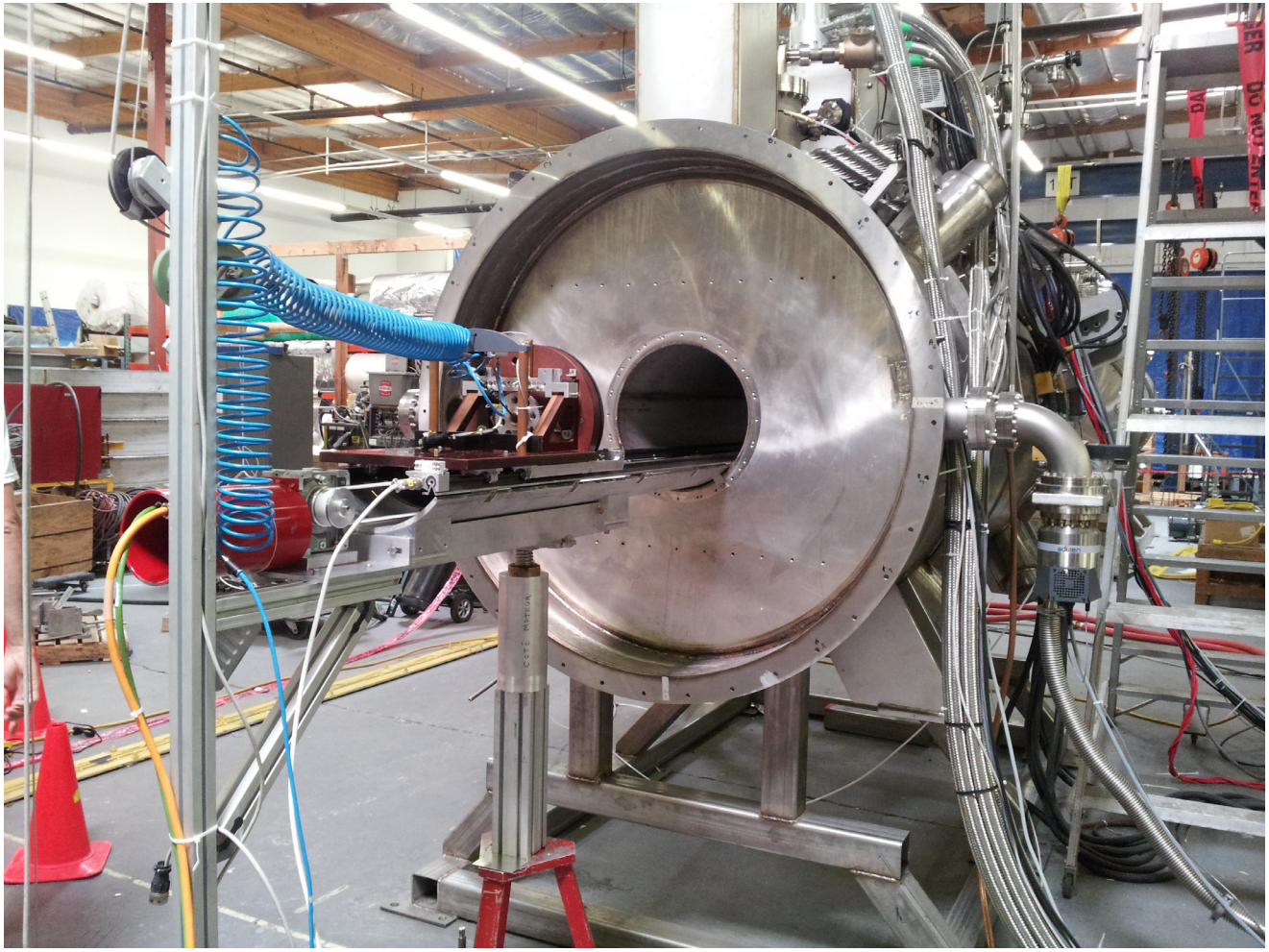
SS2 Field Measurements



M.A Leonova MC36 17 June 2013

SS2 Field Measurements

Topics

- Survey
- Mapping Device Operation
- Overview of Field Measurement Studies
  - Completed Studies
  - Plan for this week

