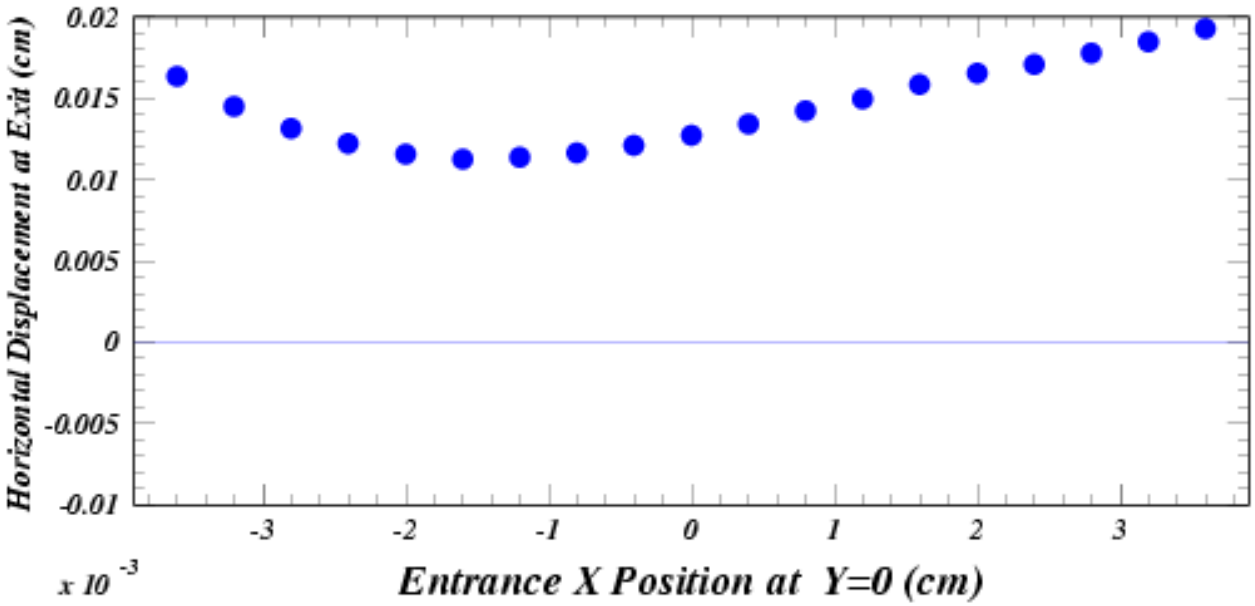
8-Pole Wiggler -- Main: 181 A End: 74 A

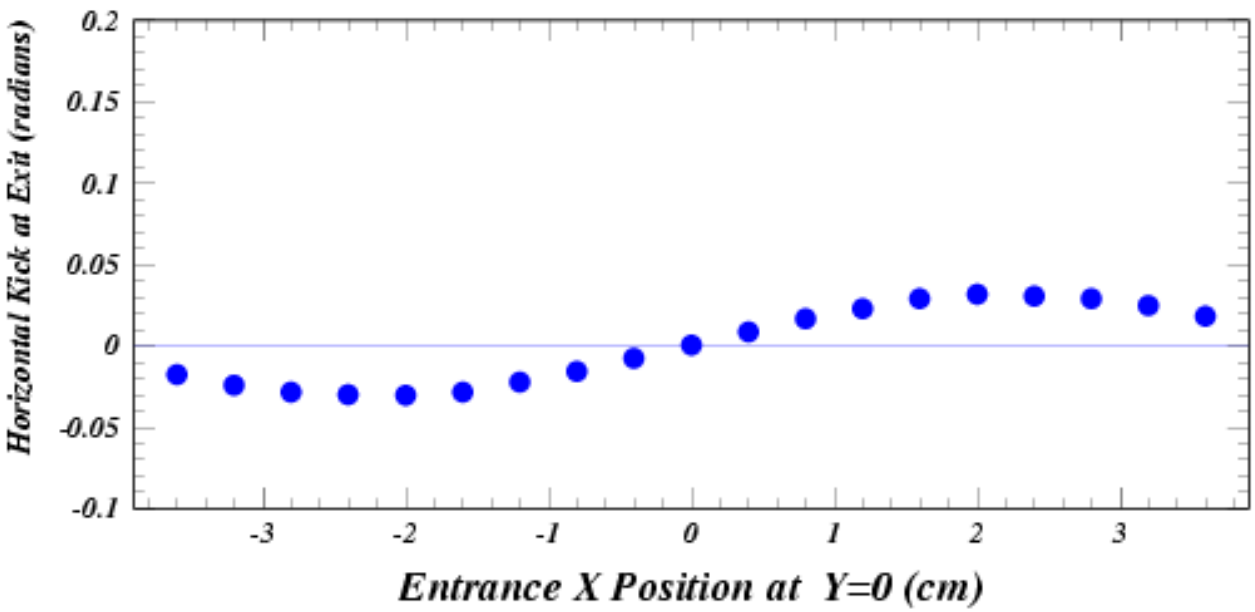
02/07/08 13.41



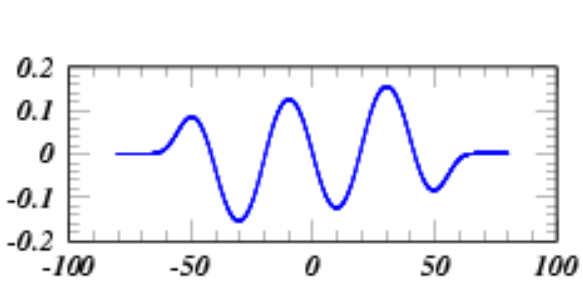
02/07/08 13.41

8-Pole Wiggler -- Main: 181 A End: 74 A

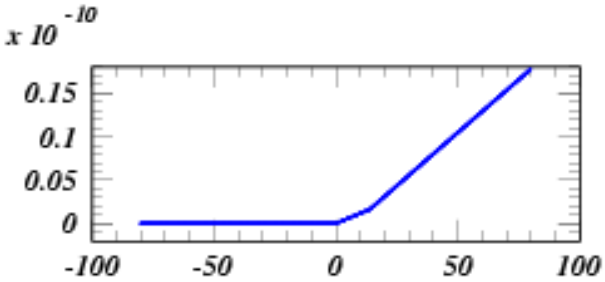




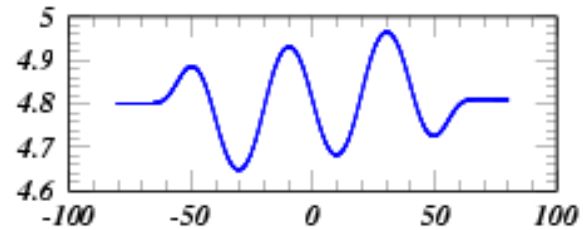
8-Pole Wiggler -- Main: 114 A End: 51 A 02/07/08 13.39



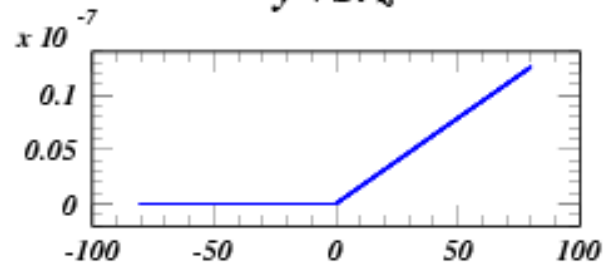
x VS. z



y VS. z



x VS. z



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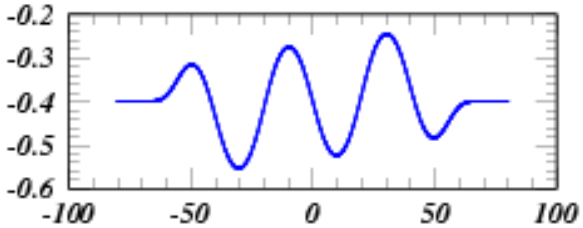
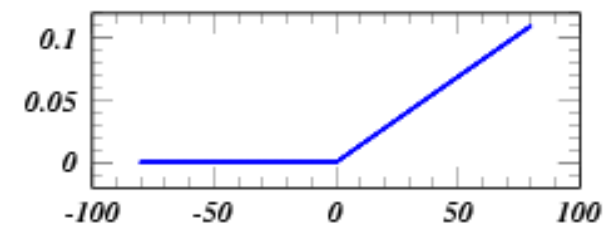


x VS. z



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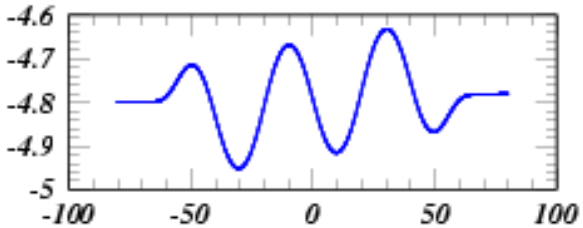
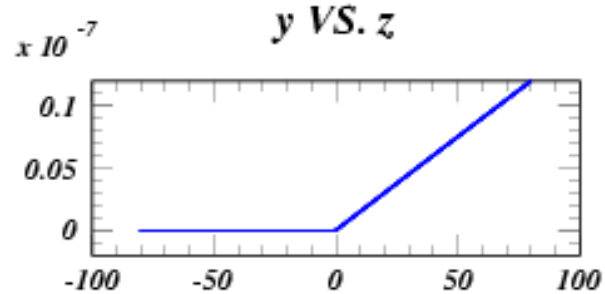
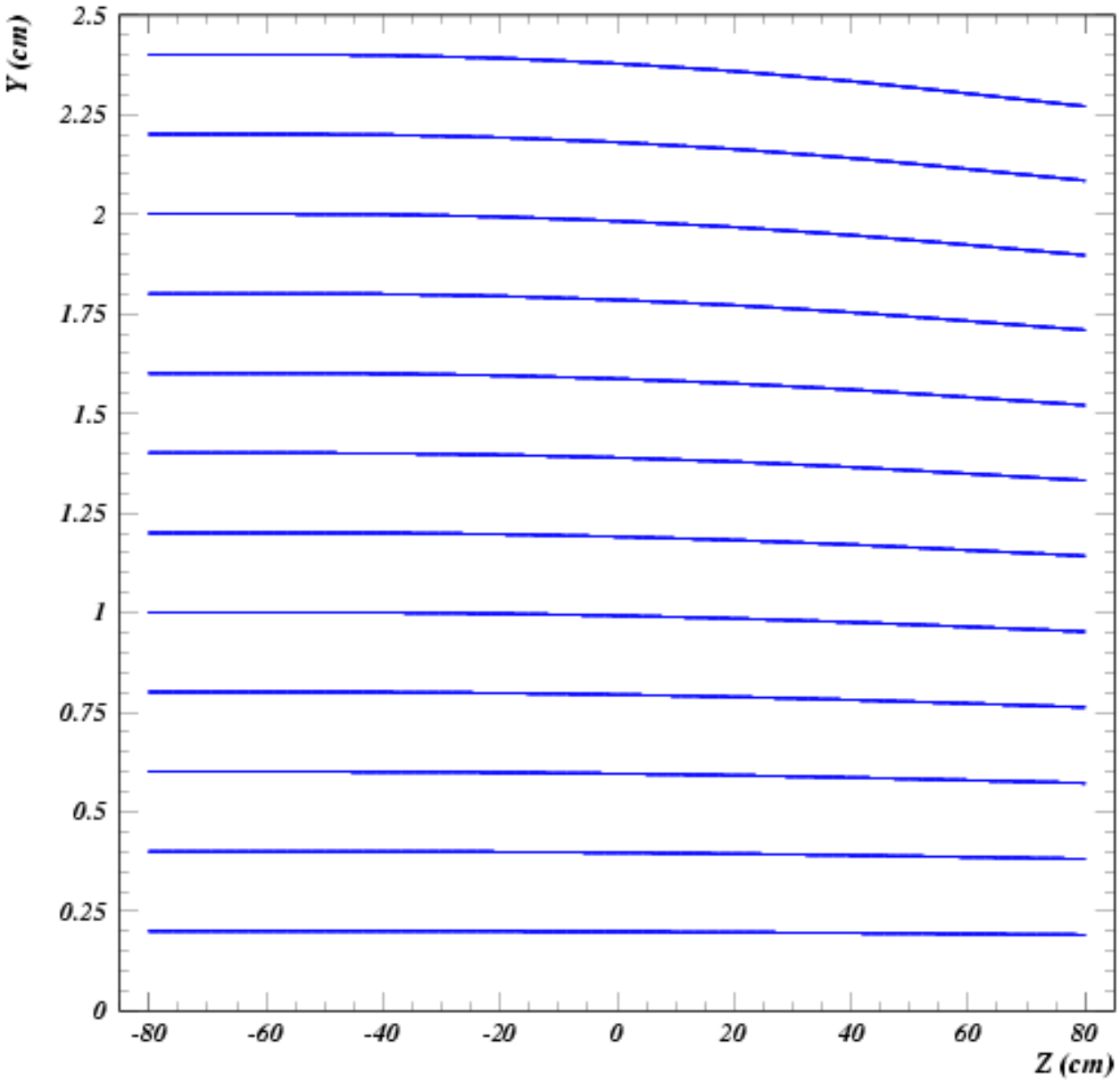


x VS. z



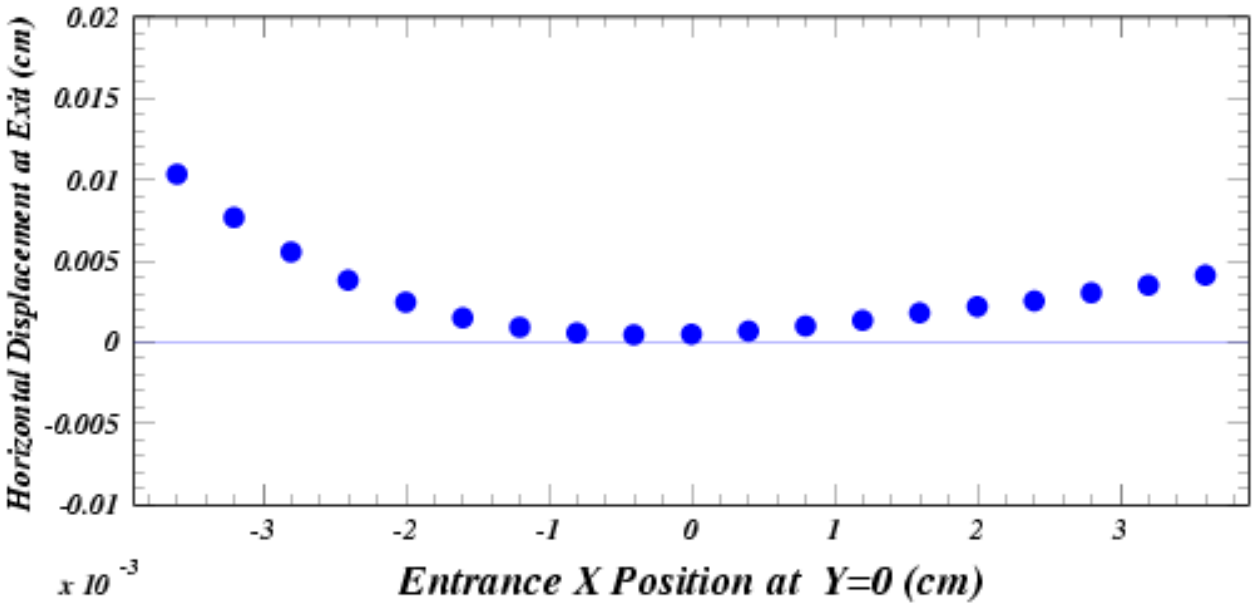
y VS. z

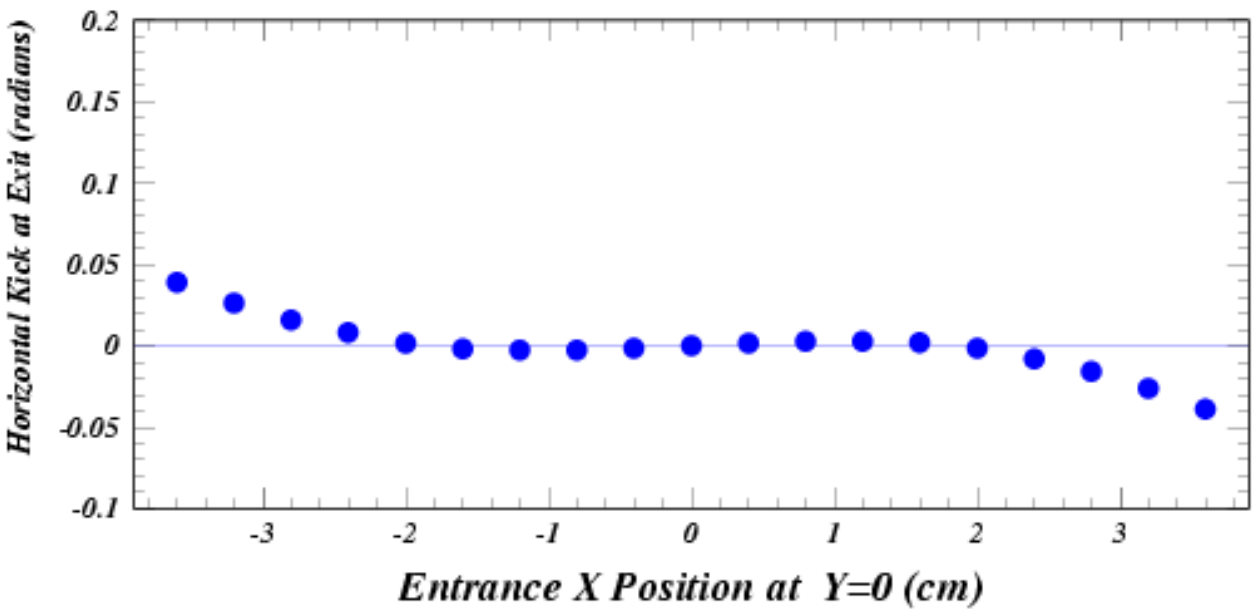
8-Pole Wiggler -- Main: 114 A End: 51 A 02/07/08 13.39



