B Field Maps and B-dot Calibration

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MINOS Collaboration Meeting

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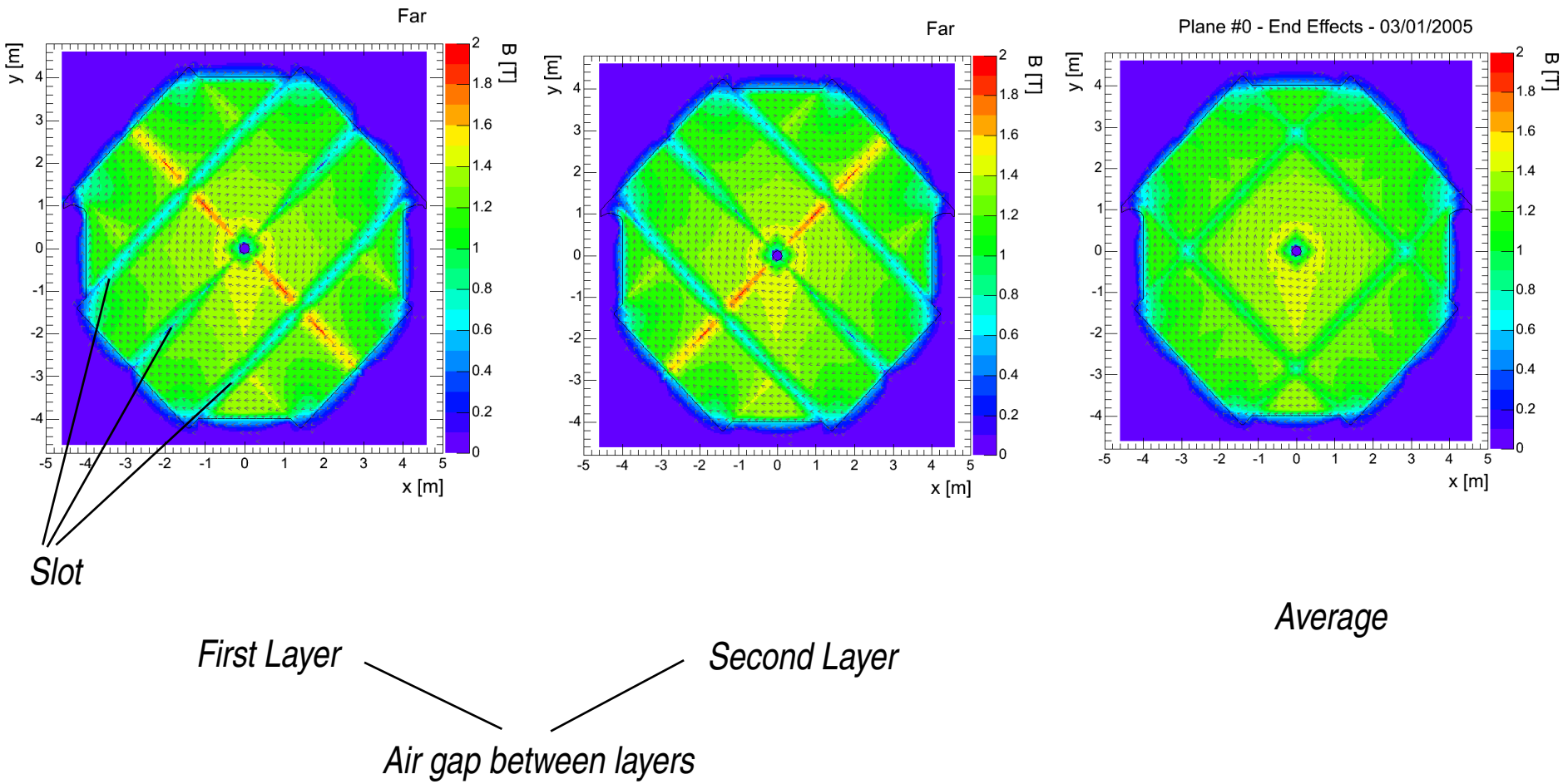
Outline

- B-Field Maps:
  - Status of field maps.
  - BH Variations per Plane.
  - End Effect Model.
- B-dot Calibration and Measurements.

B-Field Maps

- FEA is run by Bob Wands who is working part time.
- Two maps are produced for each plane: one for each layer.