SS2 Field Measurements

➢ Survey

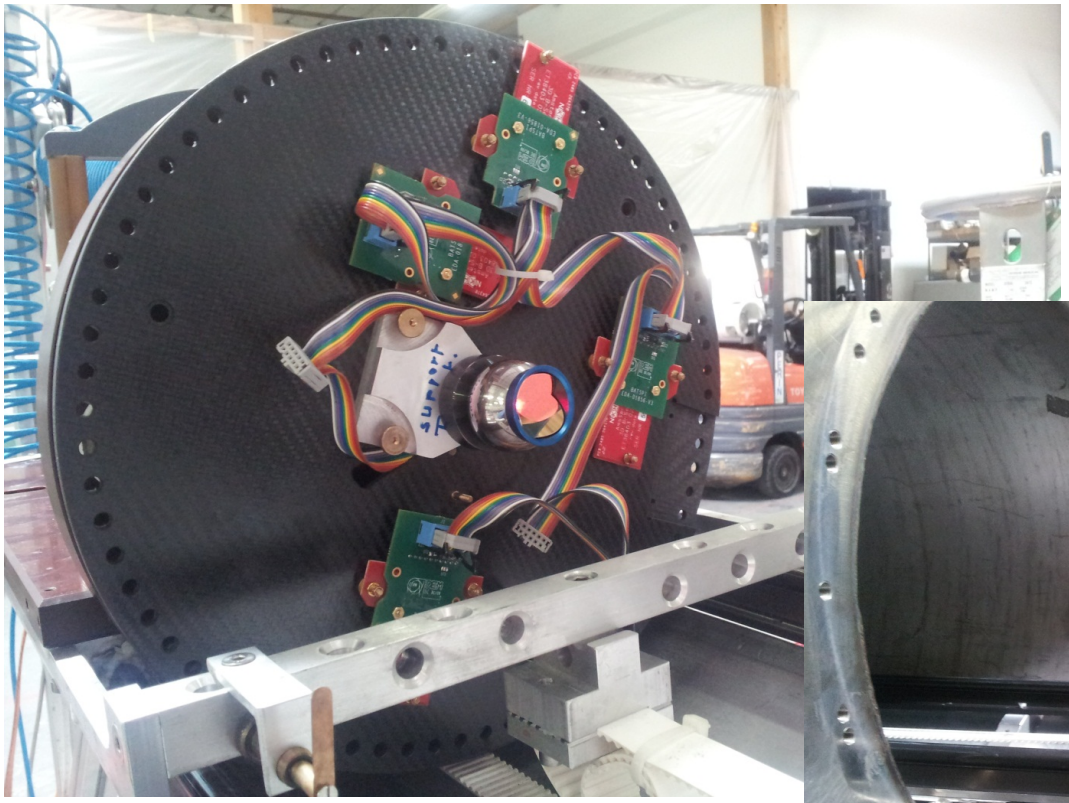
5 June – without the shield plate
12 June – with the shield plate

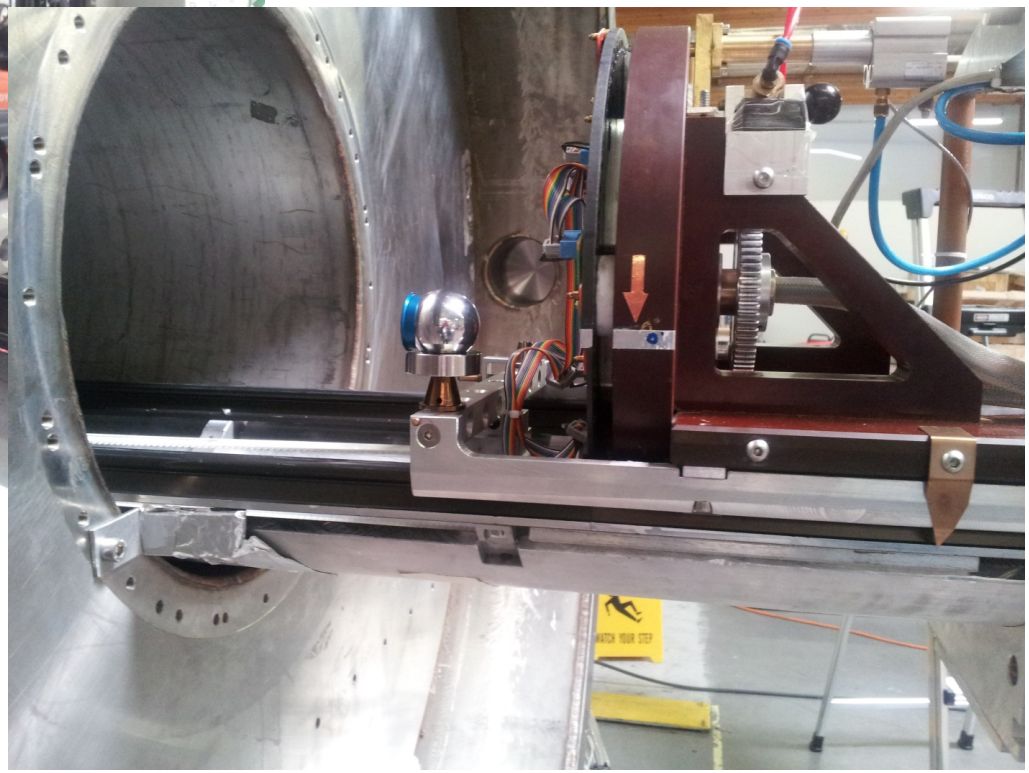
- Surveyed of fiducial markers:
  - done from 4 stations to get the best fit
  - establish a coordinate system with X axis along the cold mass axis (beam axis)
    Z axis vertical
    Y axis completes (x,y,z) right coordinate system
    origin at the DS end of cold mass
- Mapping Device measurements:
  - mapper axis as the disk moved through the magnet
  - both rails to get disk rotation as it moves through the magnet
- Calibration of longitudinal positions vs. encoder of the Mapping Device
  - 50 cm steps
  - 2 cm steps