02/07/08 13.40

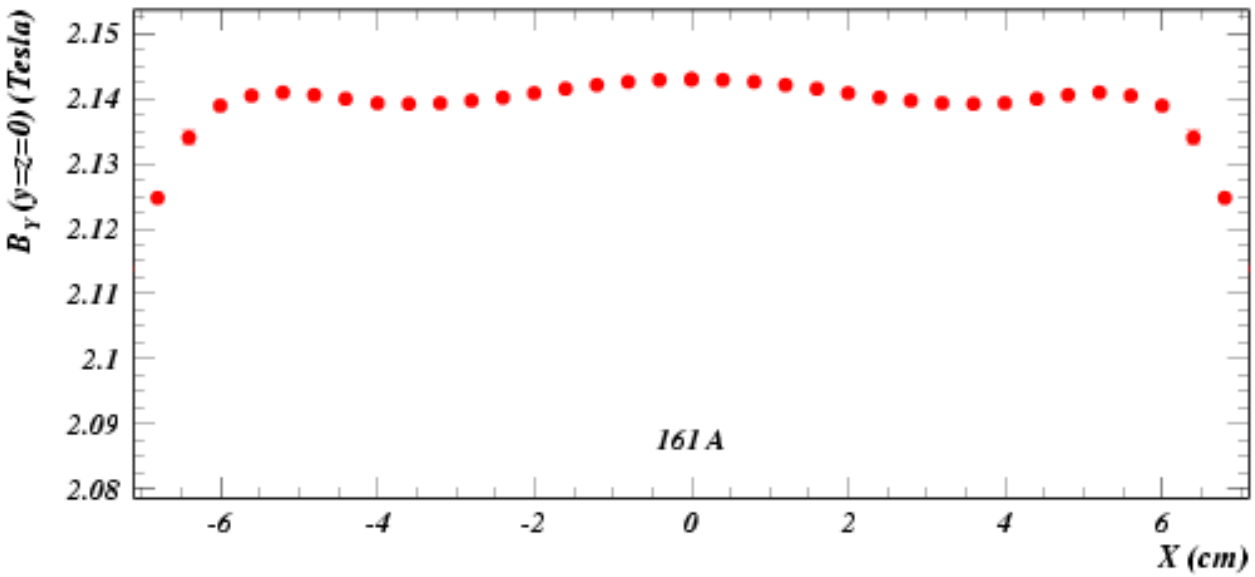
8-Pole Wiggler -- Main: 114 A End: 51 A



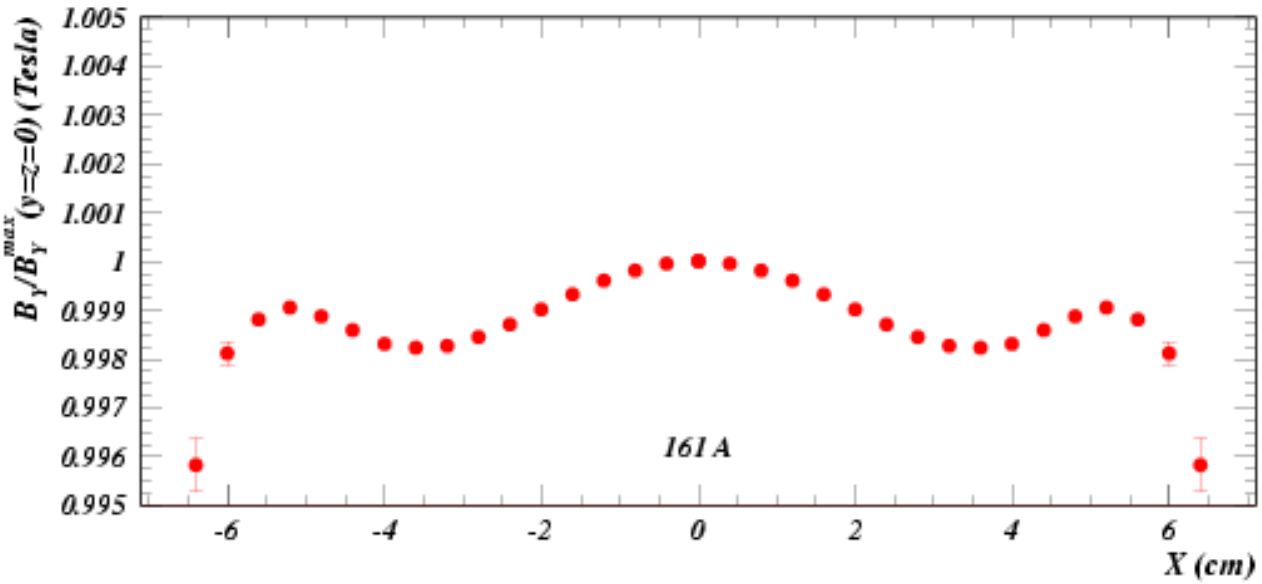


02/07/08 14.50

7-Pole 40 cm Wiggler: Central Pole



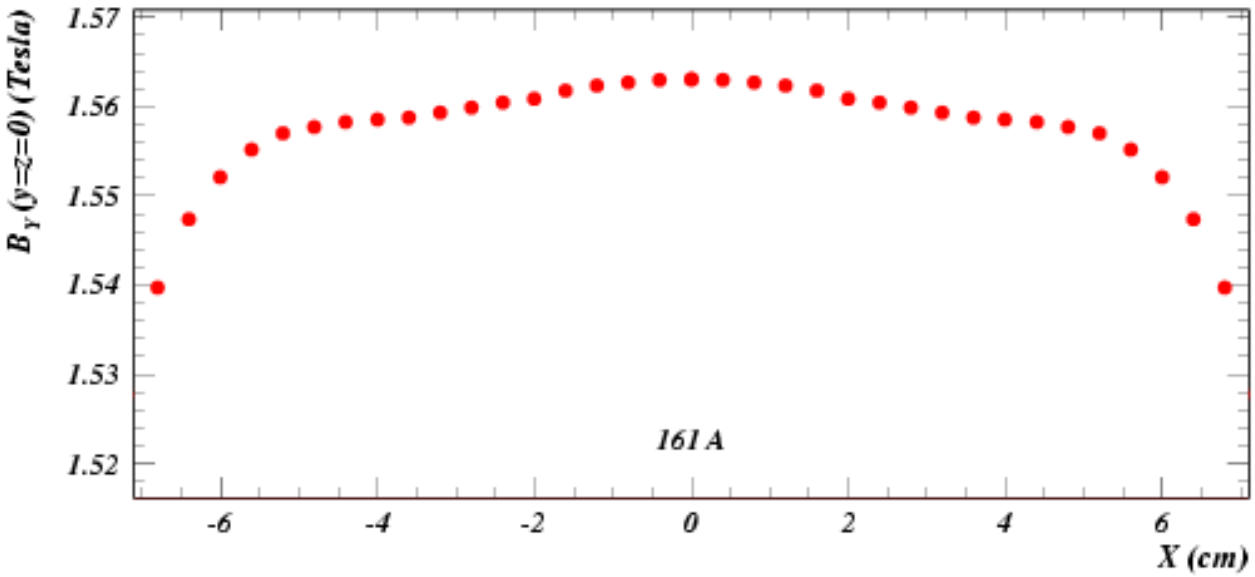
Z=0 cm



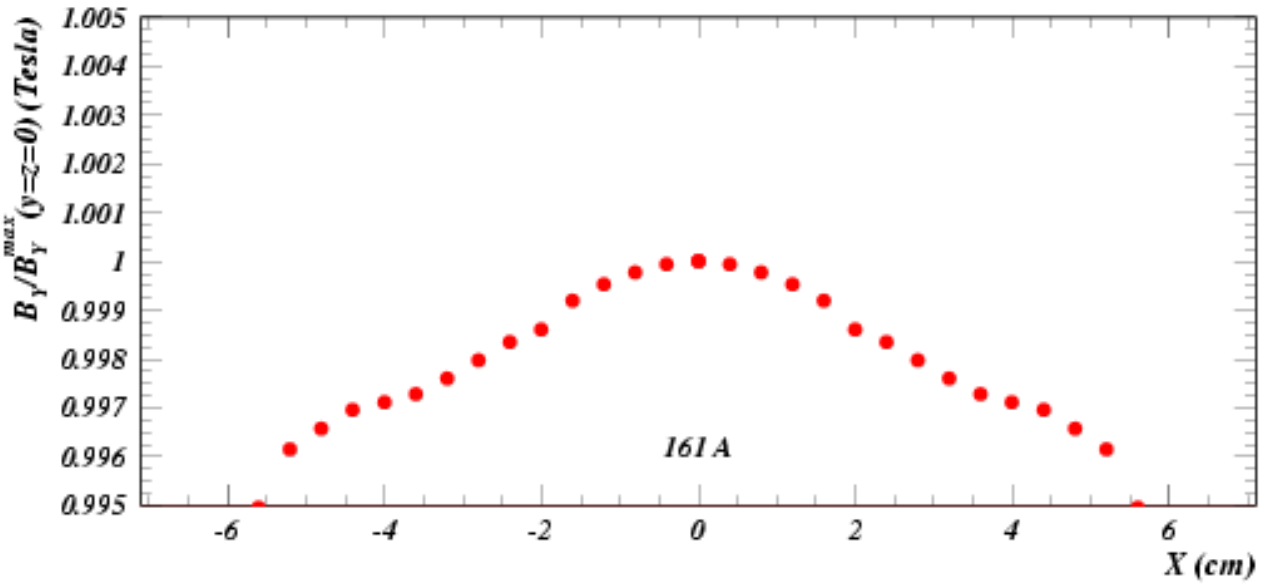
Z=0 cm

02/07/08 14.50

7-Pole 40 cm Wiggler: End Pole



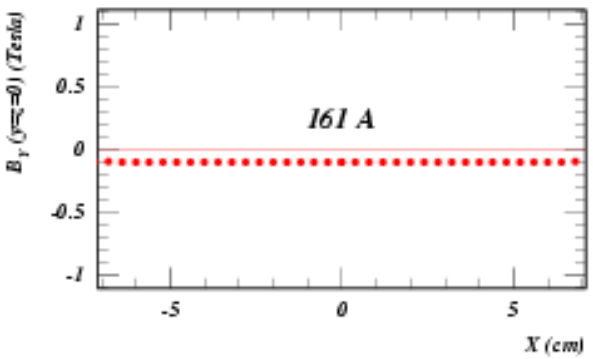
Z=57.6 cm



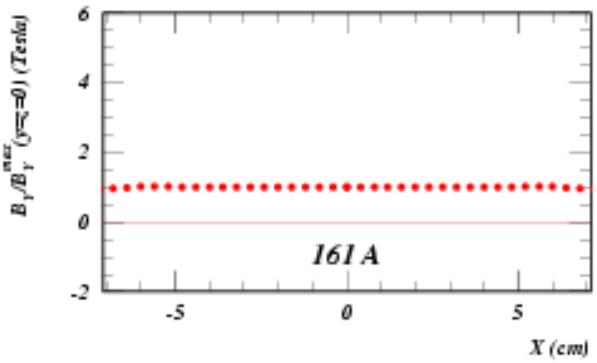
Z=57.6 cm

7-Pole 40 cm Wiggler: Between Central and Neighbor Pole

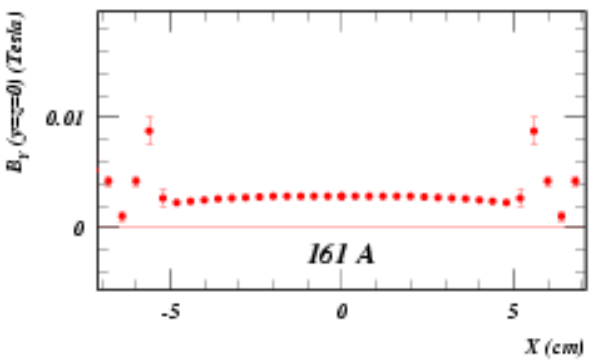
02/07/08 14.50



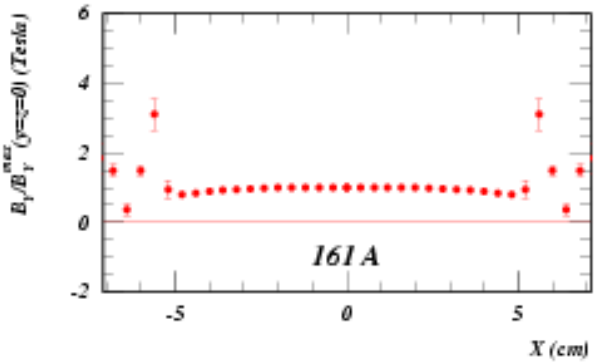
Z=9.8 cm



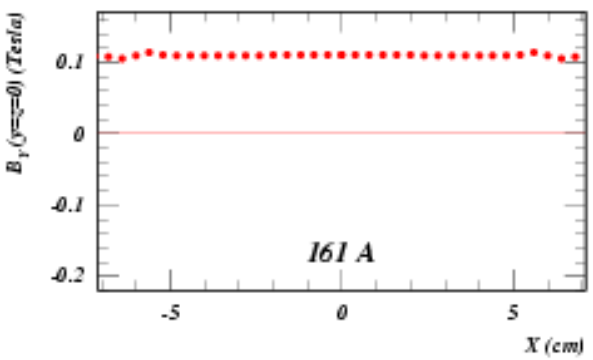
Z=9.8 cm



Z=10 cm



Z=10 cm



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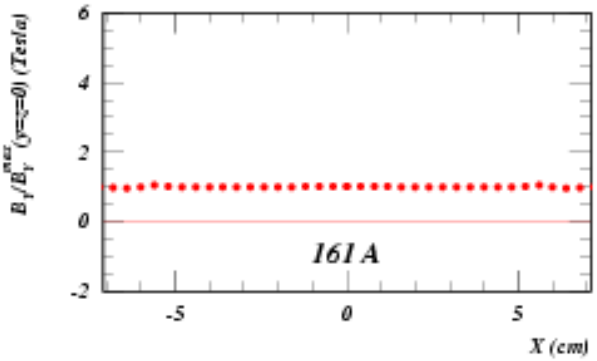
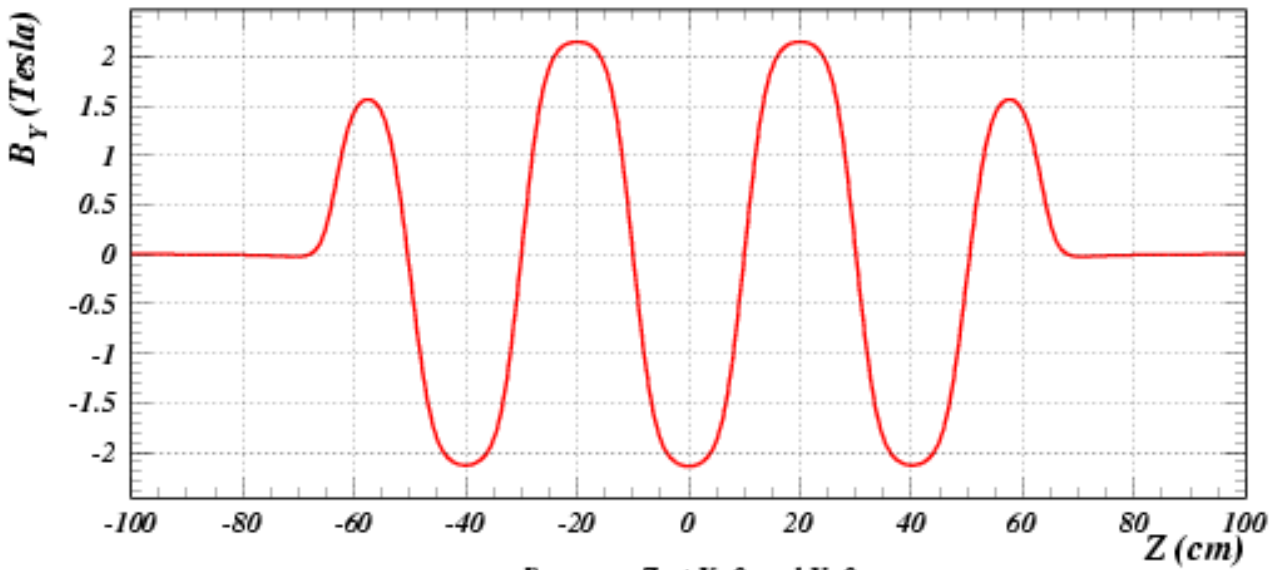