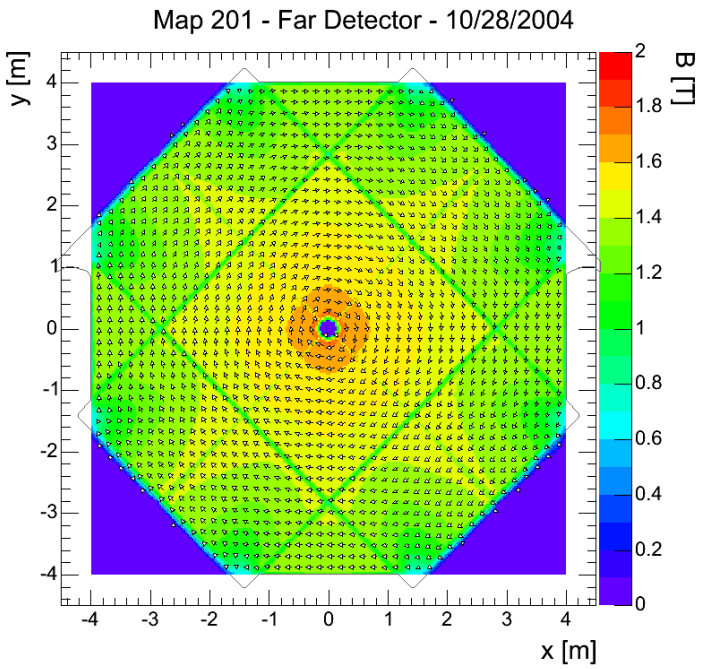


- The map used in reconstruction is the averaged field map.

B-Field Maps (II)

B-Field Map 201

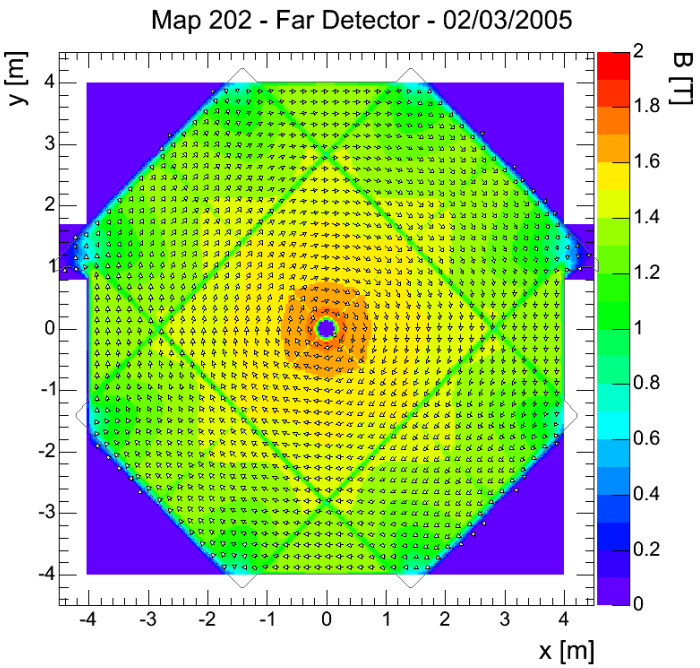
- Constan slot width of 0.2 mm.
- Air gap between layers has a width of 0.2mm
- Current at 15 kA-turns.



B-Field Maps (II)

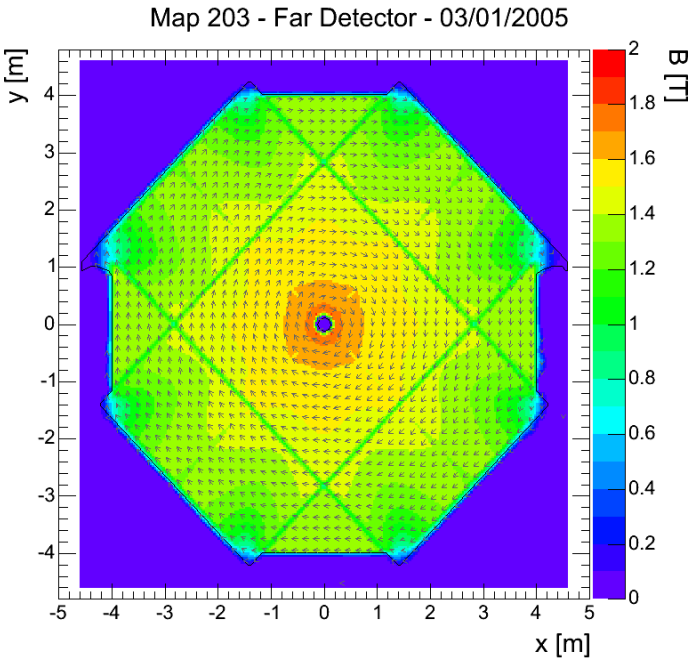
B-Field Map 202 (last map)

- Variable slot width: from 6mm at 4m to 0.25 mm near the center of the plane accordingly to $6/64*r^3$
- Air gap between layers has a width of 0.5mm
- Map of the ears included.
- Current at 15 kA-turns.