SS2 Field Measurements

All suports are not welded to the magn. Note the clamp being

SS2 Field Measurements





SS2 Field Measurements

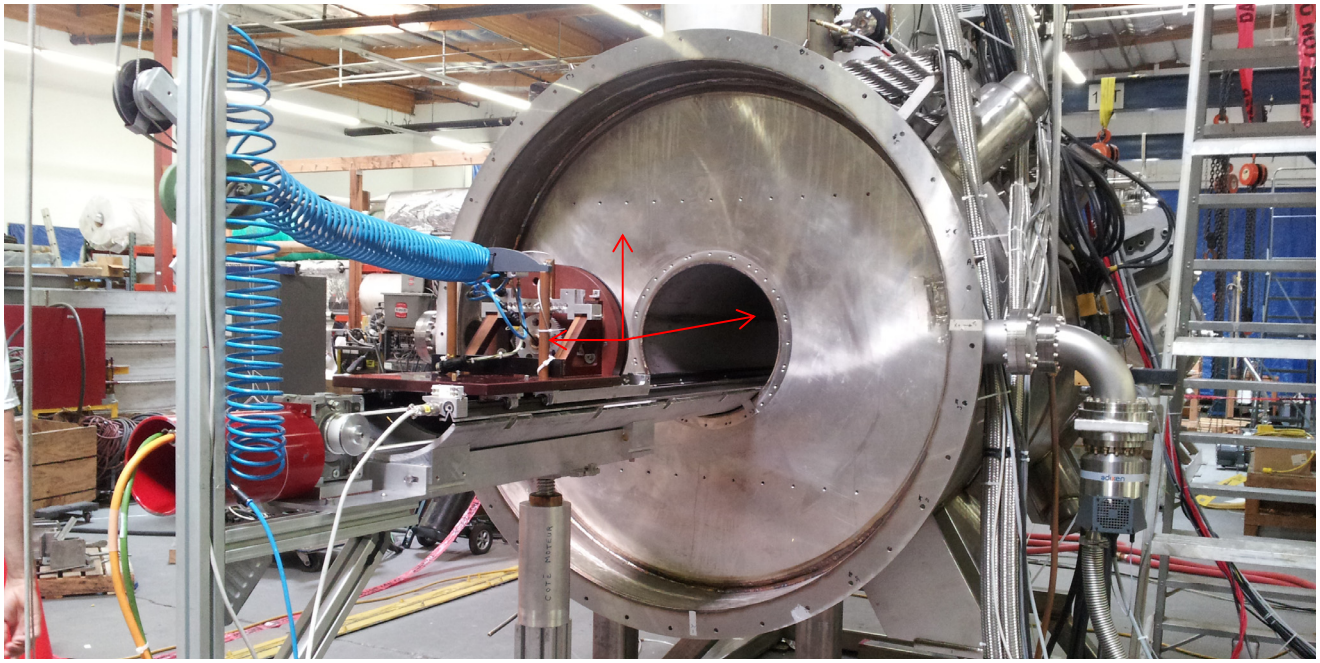
- Surveyed of fiducial markers:
  - initial measurements indicated fiducials shifted by few mm, especially on the US end of the magnet, probably due to welding done after fiducialization, magnet being under vacuum, and cold.
  - measurements after shield plate installation agreed to ~ 10 μm

- Mapping Device measurements:
  - maximum deviation of mapper axis from straight line fit was ~0.5 mm, with rms deviation ~0.3 mm
  - for mapping next magnet Pierre-Ange will make shims for aligning the device
  - measurement of the rails indicated they moved ~ together

- Calibration of longitudinal positions vs. encoder of the Mapping Device
  - indicated encoder calibration shift of 0.8 mm over 5 m