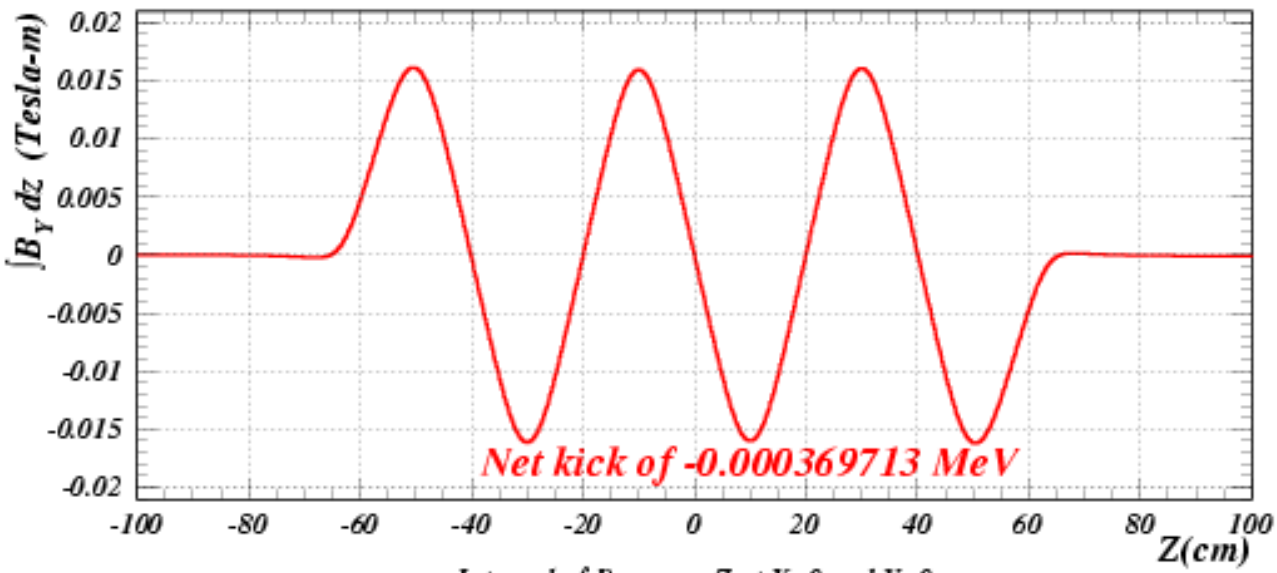
Z=10.2 cm

02/07/08 14.50

Field Map w7-20_26_161-- Trim Coil 1.3 A



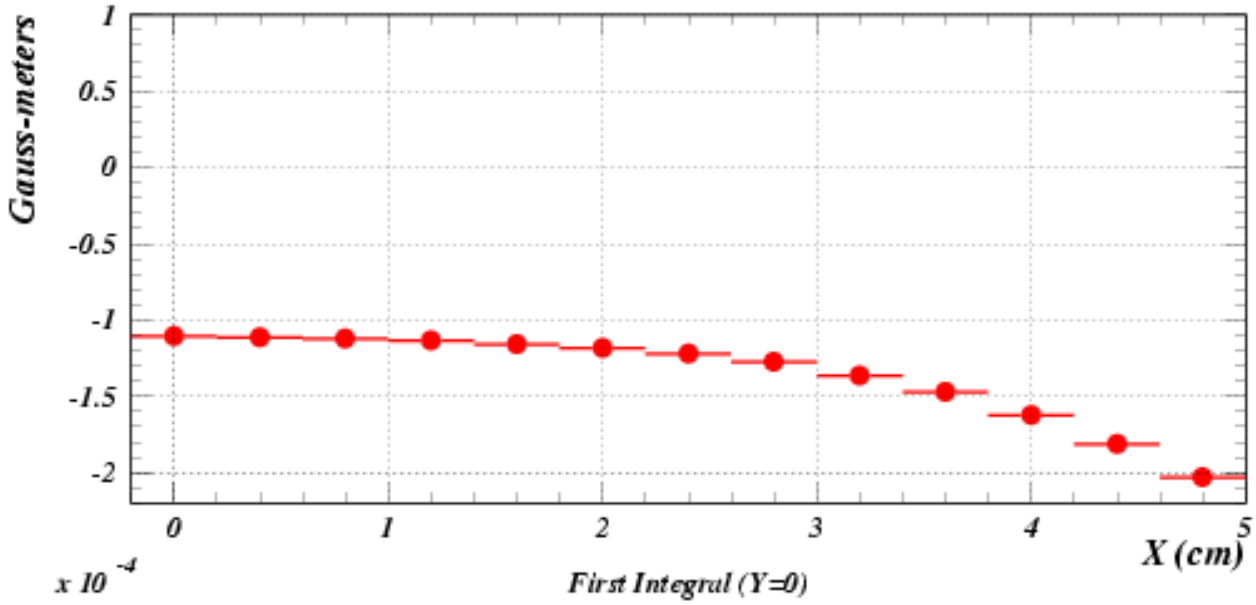
B_y versus Z at X=0 and Y=0

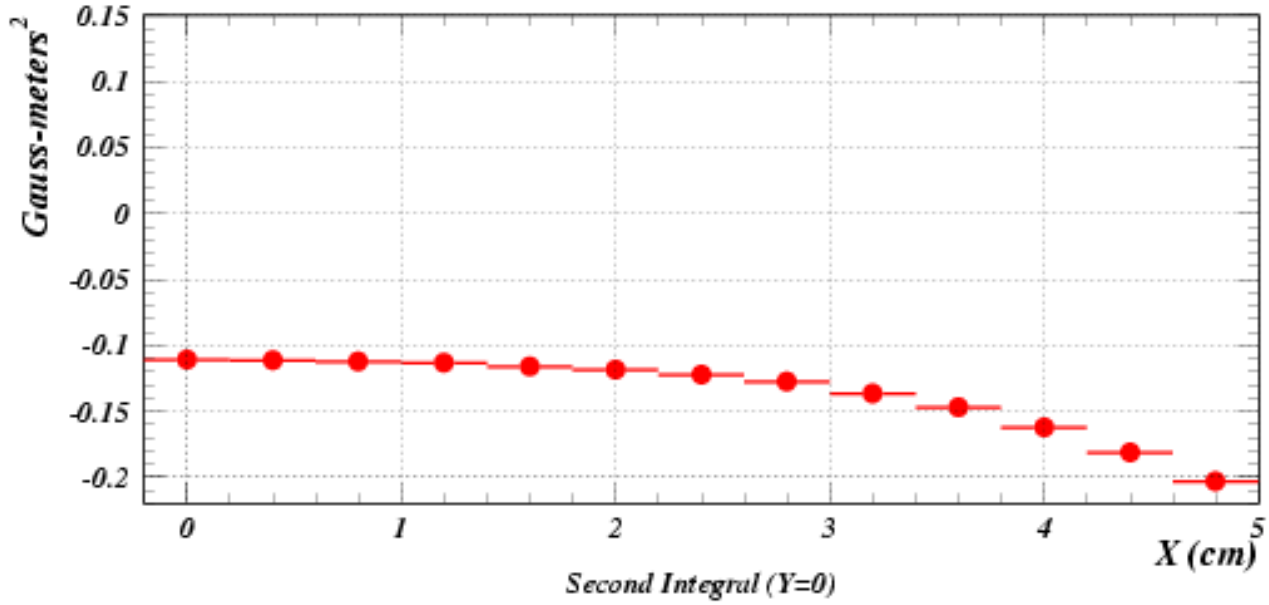


Integral of B_y versus Z at X=0 and Y=0

02/07/08 14.56

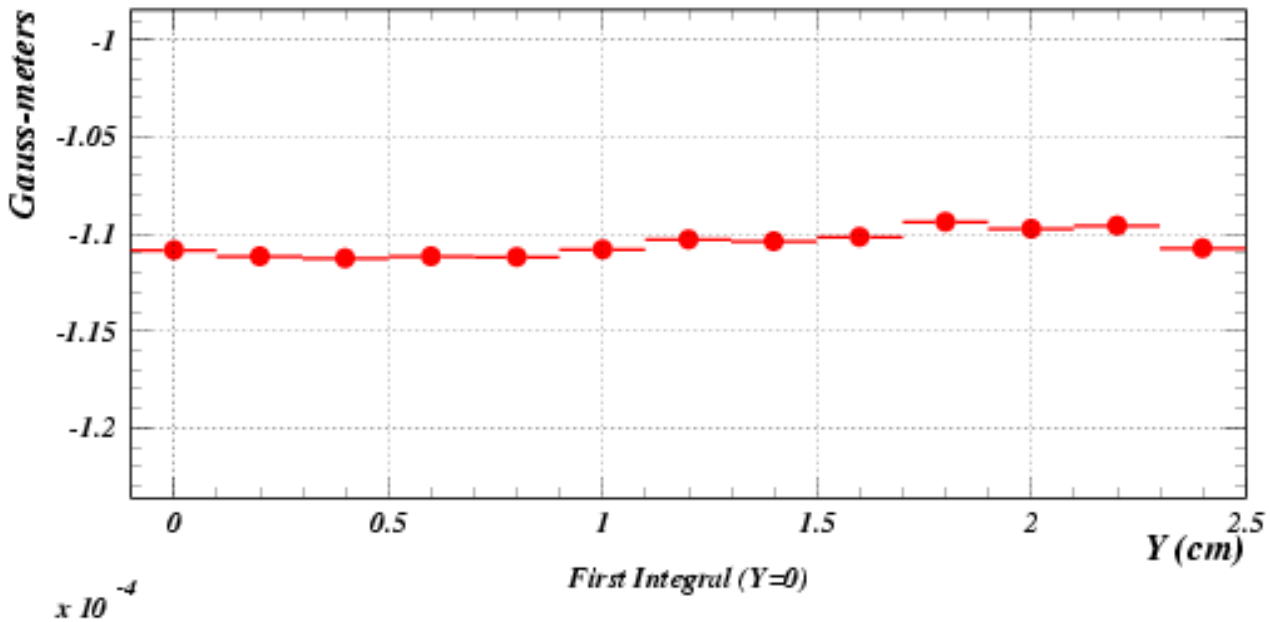
Field Map w7-20_26_161-- Trim Coil 1.3 A

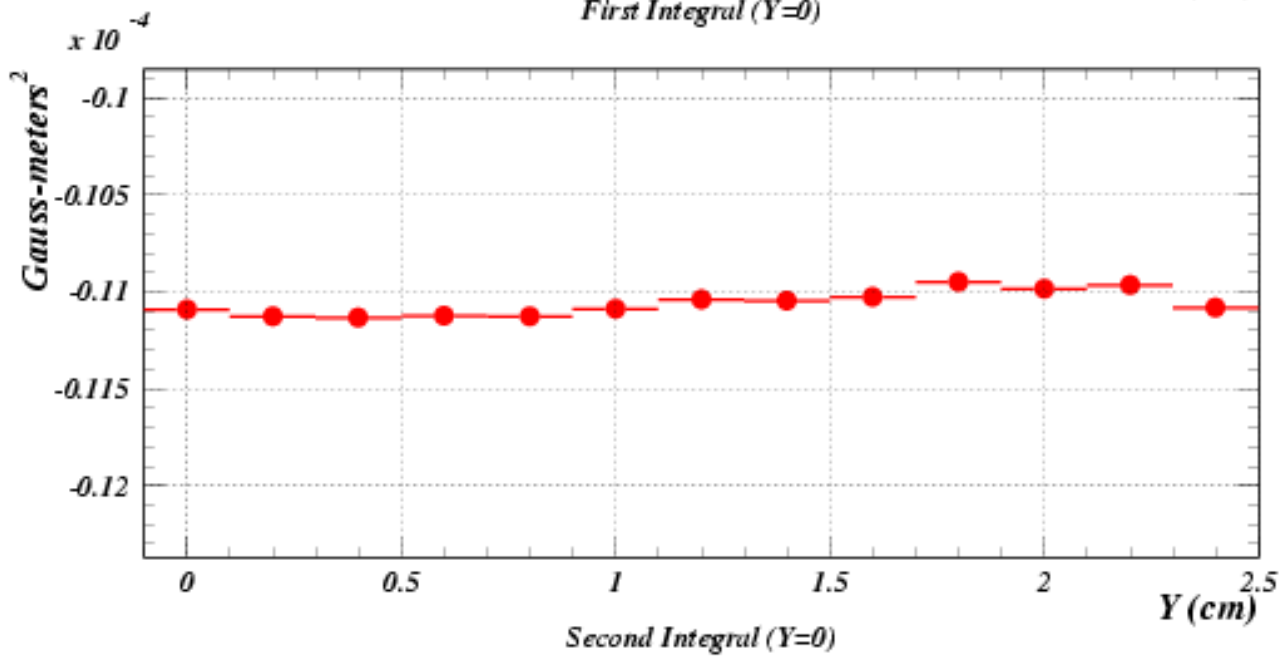




02/07/08 14.56

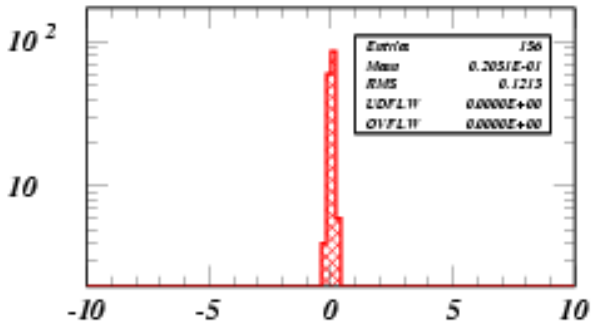
Field Map w7-20_26_161-- Trim Coil 1.3 A



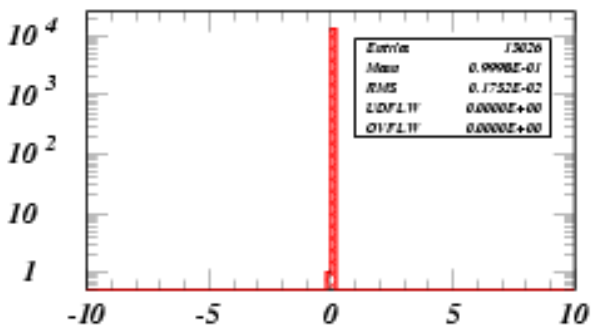


Test Boundary Conditions for w7-20_26_161

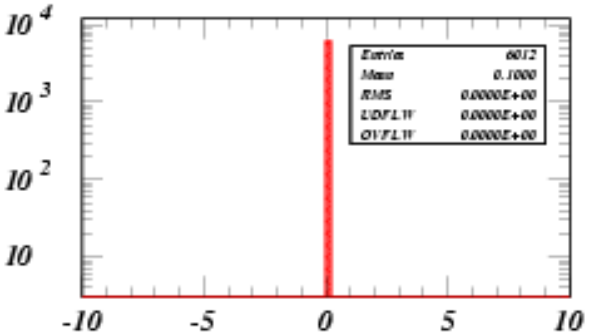
02/07/08 14.56



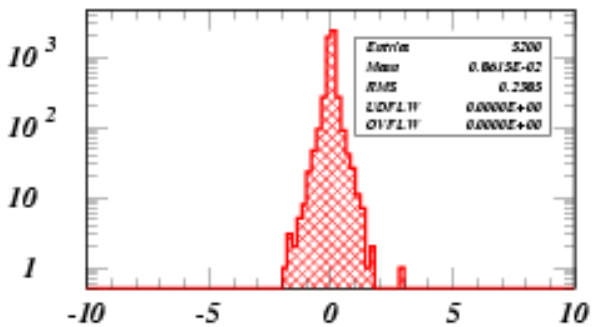
B_Z on X-Y Plane (gauss)



B_X on X-Z Plane (gauss)



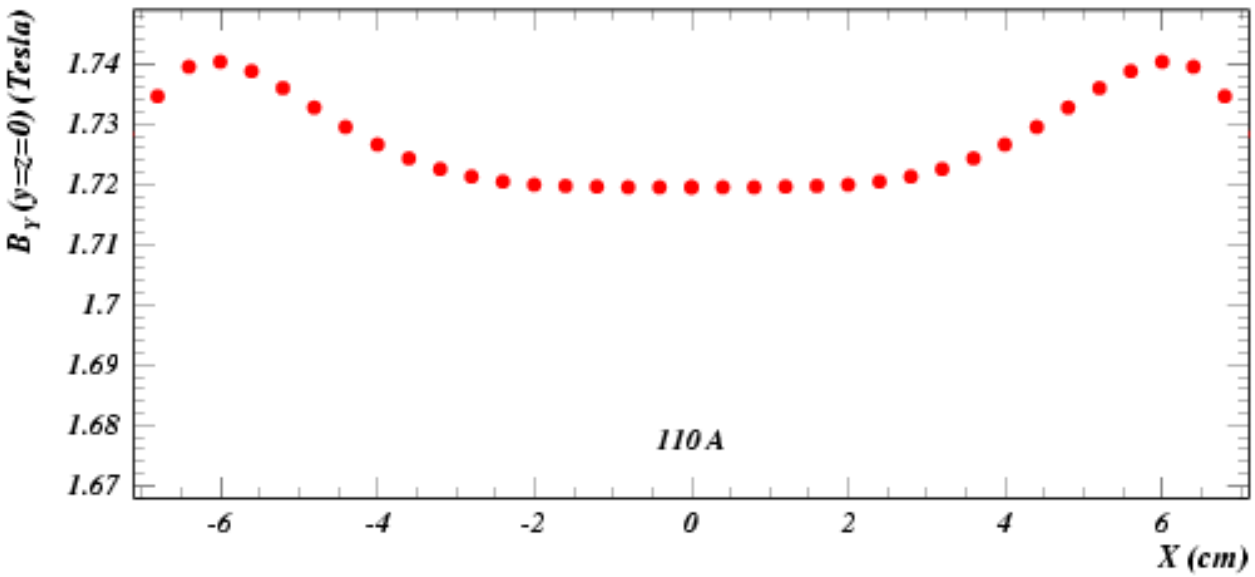
B_Z on X-Z Plane (gauss)



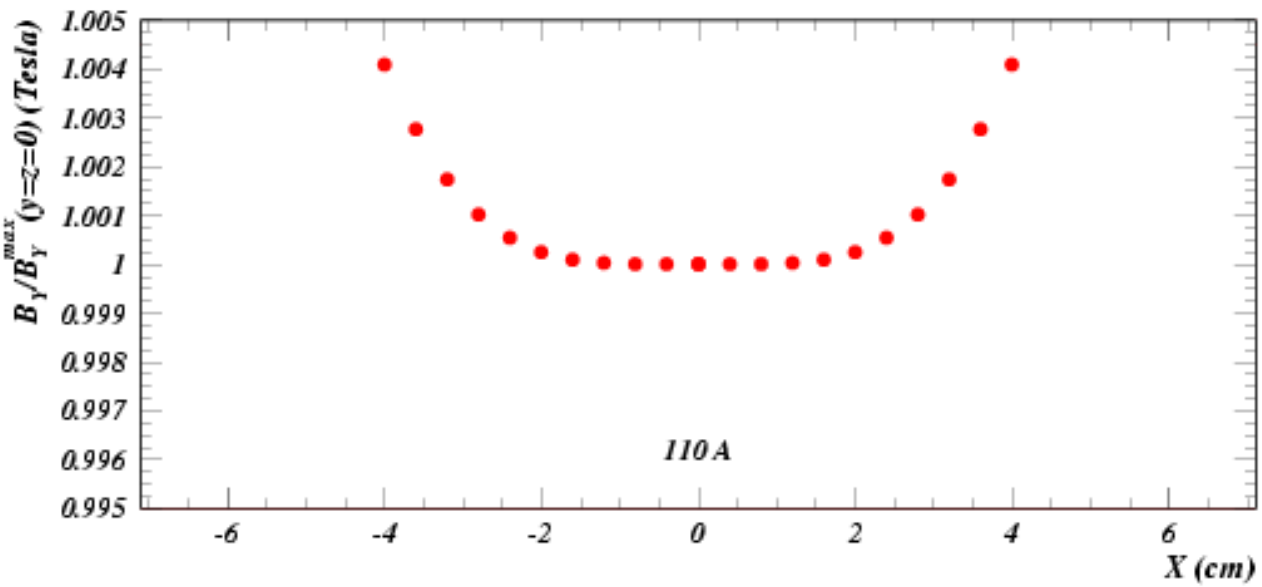
B_X on Y-Z Plane (gauss)