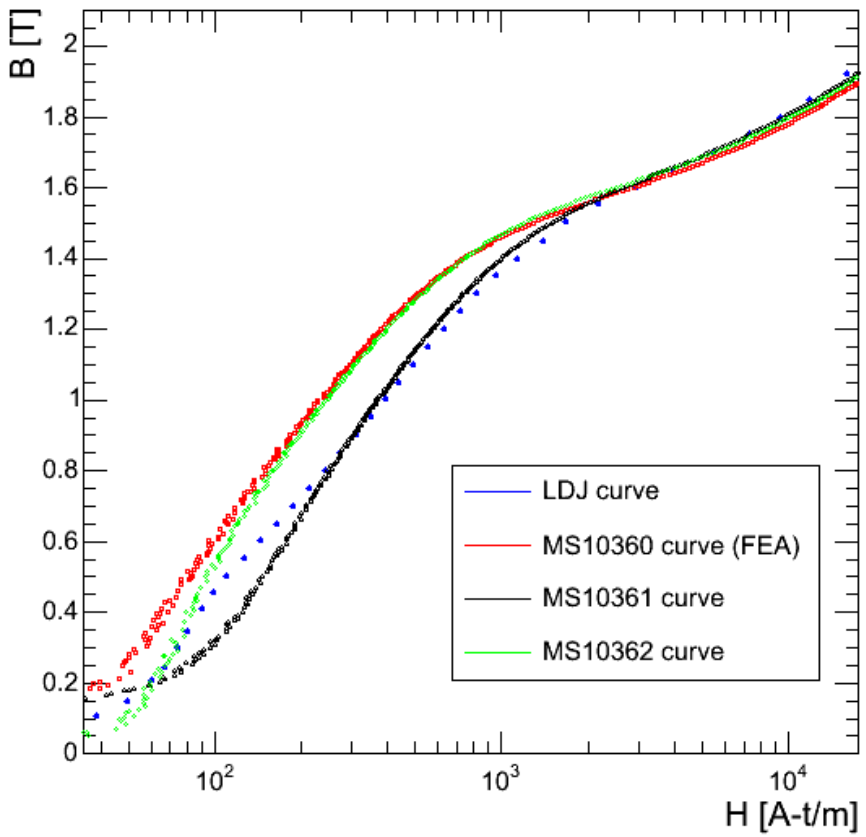
B-Field Map 203

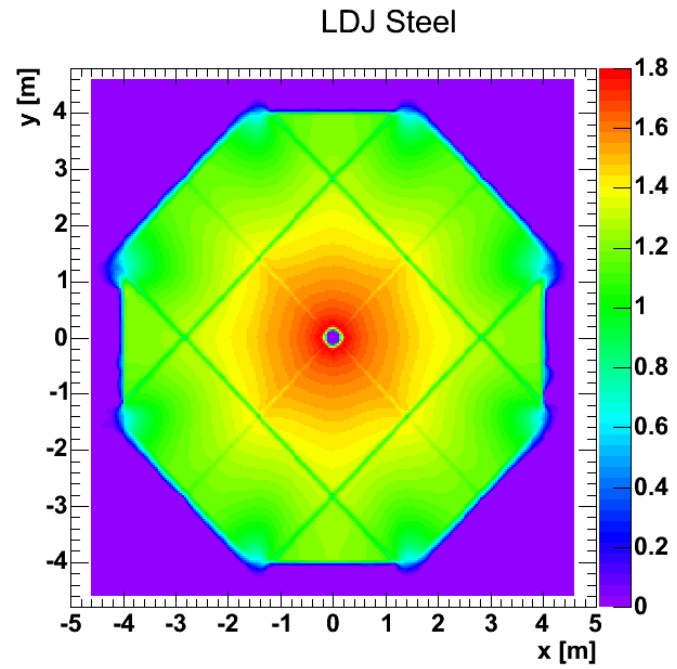
- Map extended to +- 4.6m in x axis and +- 4.2 in y axis.
- Map in MINOS coordinates.
- Current at 15.2 kA-turns (80 A x 190 turns).
- |B| module increased by < 0.5%.

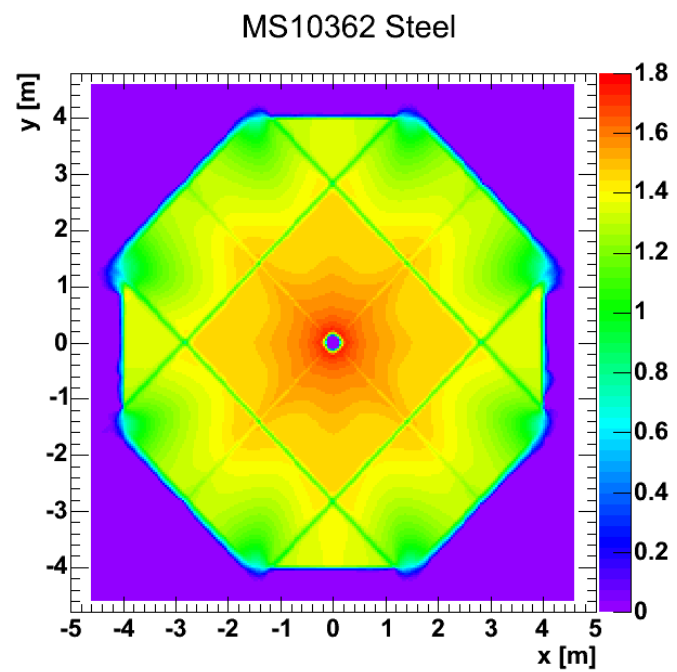


BH Variations per Plane

- The B-field maps use steel MS-10360 (MINOS steel).