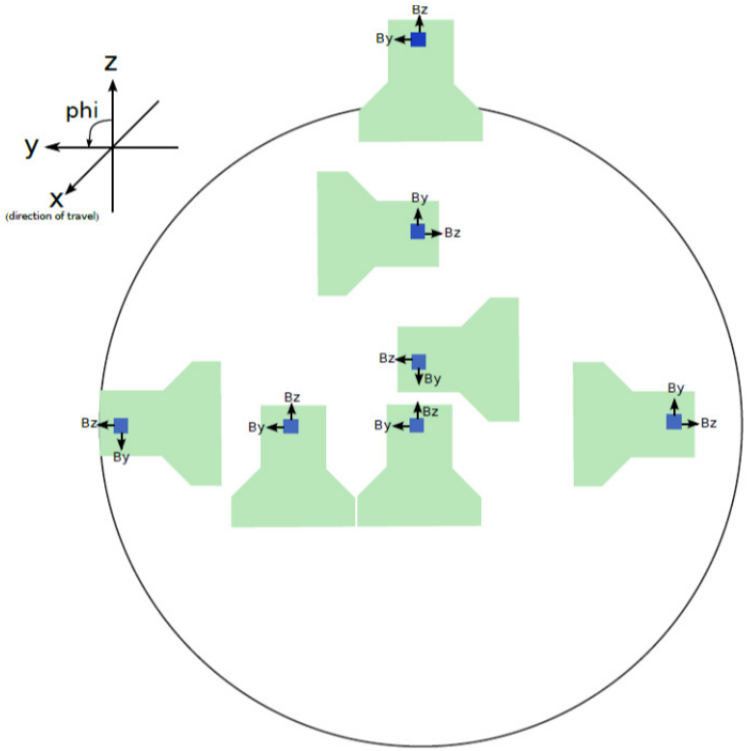
SS2 Field Measurements

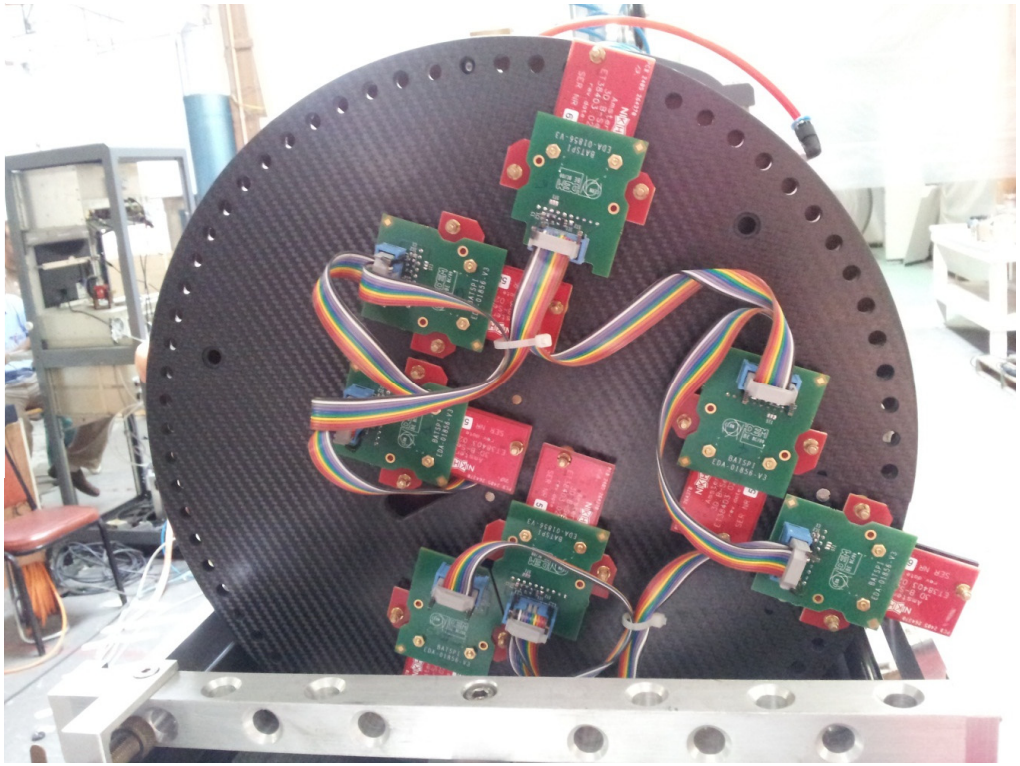
- Mapping Device



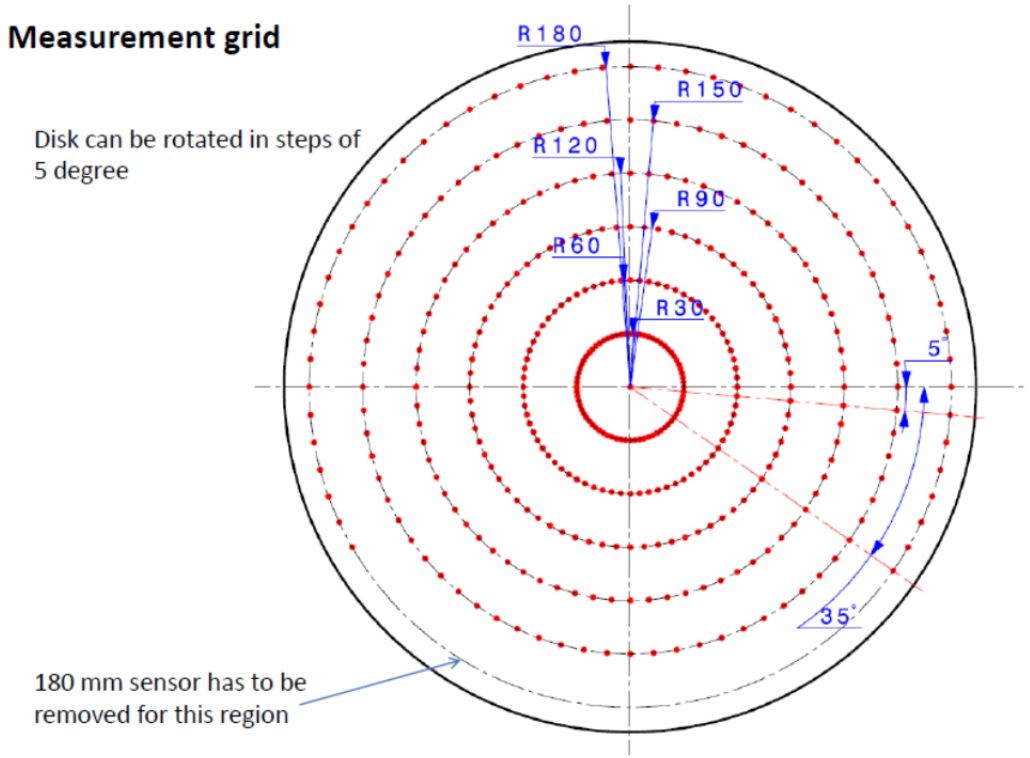
X axis along the magnet on direction opposite to beam direction
Z axis vertical
Y axis completes (x,y,z) right coordinate system

SS2 Field Measurements





SS2 Field Measurements



Two main modes of mapping:

- "fast" map:

5-cm longitudinal steps
4 disk rotation positions:
0° & 180° and 40° & 220°

- "full" map:

2-cm longitudinal steps
20° disk rotation steps

SS2 Field Measurements