02/07/08 15.01

7-Pole 40 cm Wiggler: Central Pole



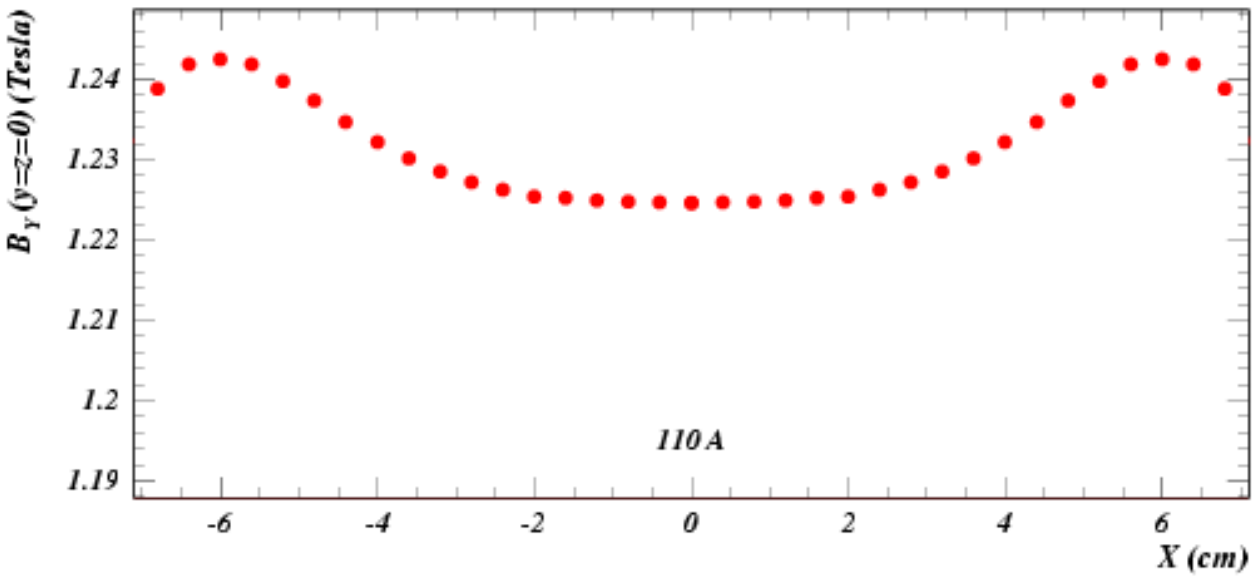
Z=0 cm



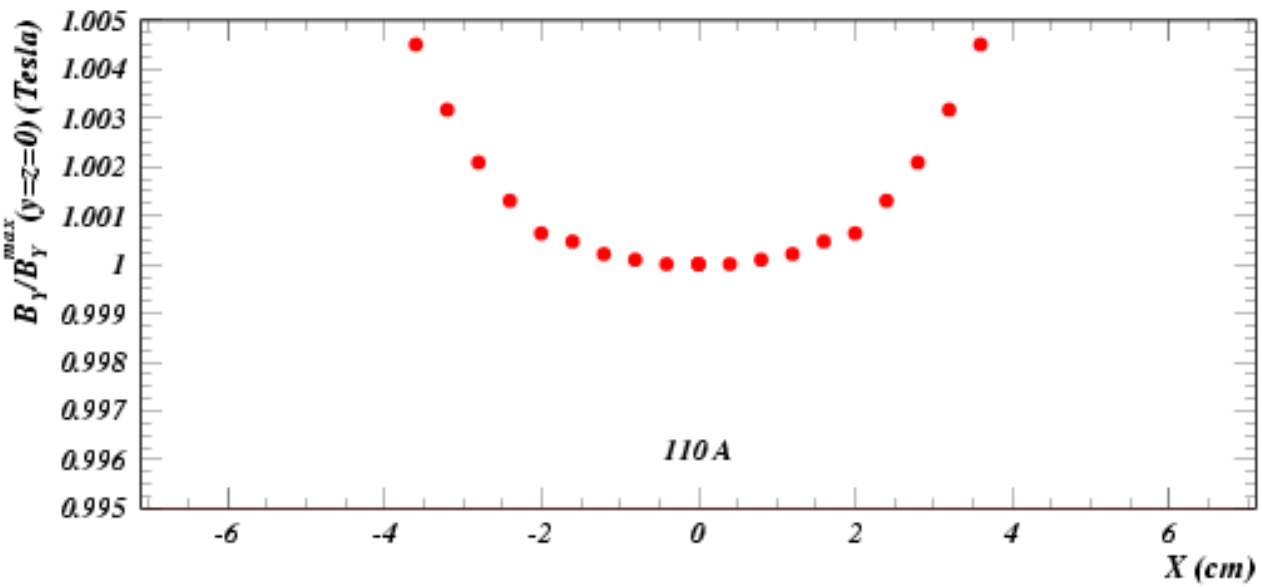
Z=0 cm

02/07/08 15.01

7-Pole 40 cm Wiggler: End Pole



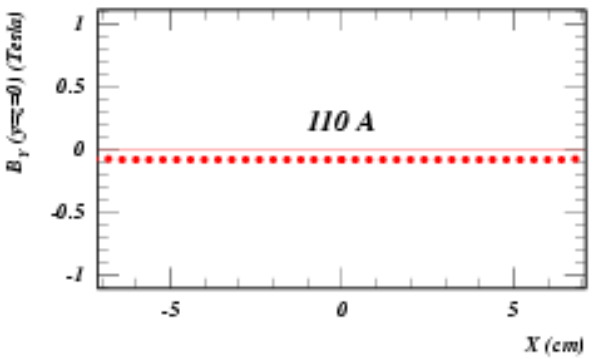
Z=57.6 cm



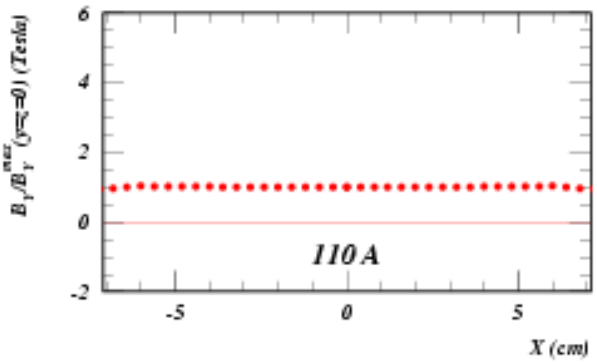
Z=57.6 cm

02/07/08 15.01

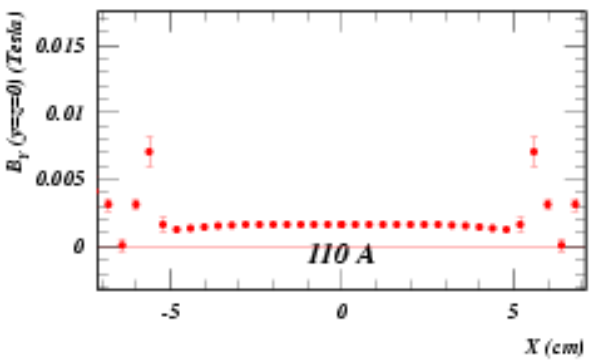
7-Pole 40 cm Wiggler: Between Central and Neighbor Pole



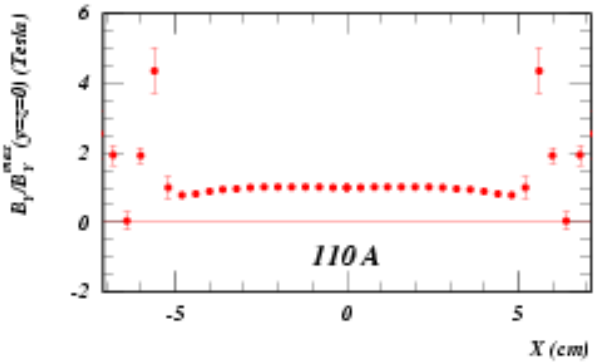
Z=9.8 cm



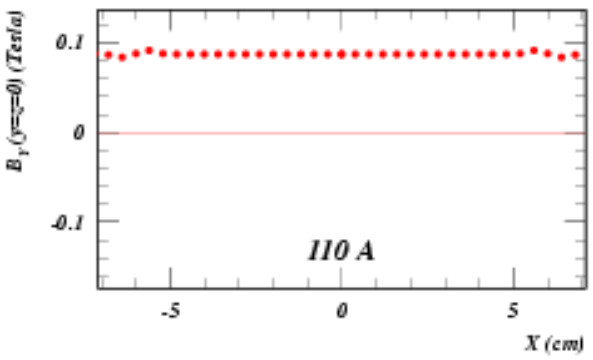
Z=9.8 cm



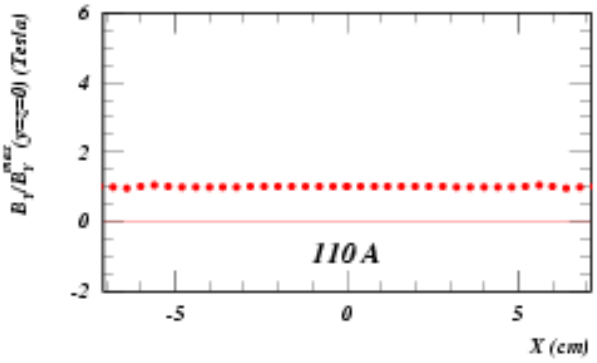
Z=10 cm



Z=10 cm



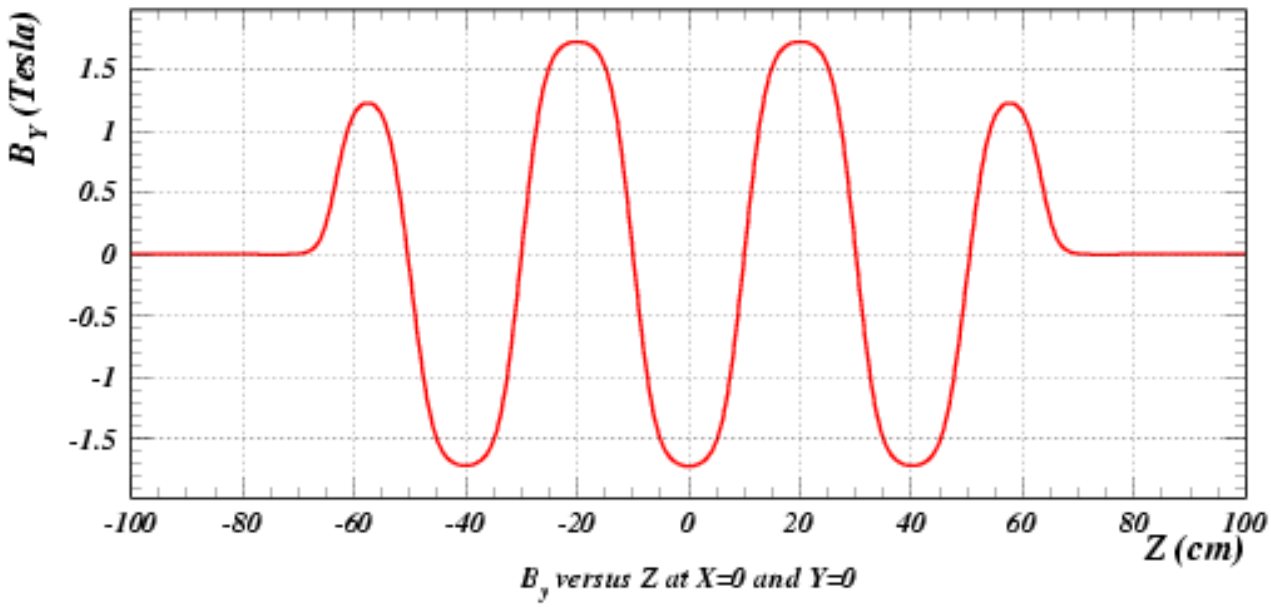
Z=10.2 cm



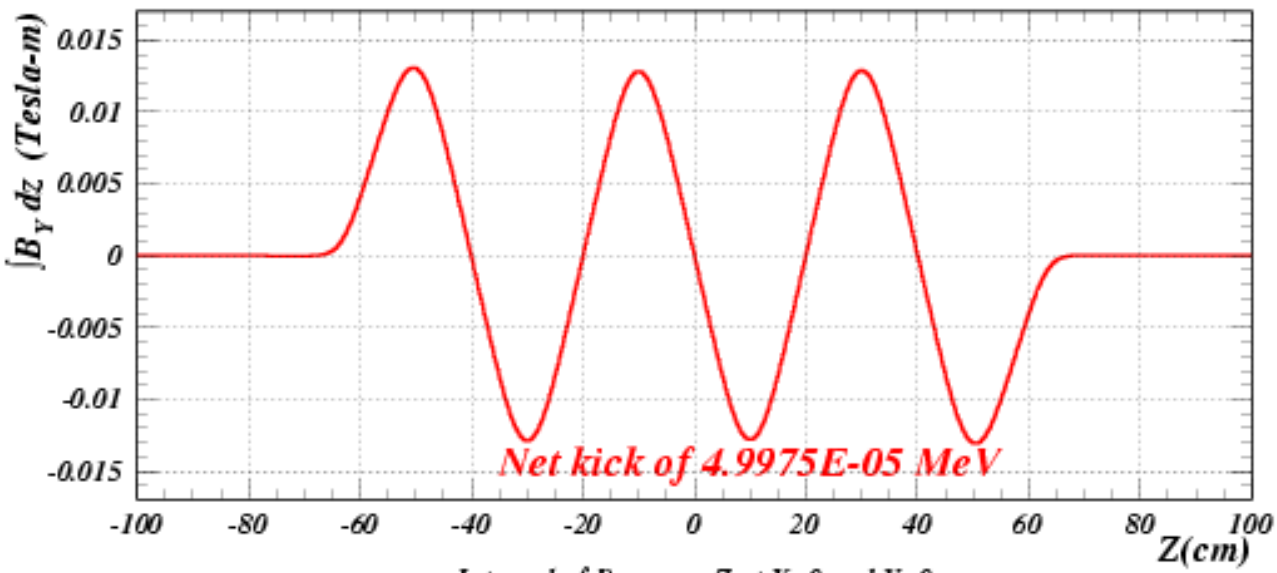
Z=10.2 cm

02/07/08 15.02

Field Map w7-20_28_110-- Trim Coil 2.9 A



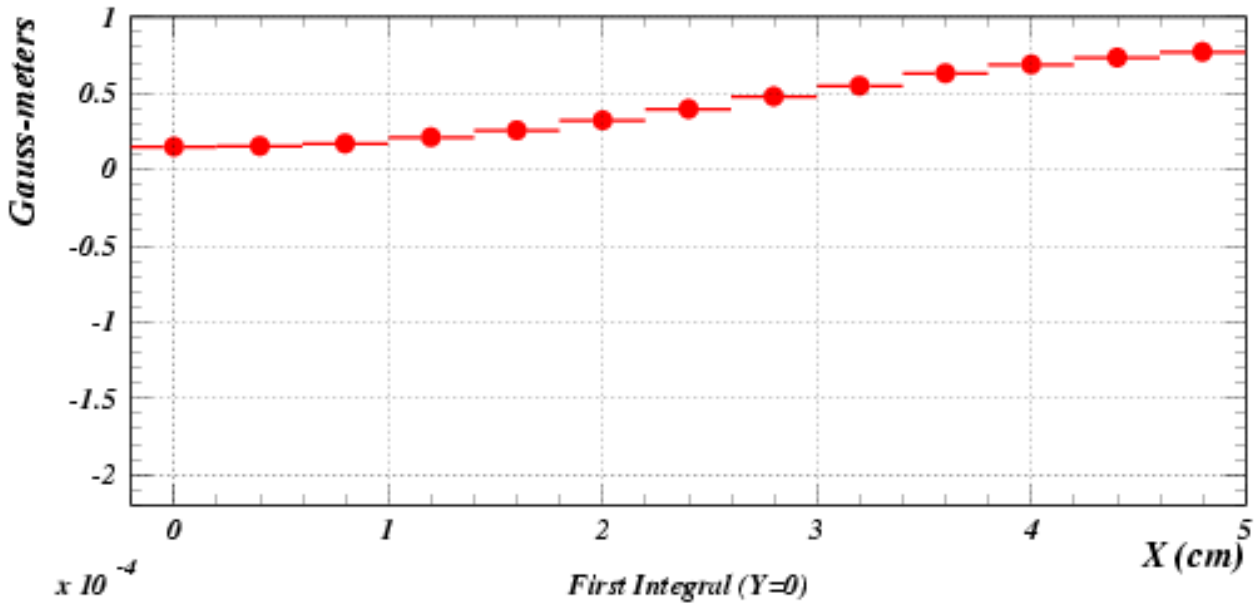
B_y versus Z at X=0 and Y=0

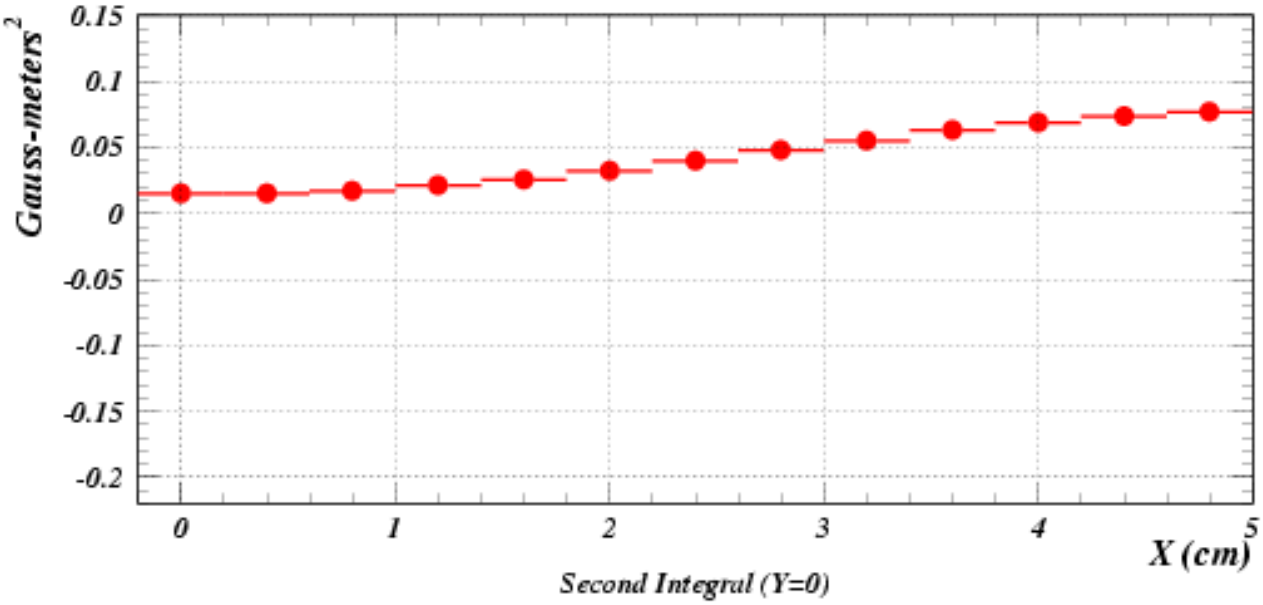


Integral of B_y versus Z at X=0 and Y=0

02/07/08 15.10

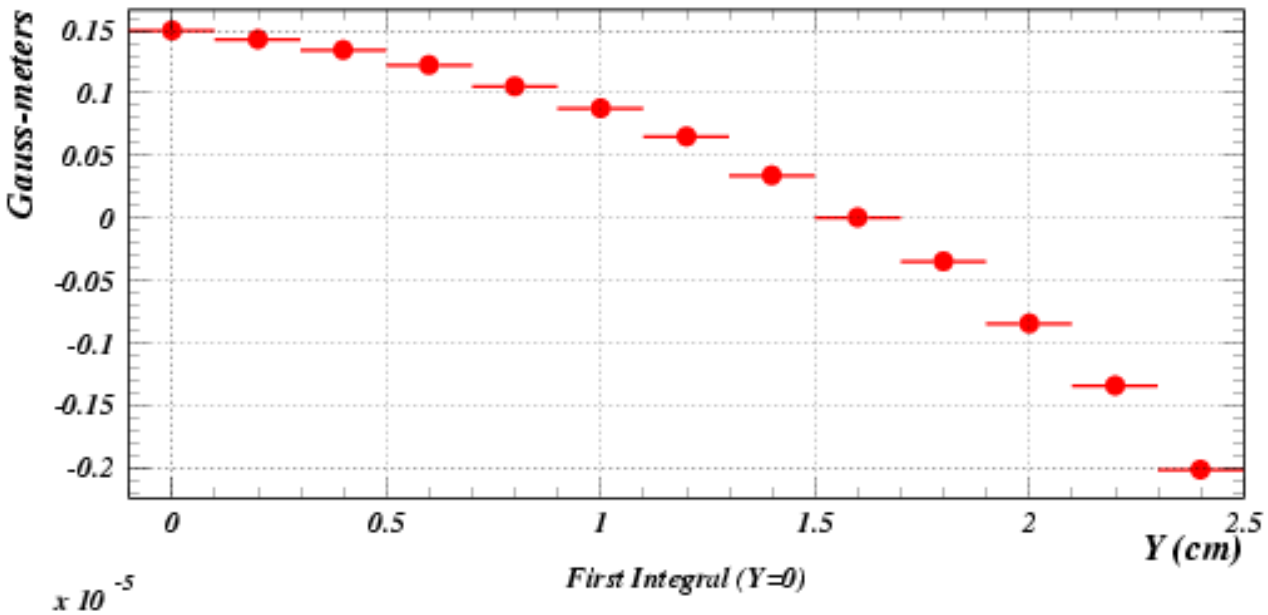
Field Map w7-20_28_110-- Trim Coil 2.9 A