- Maximum difference of 8% with LDJ steel compared to MINOS steel.

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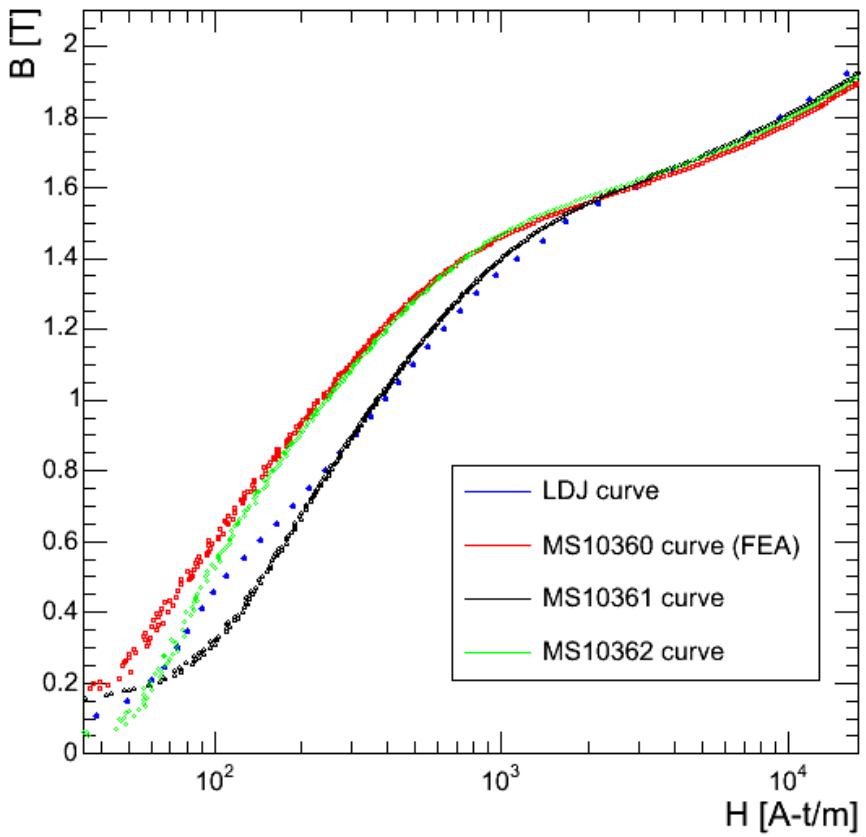