- Overview of Field Measurement Studies
  - Completed Studies

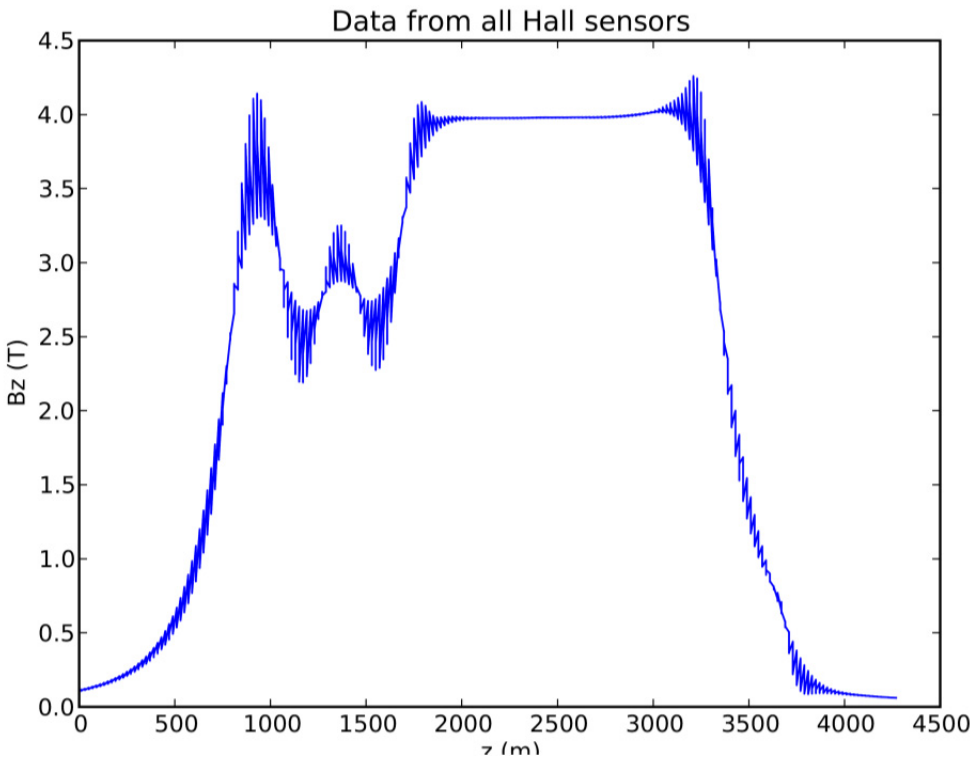
no shield plate:	"fast" maps at	80% current (in Solenoid Mode for 240 MeV line settings)
		95% current
		80% current
		50% current
with shield plate:	"fast" maps at	50% current (in Solenoid Mode for 240 MeV line settings)
		80% current
		80% current after the magnet was at 98%
		0 current
		10 A in coils
		0 current
	"full" maps at	0 current
		100% current (in Solenoid Mode for 240 MeV line settings)
		0 current
		100% current (in Flip Mode for 240 MeV line settings)
		0 current