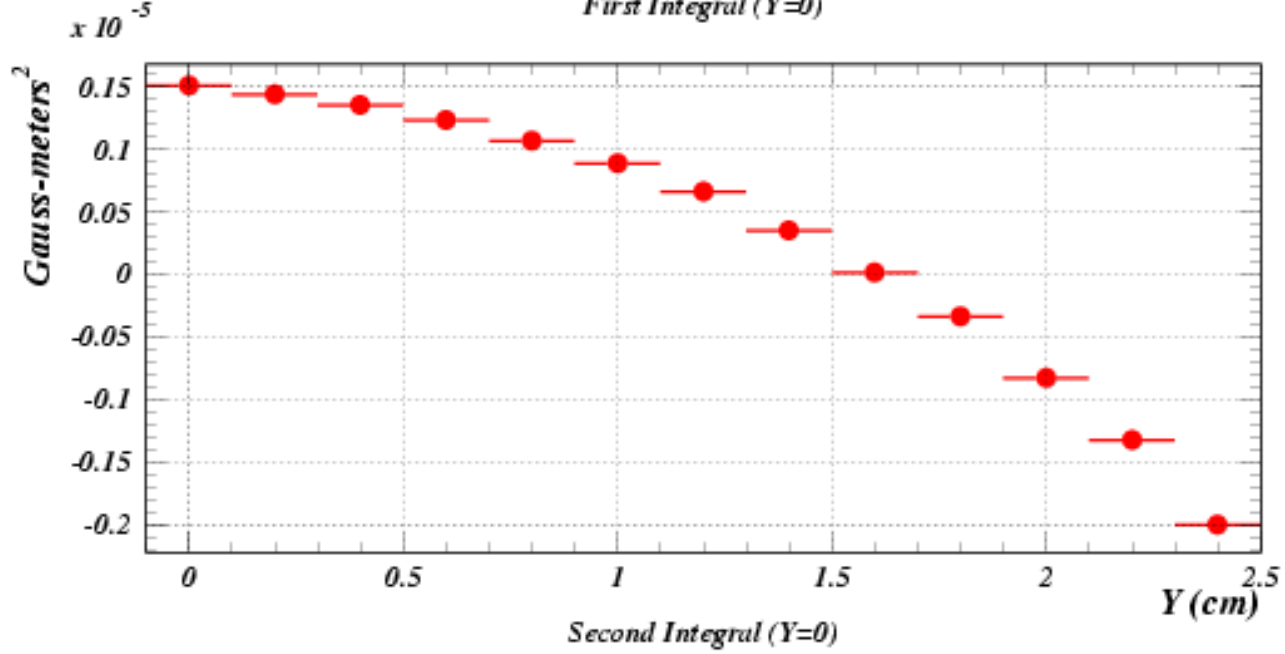




02/07/08 15.10

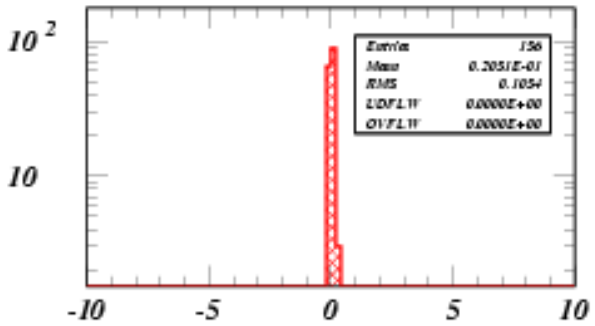
Field Map w7-20_28_110-- Trim Coil 2.9 A



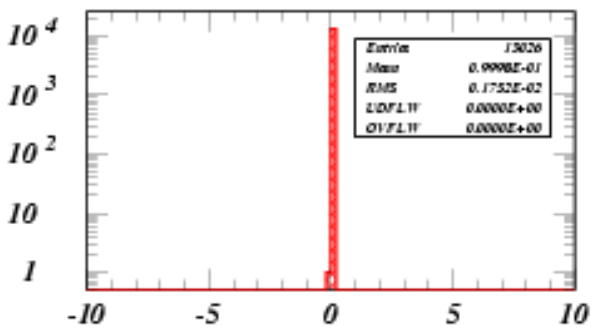


Test Boundary Conditions for w7-20_28_110

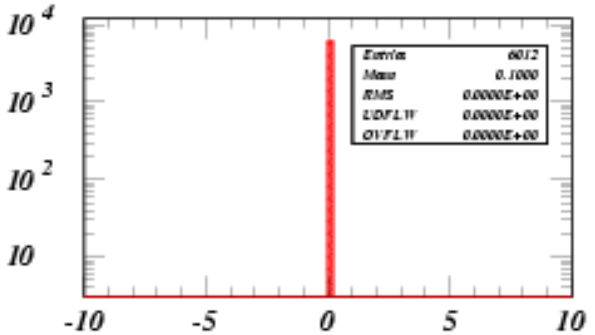
02/07/08 15.10



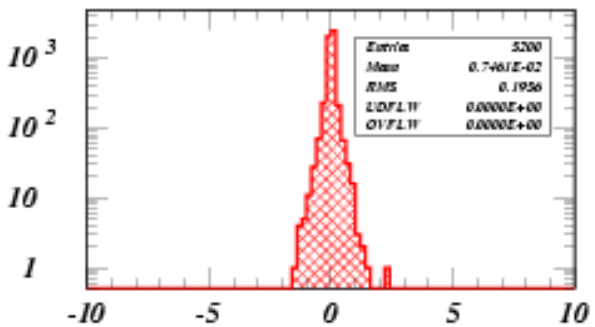
B_Z on X-Y Plane (gauss)



B_X on X-Z Plane (gauss)



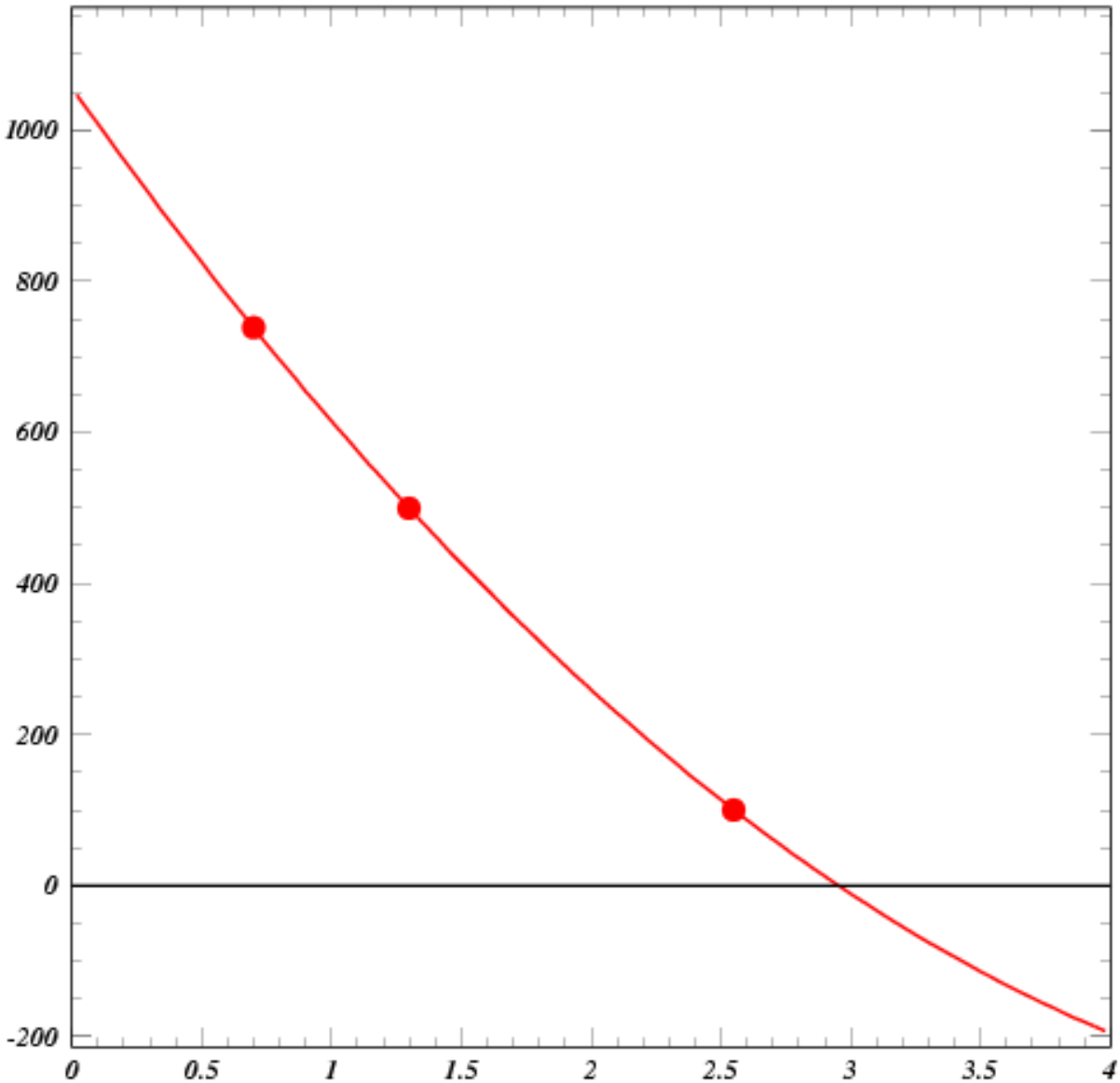
B_Z on X-Z Plane (gauss)



B_X on Y-Z Plane (gauss)

02/07/03 10.26

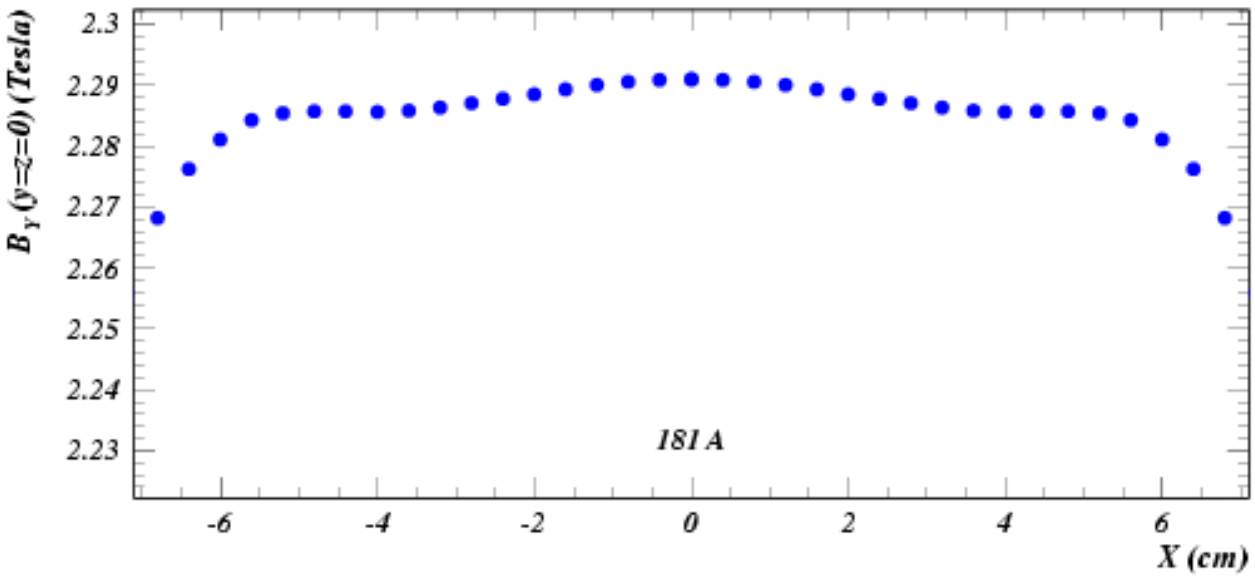
w7-20_27_110_ Tracks: 2.6 Amps in Trim Coil