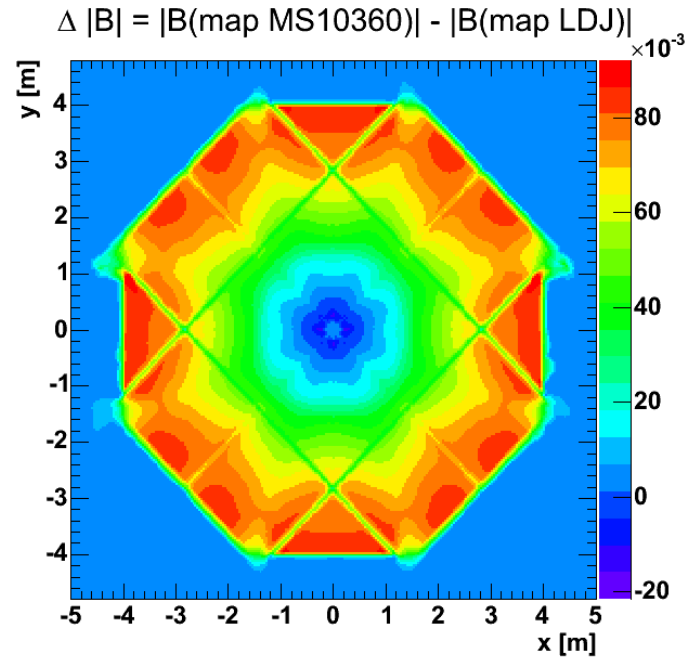

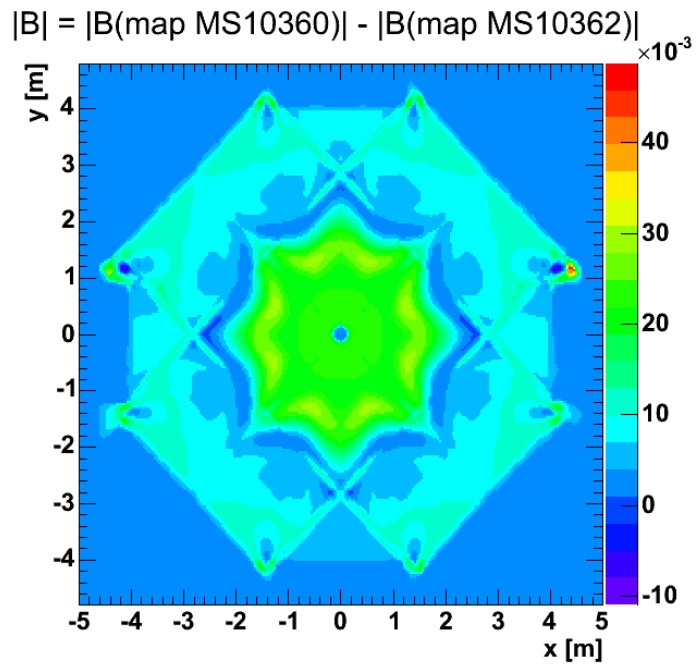

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