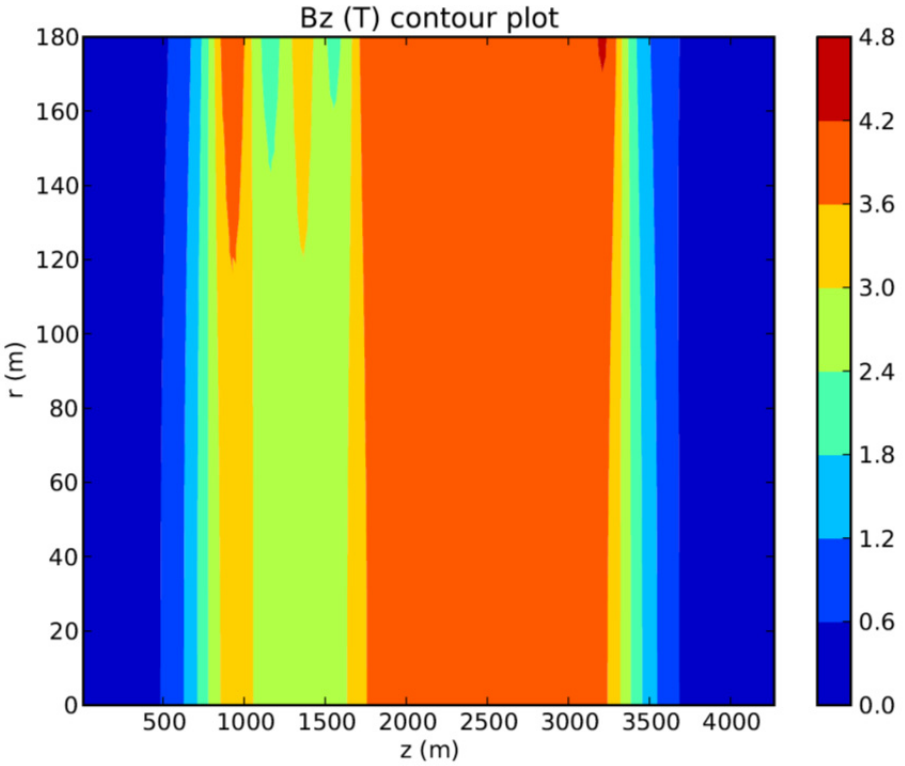
  - Plan for this week

no shield plate:	"full" maps at	80% current (in Solenoid Mode for 240 MeV line settings)
		80% current (in Flip Mode for 240 MeV line settings)
		0 current
	"fast" maps of individual coils at ~ 30 A	