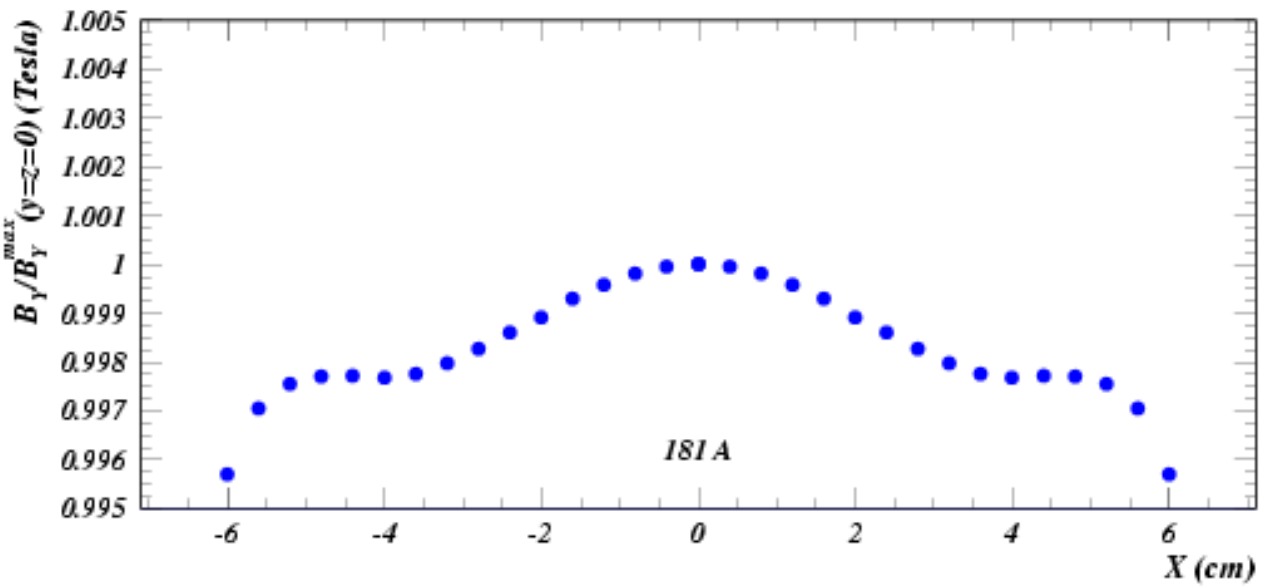
1055.8+x*(-483.88)+42.775*x**2

02/07/08 16.38

8-Pole 40 cm Wiggler: Central Pole



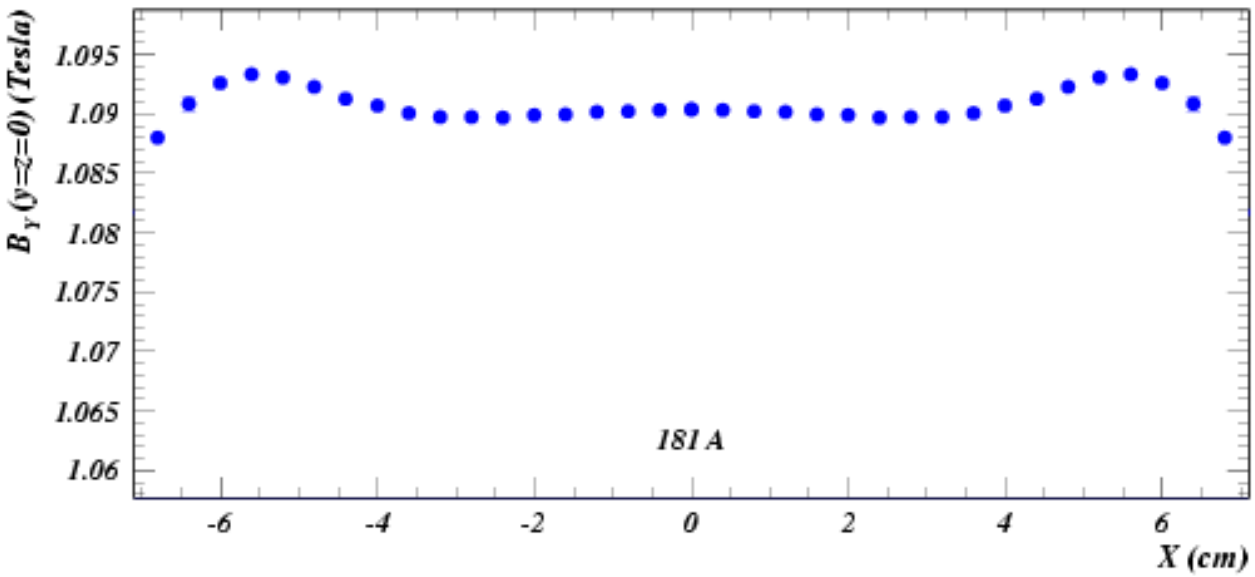
Z=10 cm



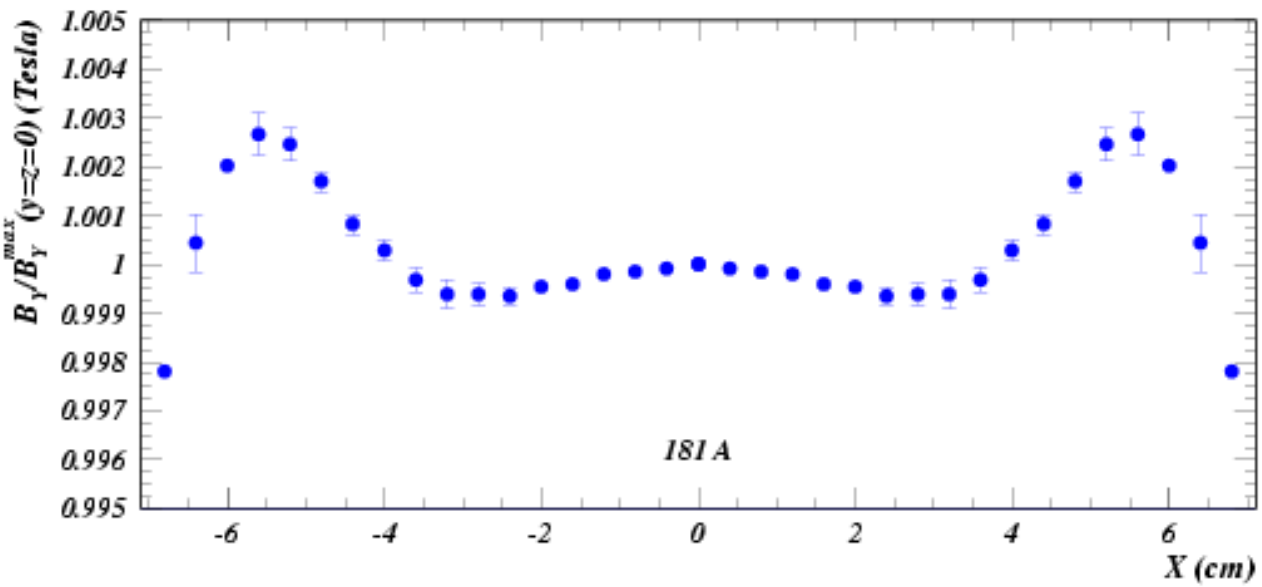
Z=10 cm

02/07/08 16.38

8-Pole 40 cm Wiggler: End Pole



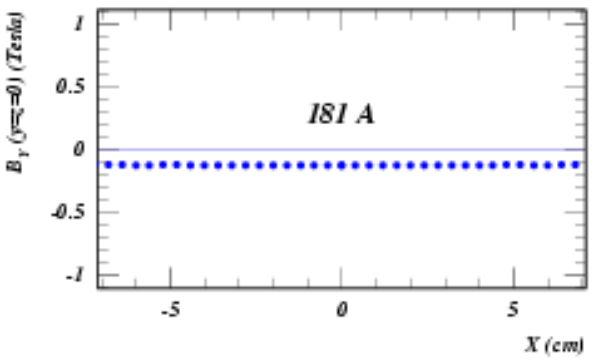
Z=60 cm



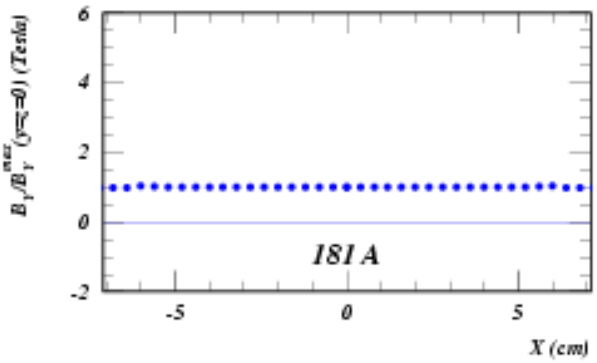
Z=60 cm

02/07/08 16.38

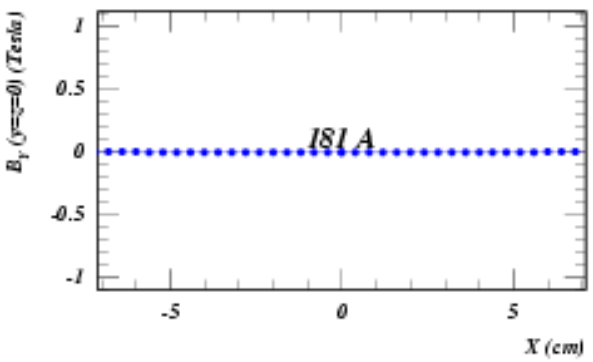
8-Pole 40 cm Wiggler: Between Central and Neighbor Pole



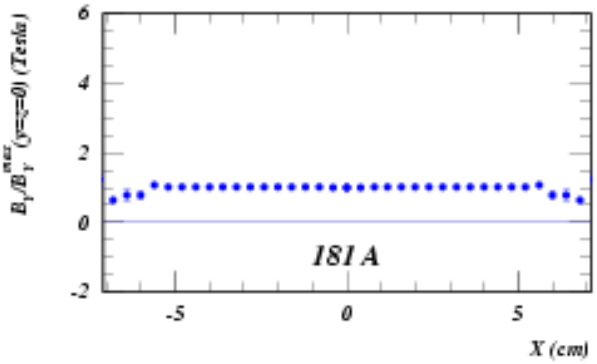
Z=19.8 cm



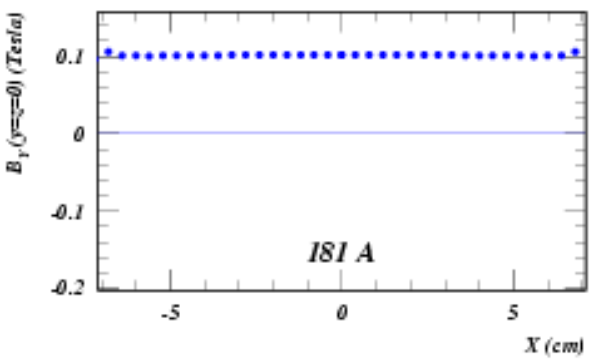
Z=19.8 cm



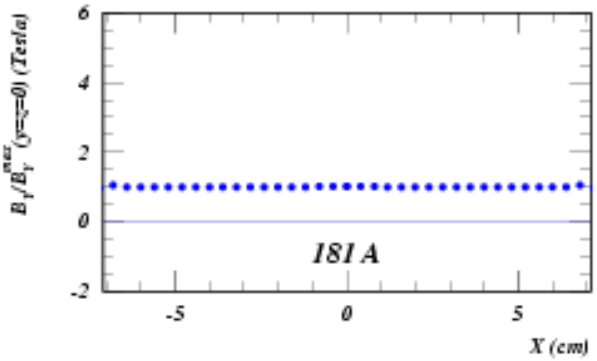
Z=20 cm



Z=20 cm



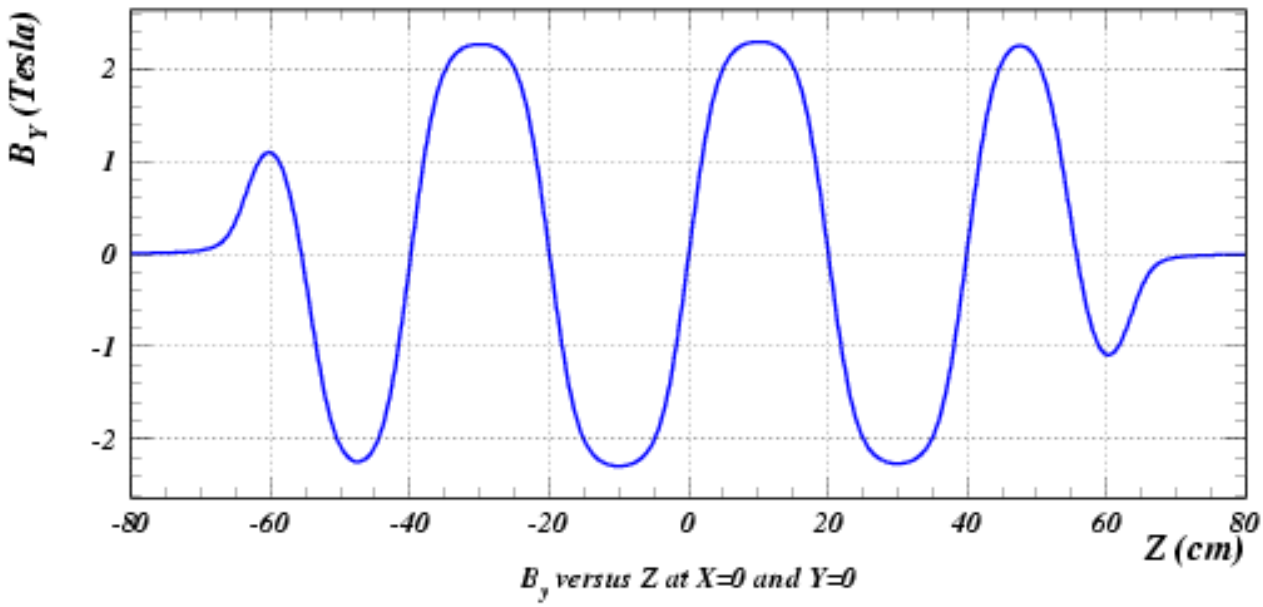
Z=20.2 cm



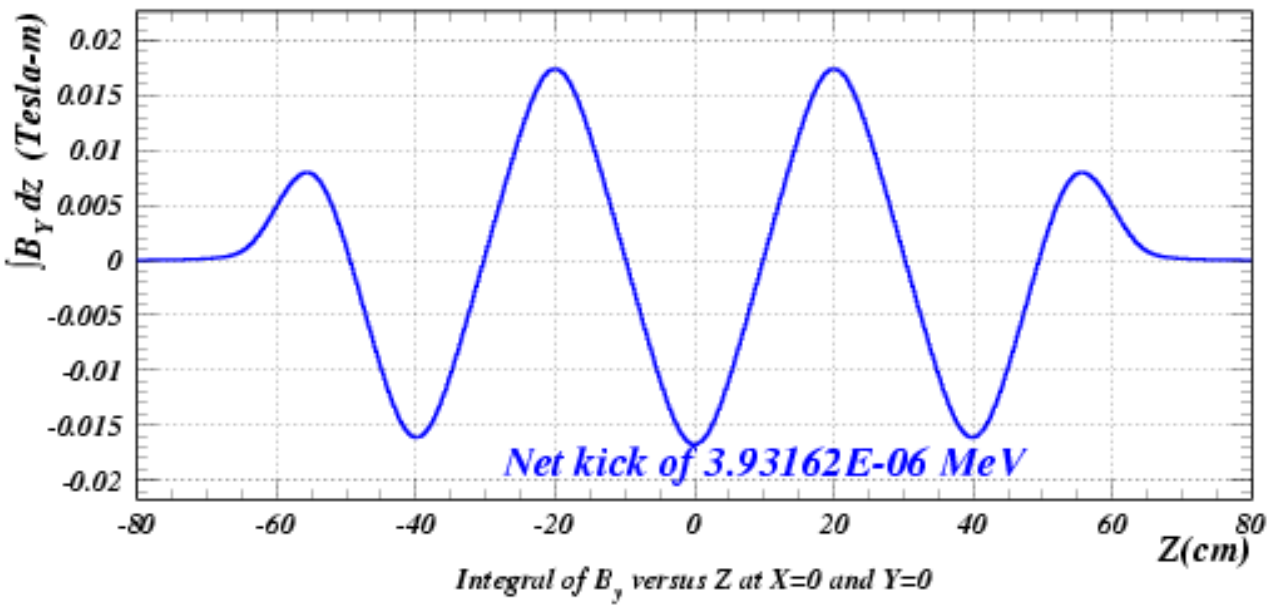
Z=20.2 cm

02/07/08 16.39

Field Map w8-20_10_181-- End Coil 74 A



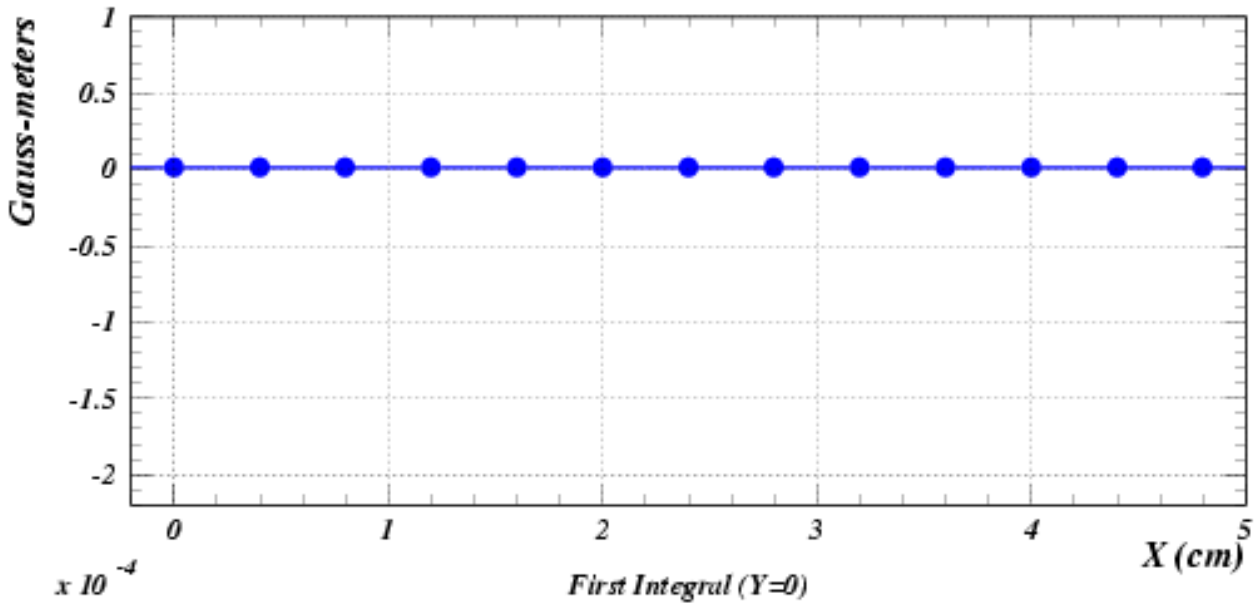
B_y versus Z at X=0 and Y=0

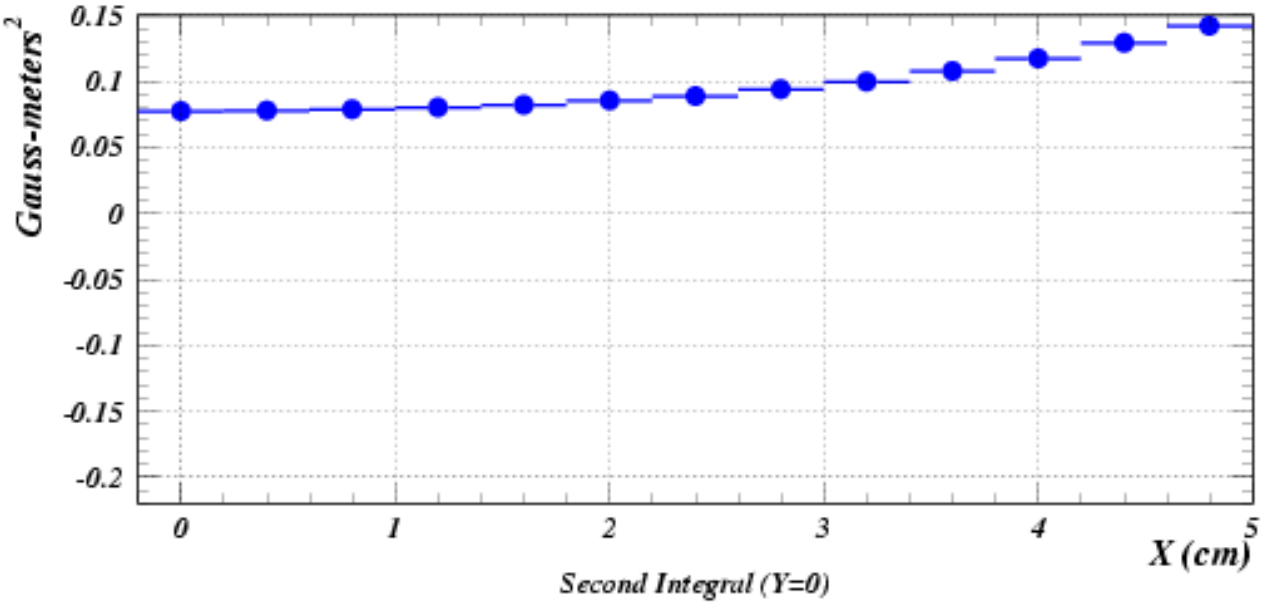


Integral of B_y versus Z at X=0 and Y=0

02/07/08 16.50

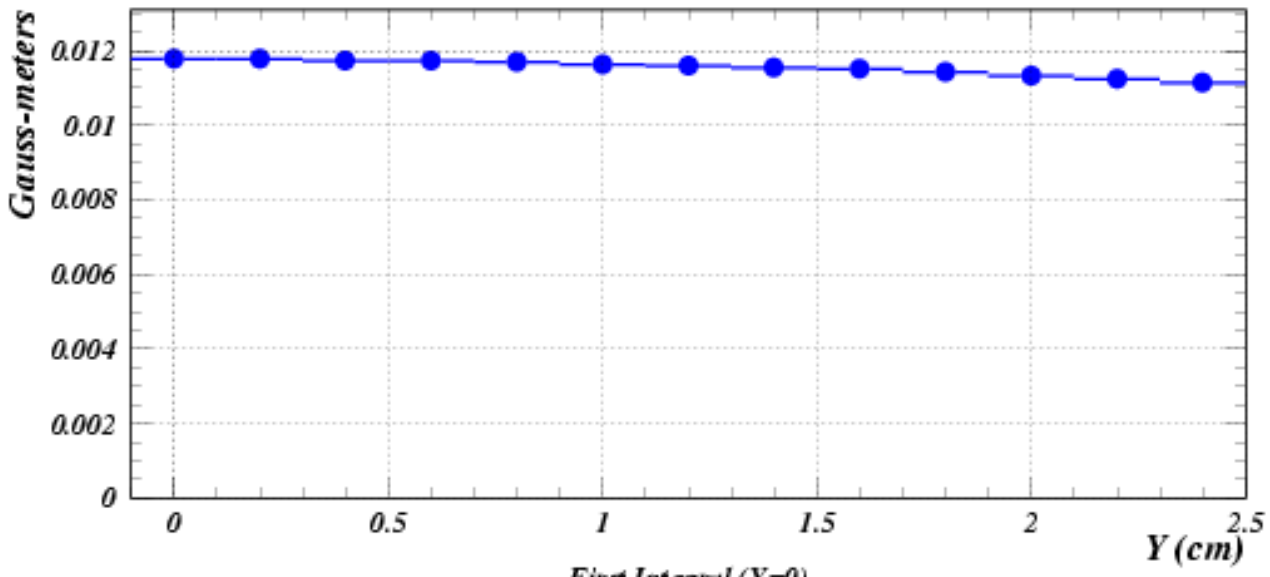
Field Map w8-20_10_181-- End Coil 74 A



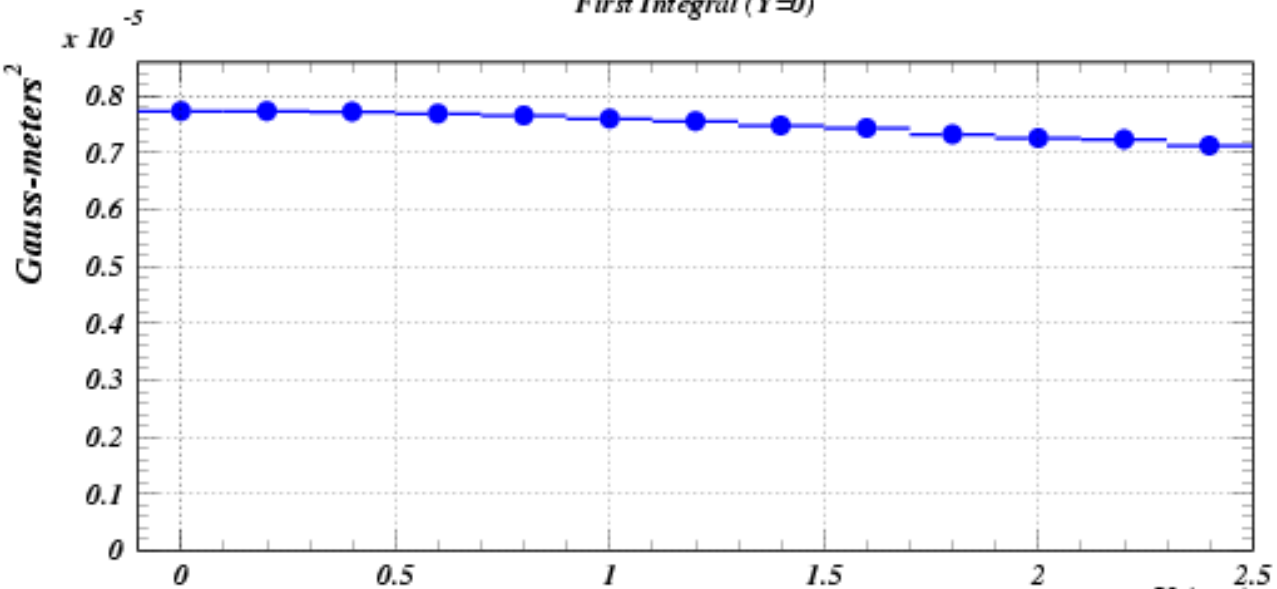


02/07/08 16.50

Field Map w8-20_10_181-- End Coil 74 A



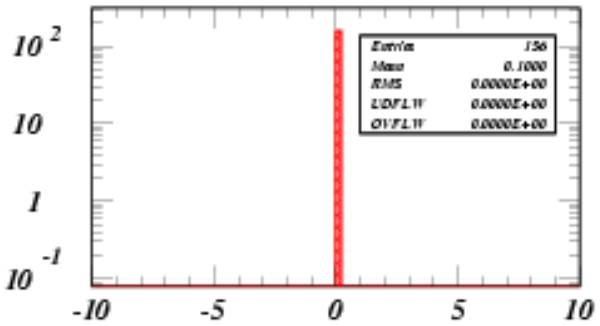
First Integral (Y=0)