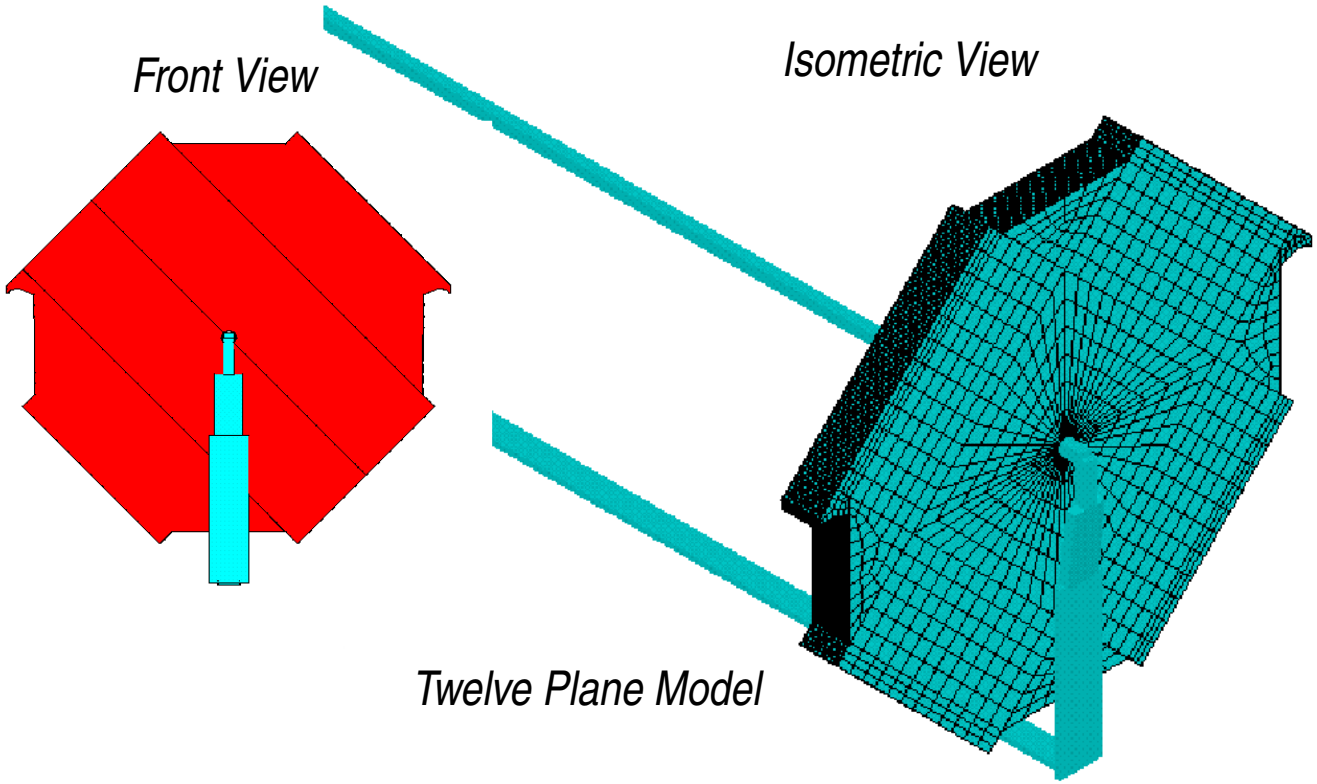
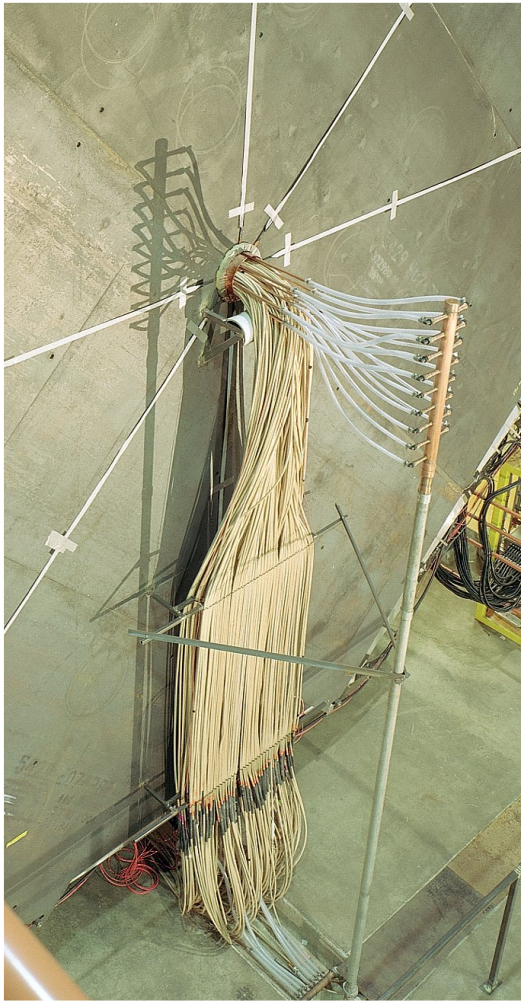
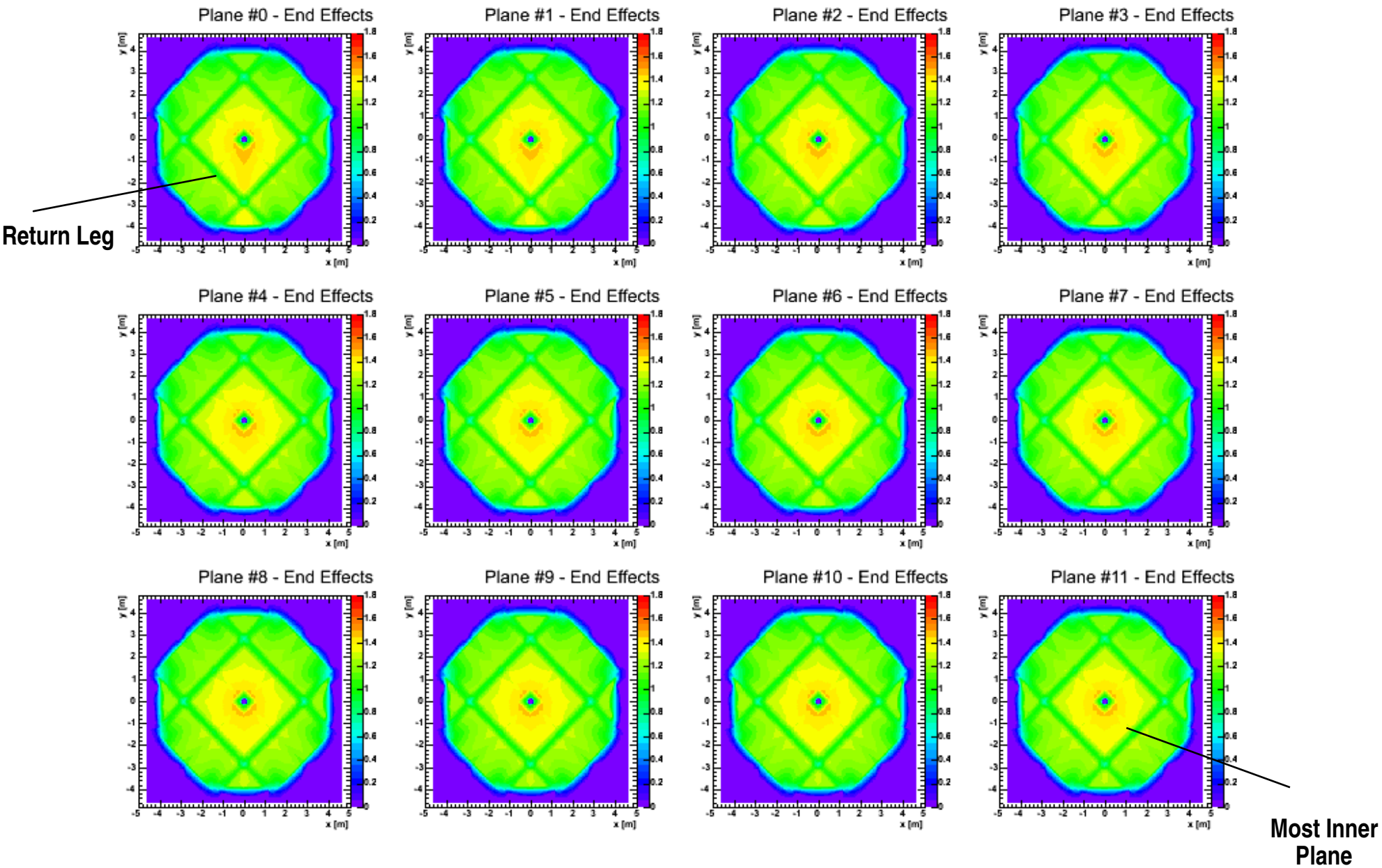
End Effects Model