SS2 Field Measurements

Full Maps at 100% current with shield plate: Solenoid mode

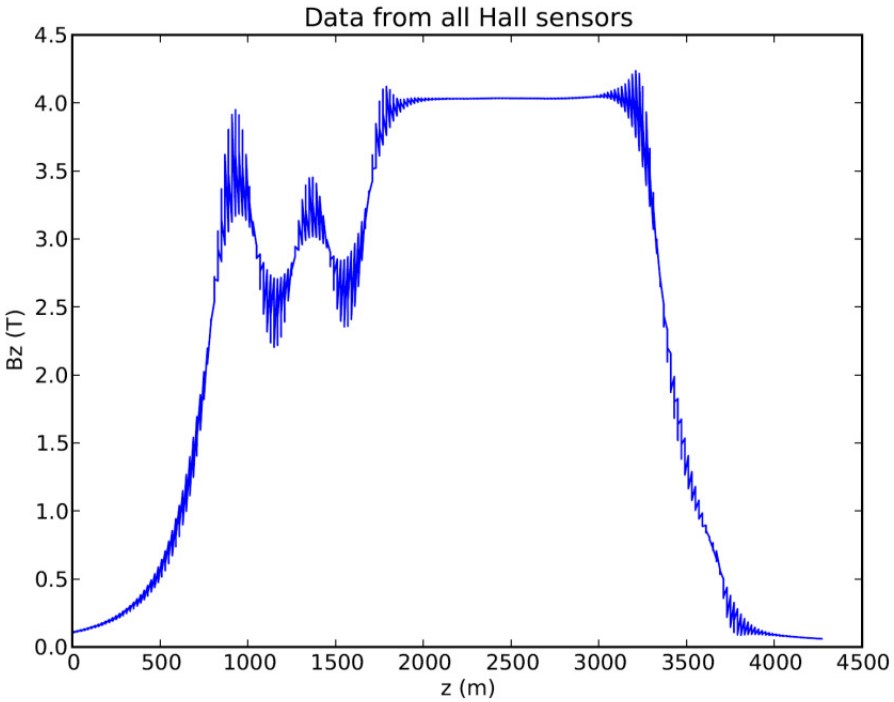


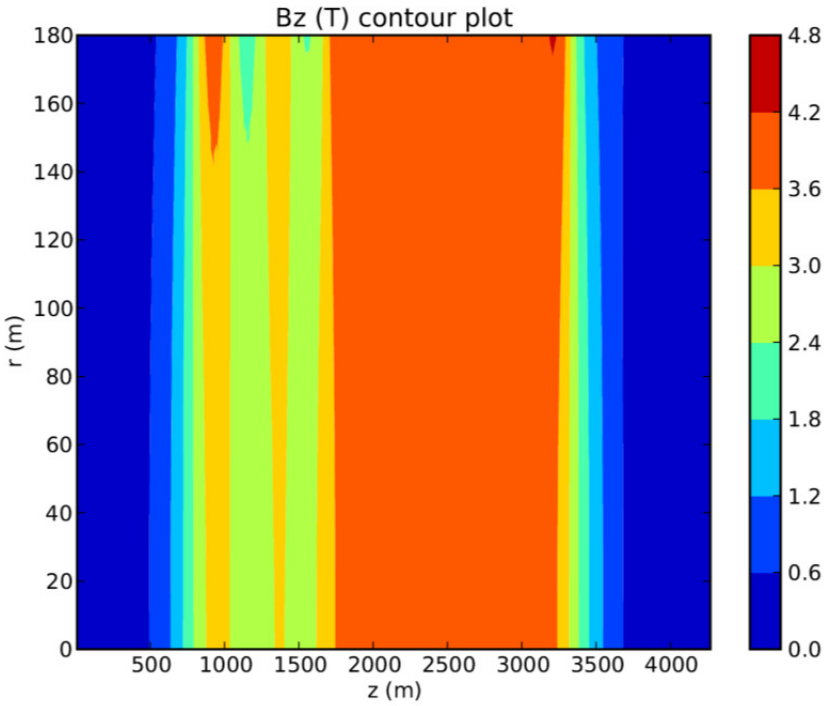


M.A Leonova MC36 17 June 2013

SS2 Field Measurements

Full Maps at 100% current with shield plate: Flip mode

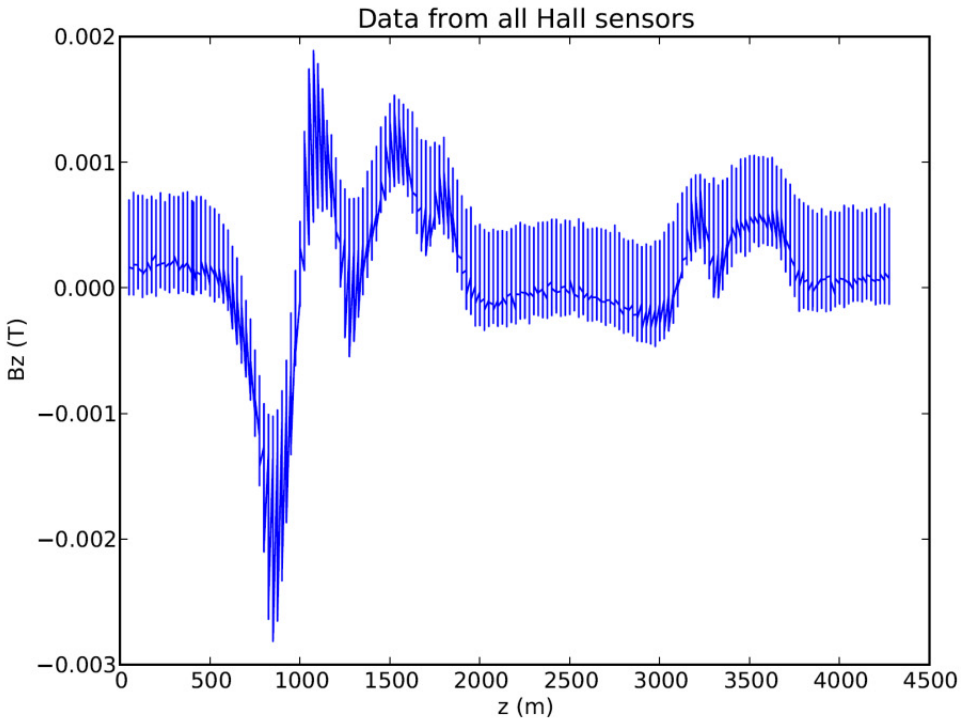