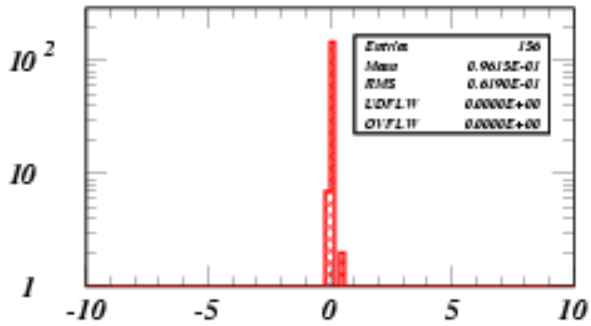
Second Integral (Y=0)

Test Boundary Conditions for w8-20_10_181

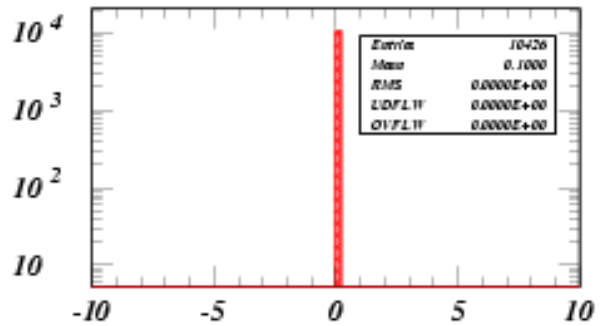
02/07/08 16.50



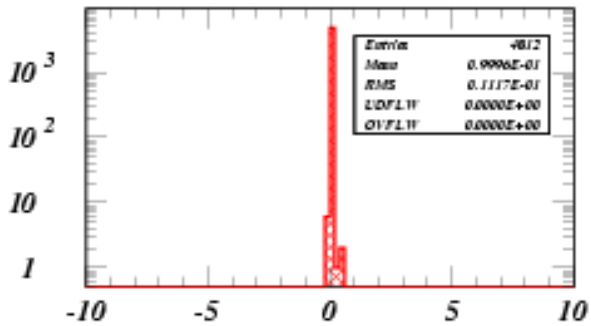
B_X on X-Y Plane (gauss)



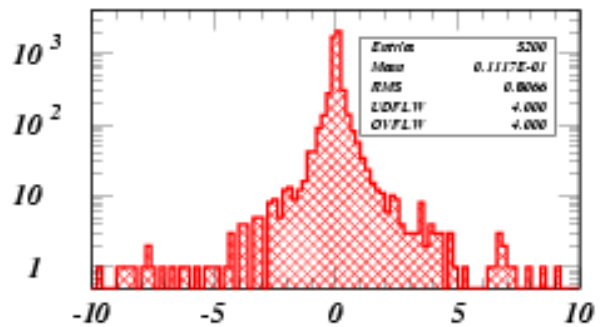
B_Y on X-Y Plane (gauss)



B_X on X-Z Plane (gauss)



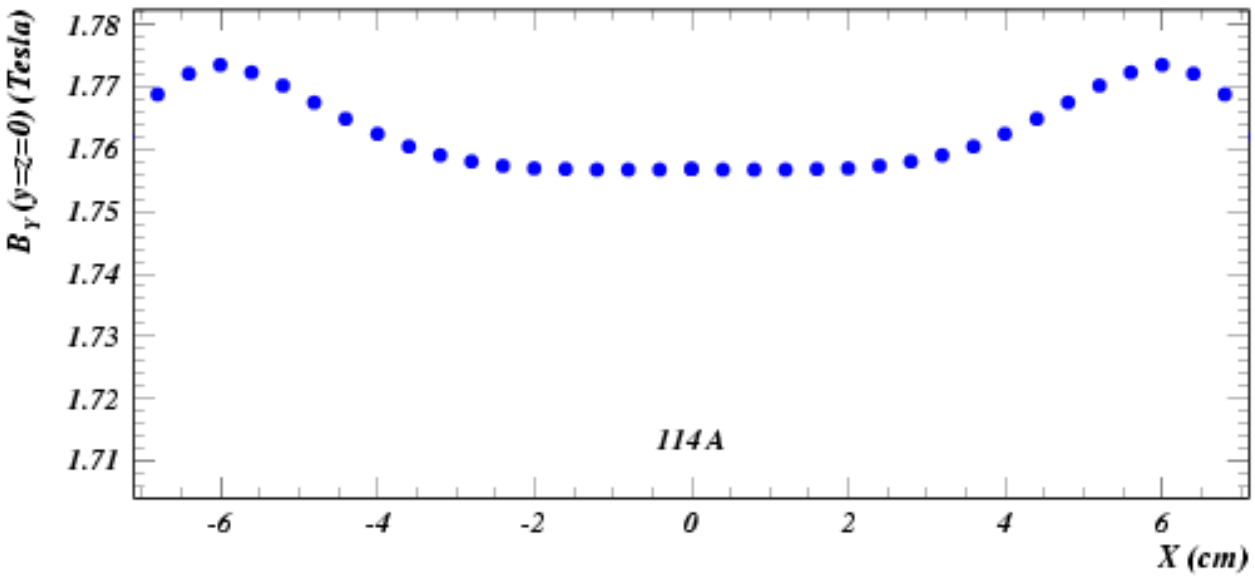
B_Z on X-Z Plane (gauss)



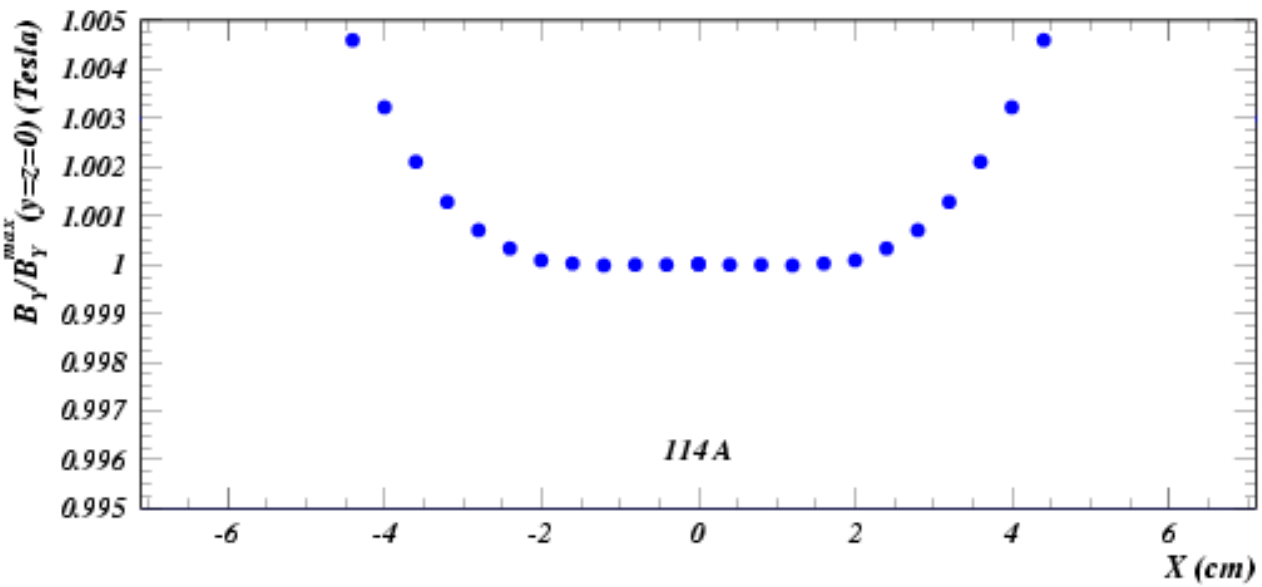
B_X on Y-Z Plane (gauss)

02/07/08 16.20

8-Pole 40 cm Wiggler: Central Pole



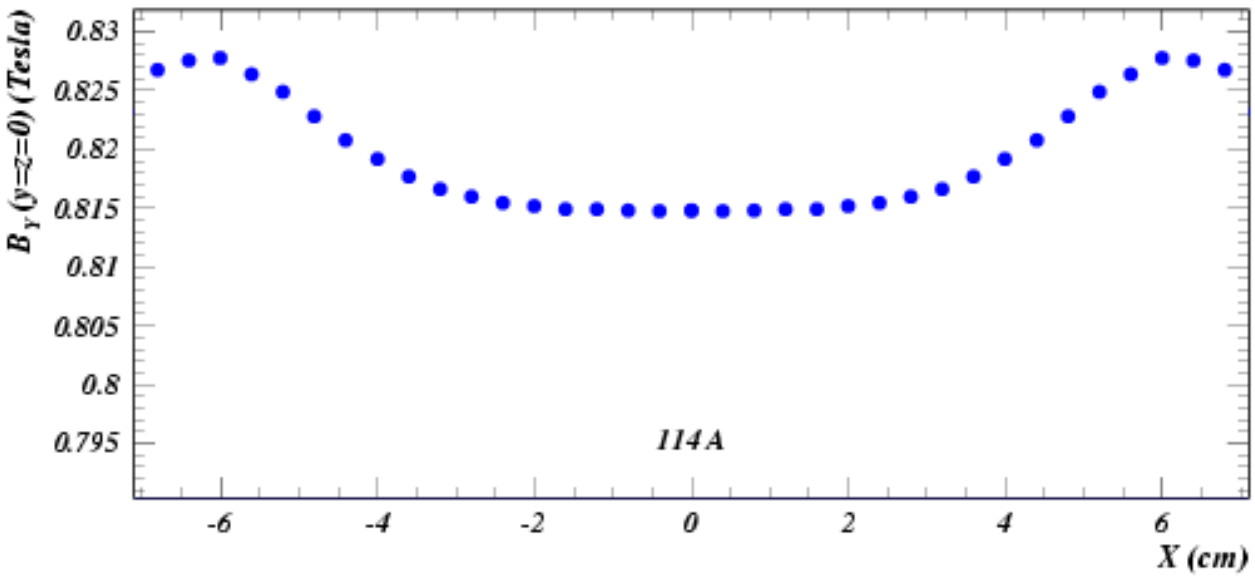
Z=10 cm



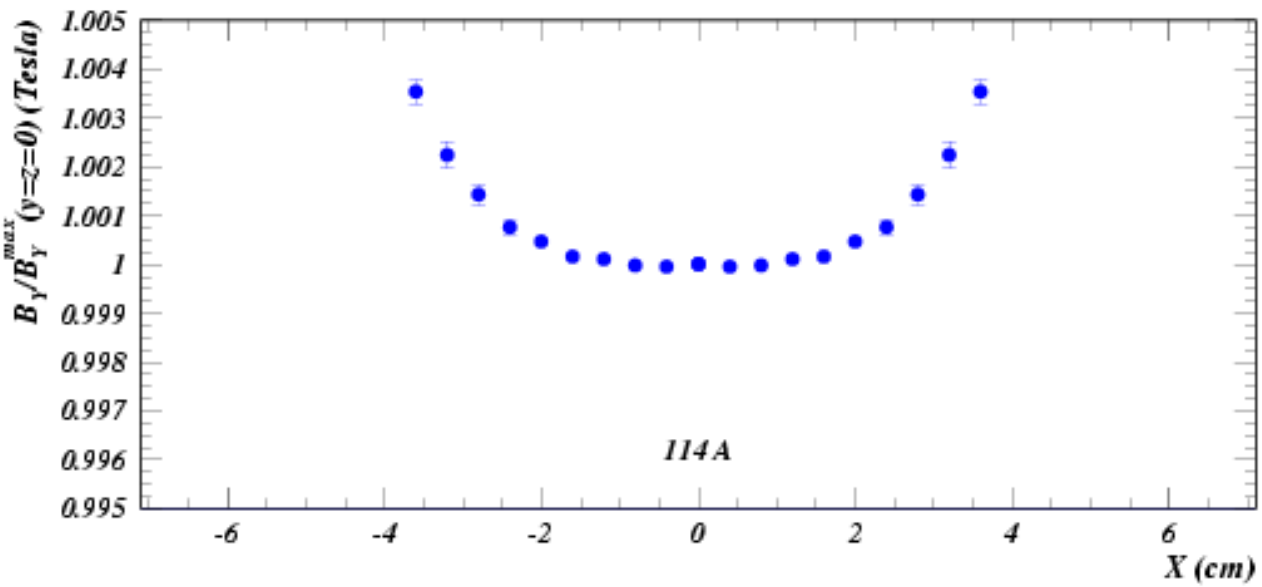
Z=10 cm

02/07/08 16.20

8-Pole 40 cm Wiggler: End Pole



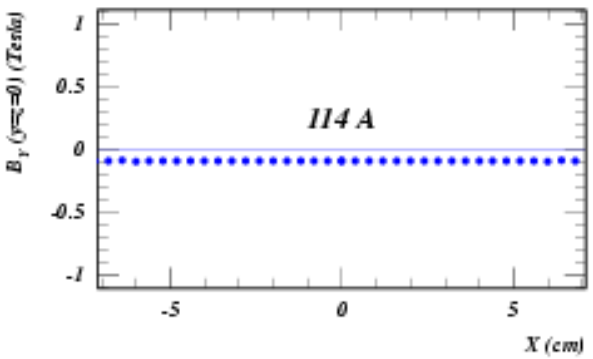
Z=60 cm



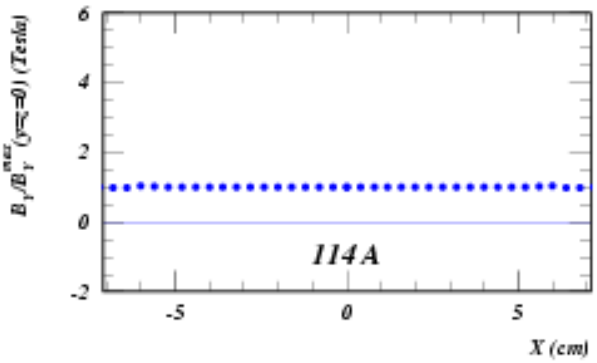
Z=60 cm

02/07/08 16.20

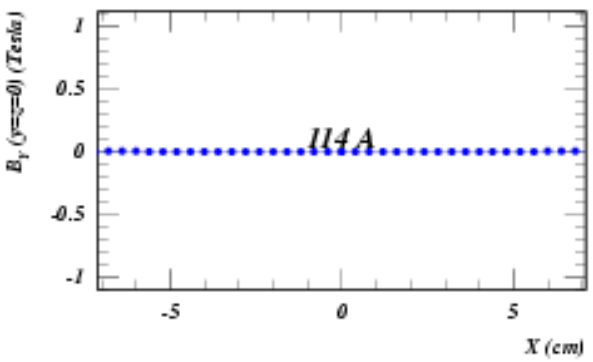
8-Pole 40 cm Wiggler: Between Central and Neighbor Pole