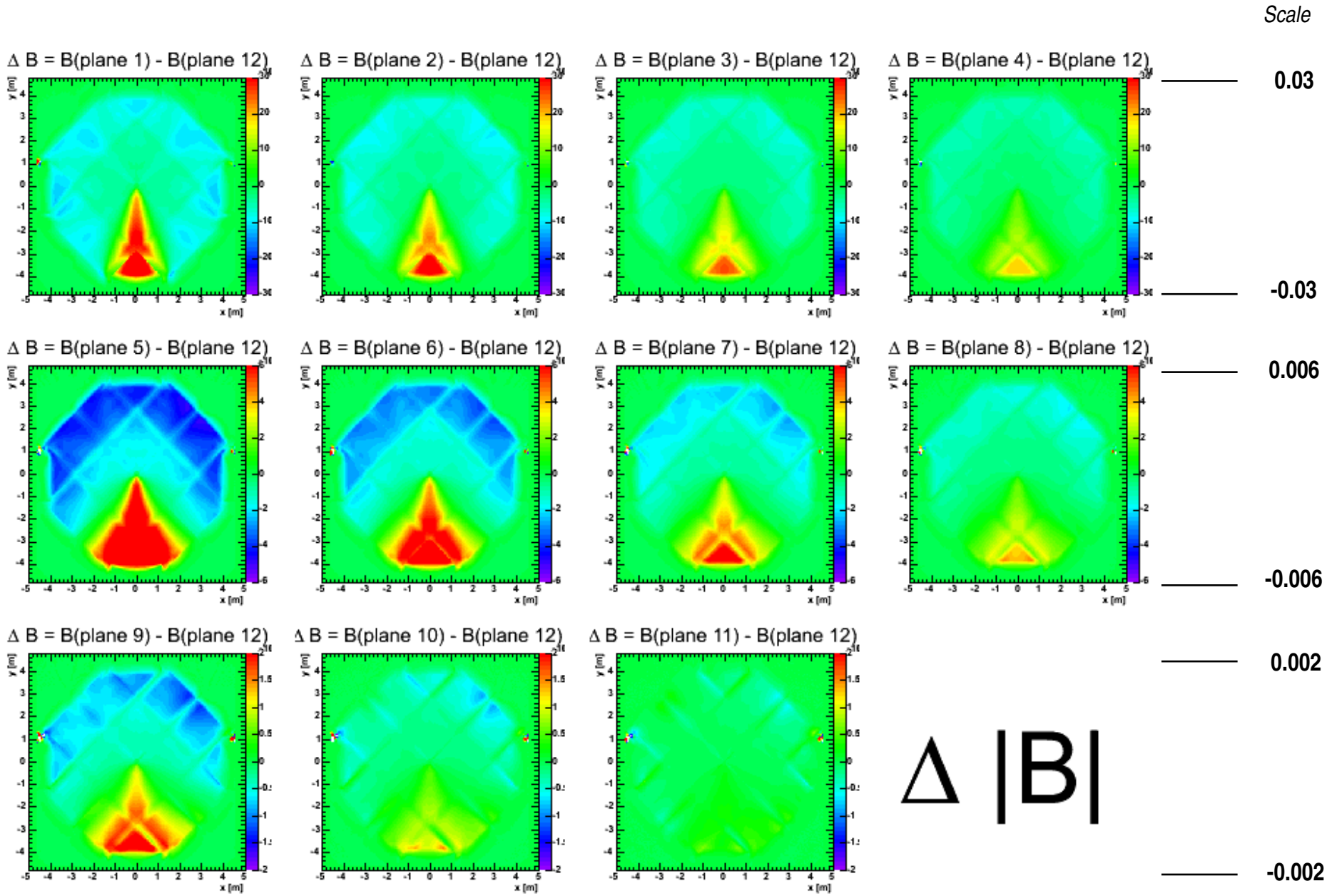




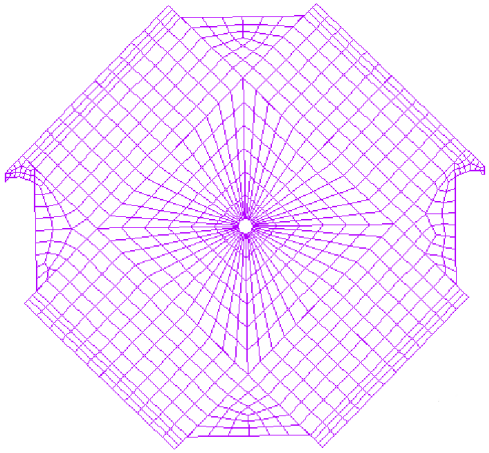
End Effects Model (II)