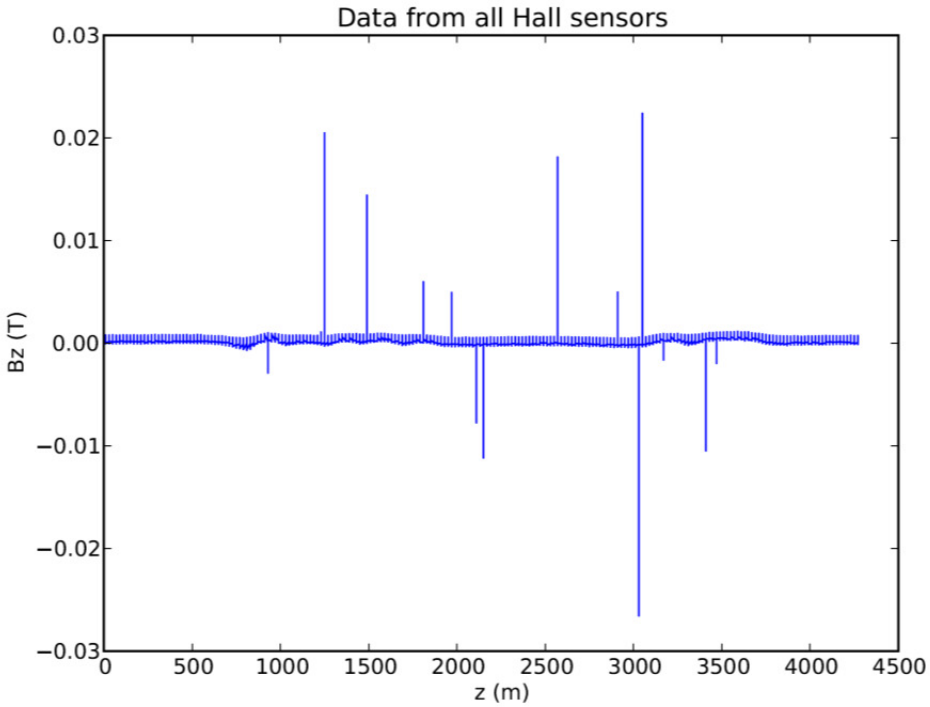
SS2 Field Measurements

Maps at 0 current with shield plate:

10 June

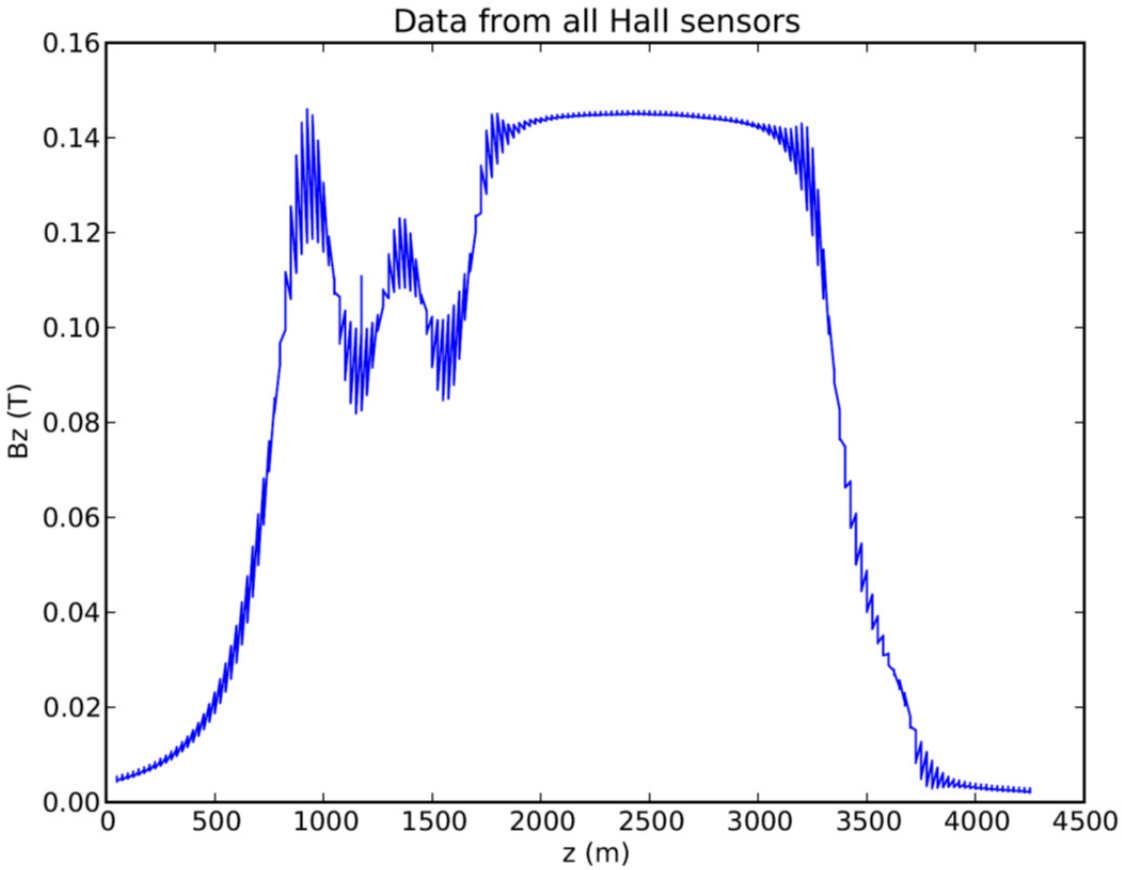


14 June



SS2 Field Measurements

Map at 10A in M1, M2, C coils and 8A in E1, E2 coils with shield plate



M.A Leonova MC36 17 June 2013