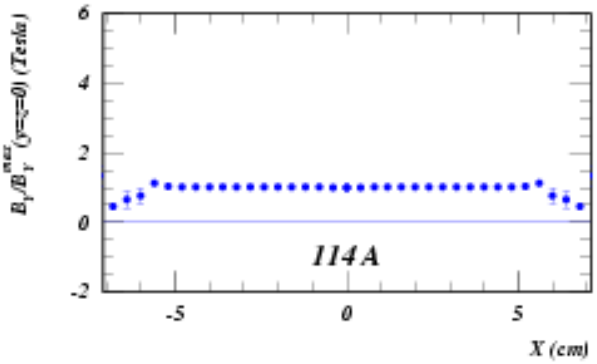
Z=19.8 cm



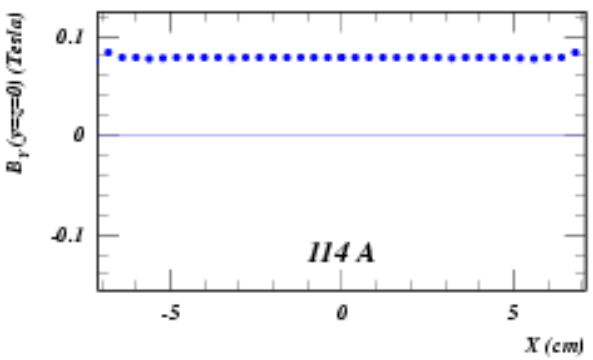
Z=19.8 cm



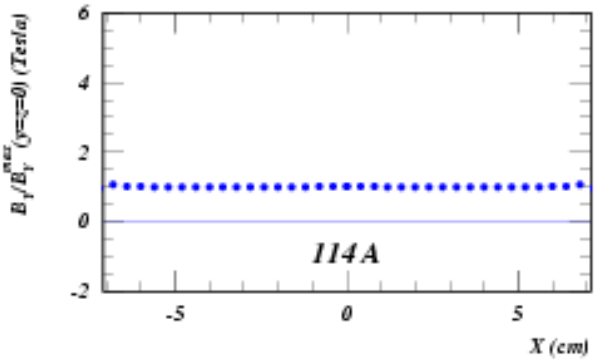
Z=20 cm



Z=20 cm



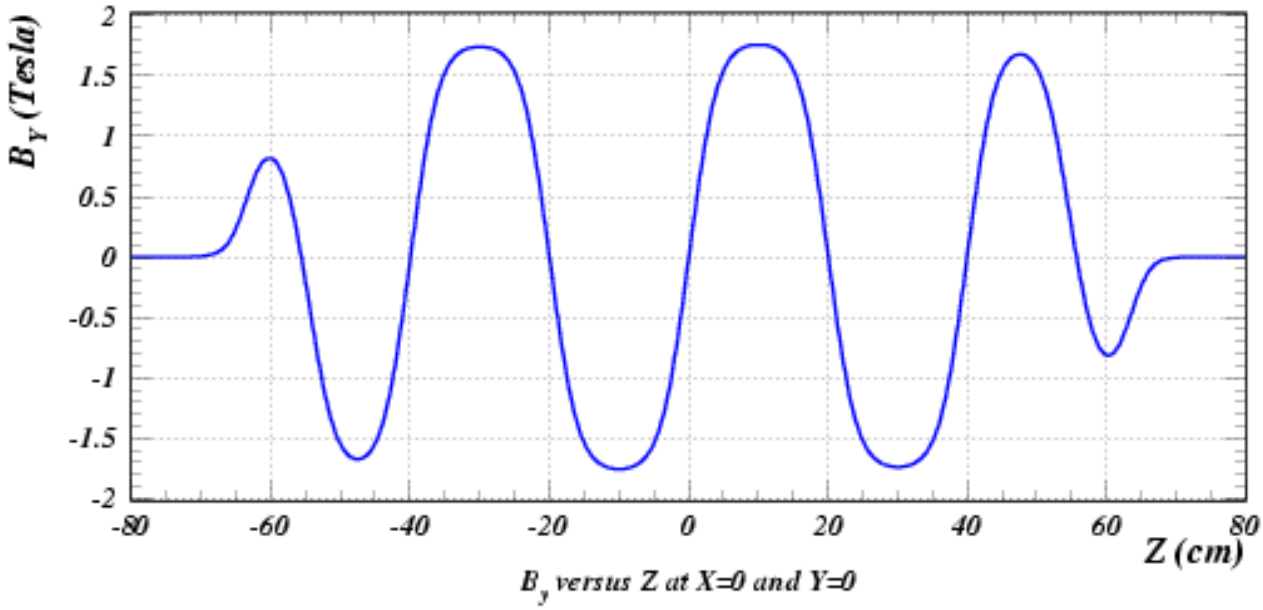
Z=20.2 cm



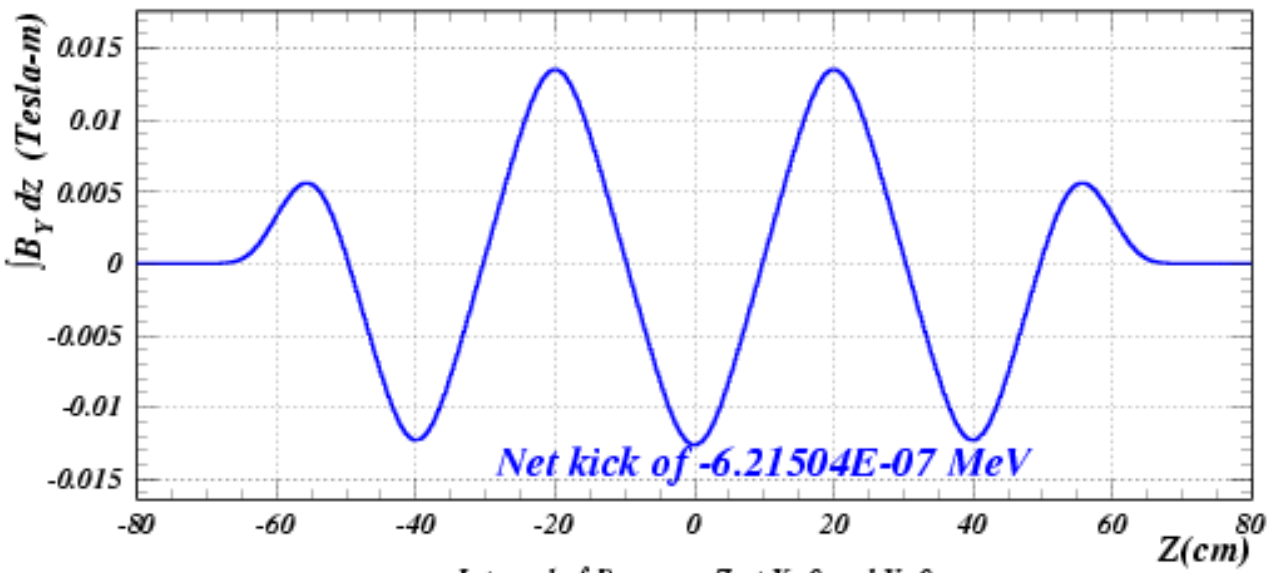
Z=20.2 cm

02/07/08 16.20

Field Map w8-20_12_114-- End Coil 51 A



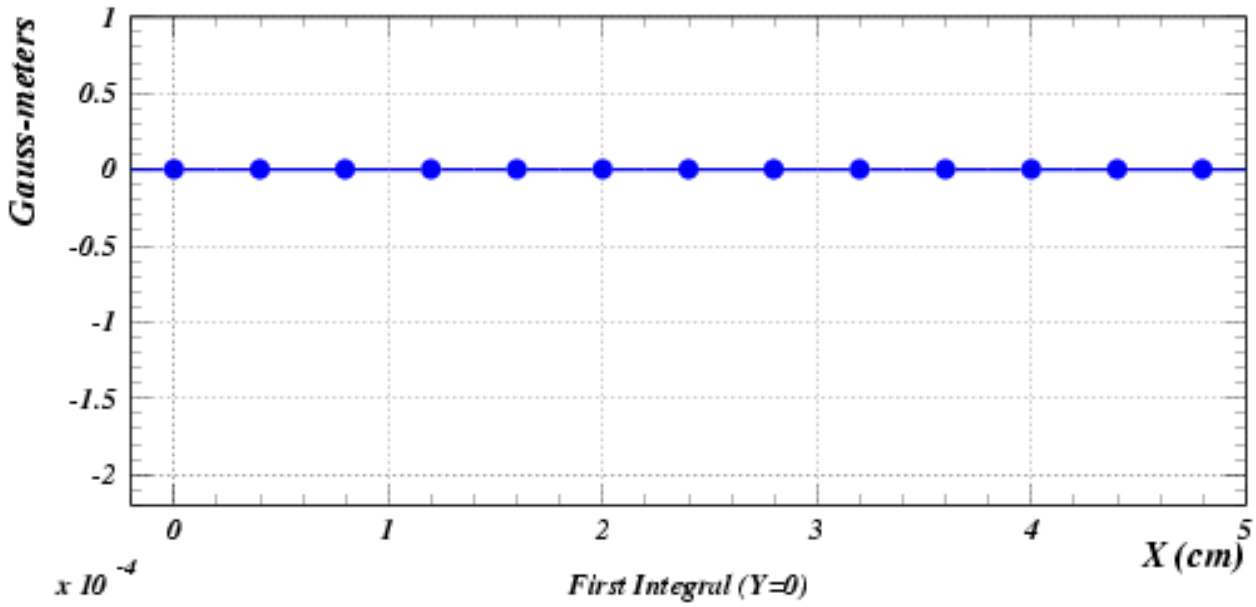
B_y versus Z at X=0 and Y=0

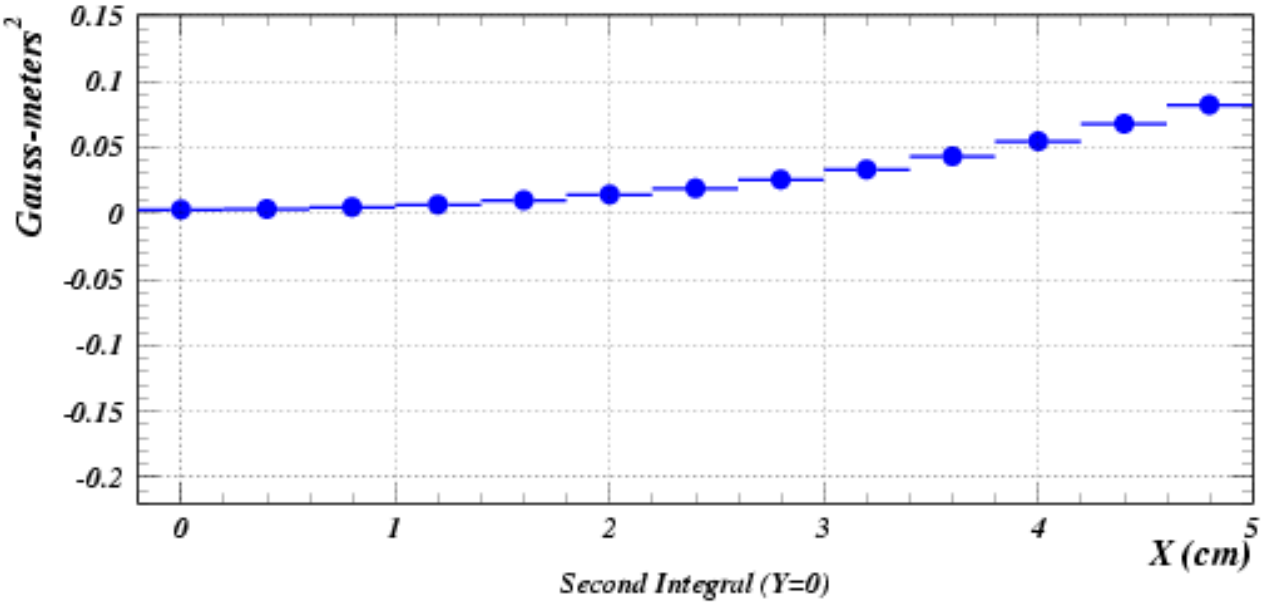


Integral of B_y versus Z at X=0 and Y=0

02/07/08 16.30

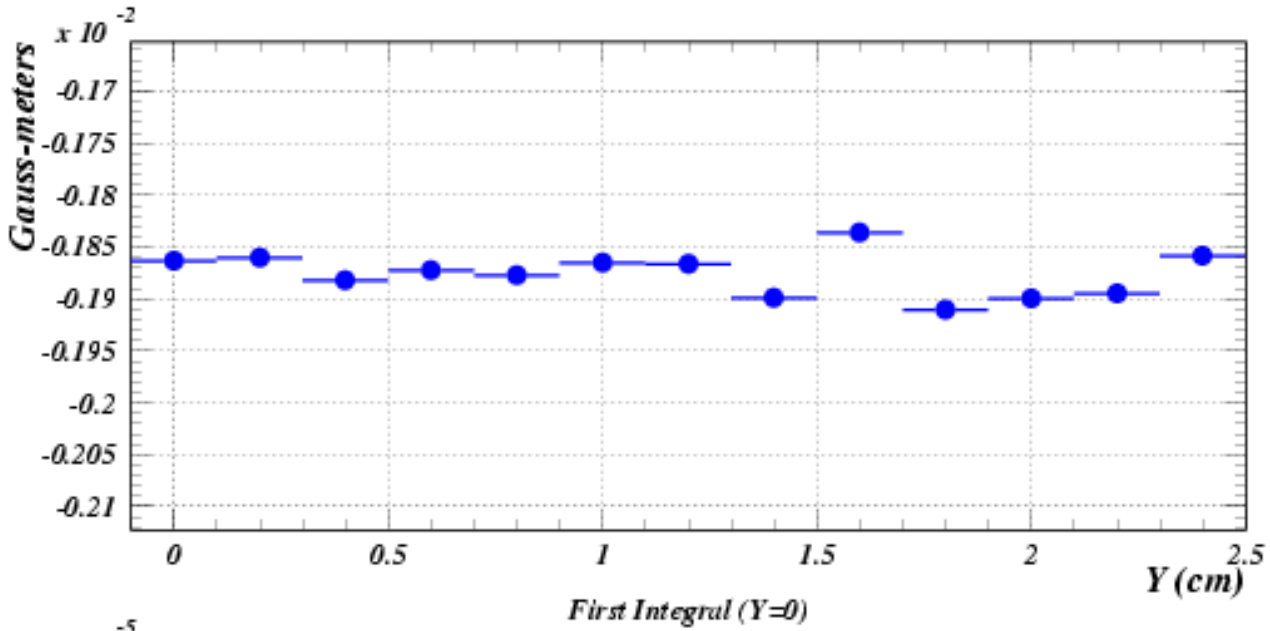
Field Map w8-20_12_114-- End Coil 51 A



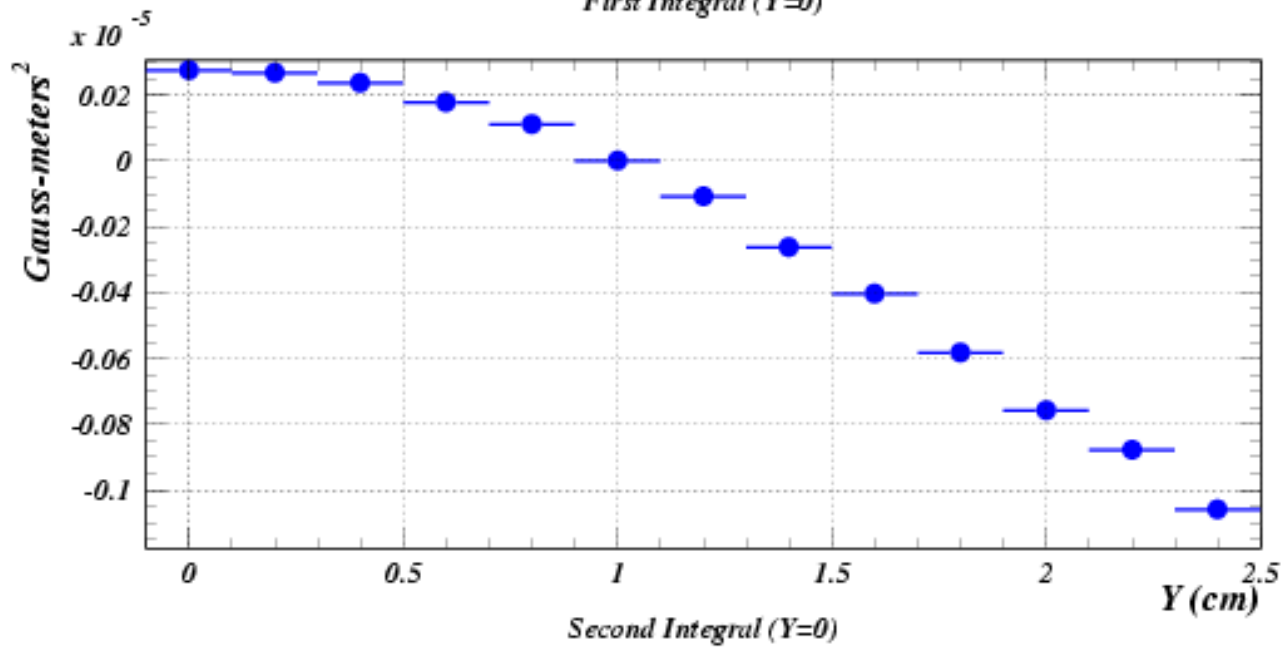


02/07/08 16.30

Field Map w8-20_12_114-- End Coil 51 A



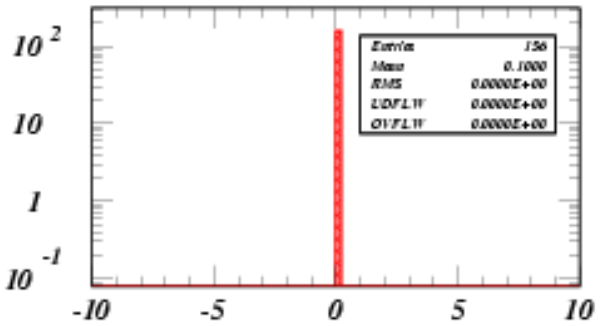
First Integral (Y=0)



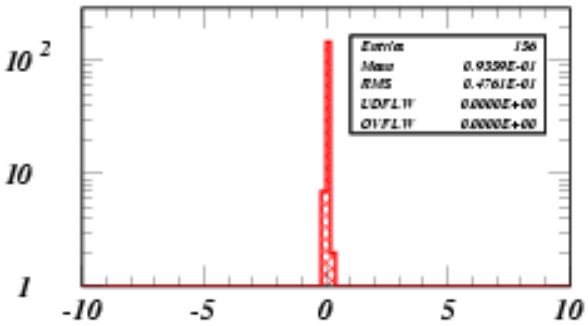
Second Integral (Y=0)

Test Boundary Conditions for w8-20_12_114

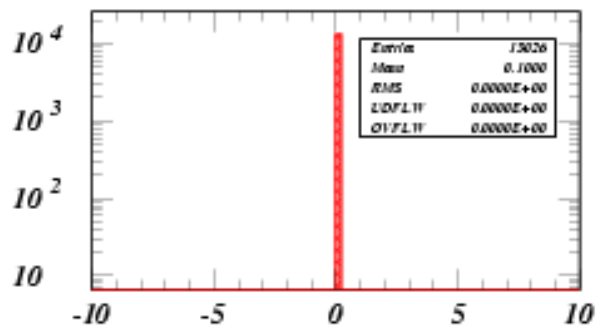
02/07/08 16.30



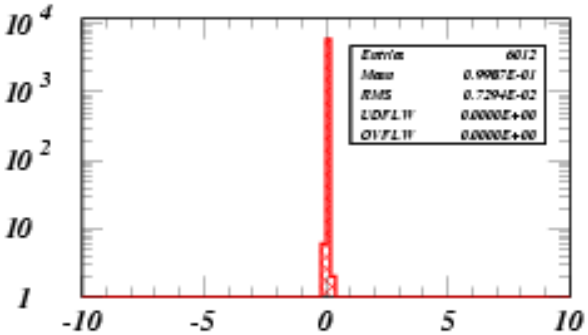
B_X on X-Y Plane (gauss)



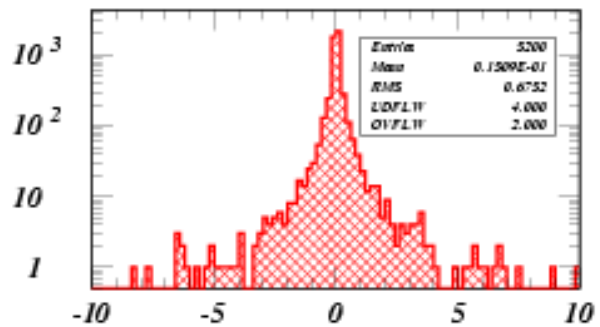
B_Y on X-Y Plane (gauss)



B_X on X-Z Plane (gauss)



B_Z on X-Z Plane (gauss)



B_X on Y-Z Plane (gauss)