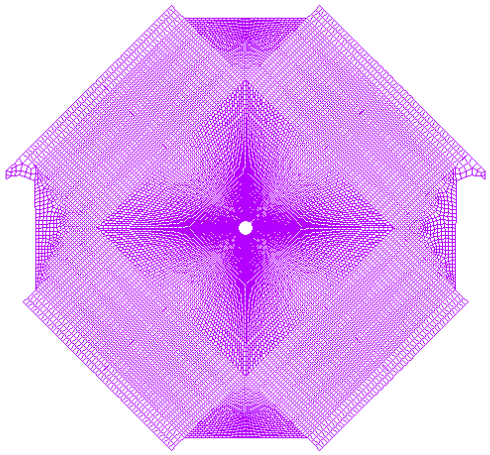
End Effects Model (III)



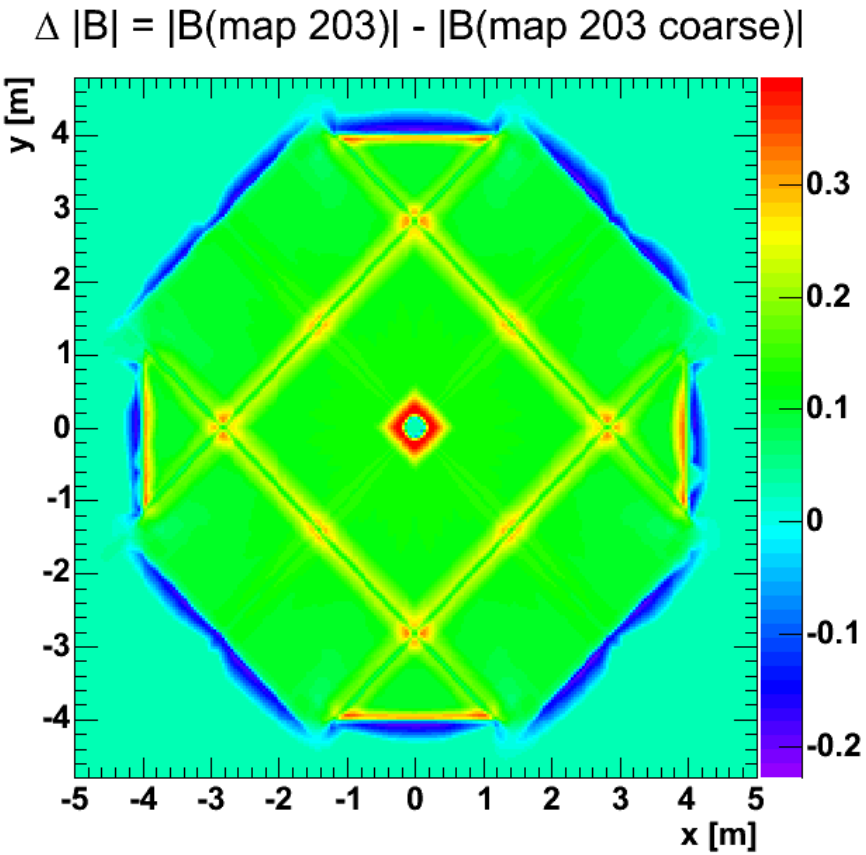
End Effects Model (IV)



End Model Mesh



Mid-Detector Model Mesh



B-dot Calibration

Software:

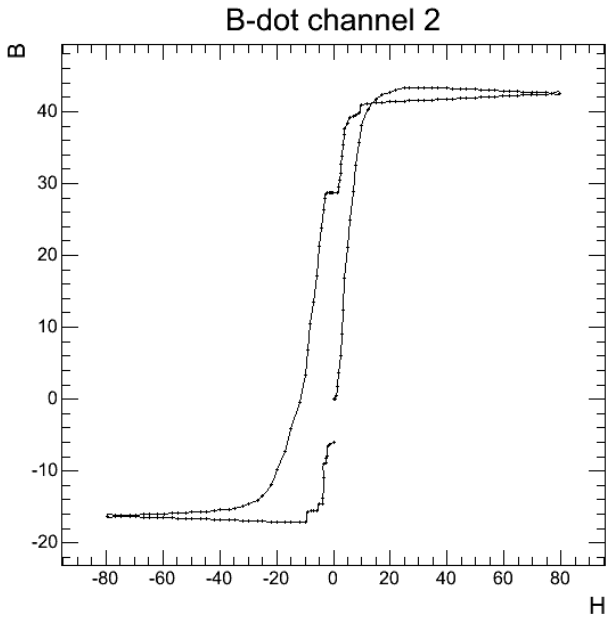
- Many bugs fixed (e.g. automatic reverse of switch).
- Active develoment of code (LabView).
  - ADC corrections.
  - Inverted polarization.
  - Optimization of step currents and time delays.
  - Writing data.
- Working on master/client servers.
- Computers configuration fixed.

Hardware:

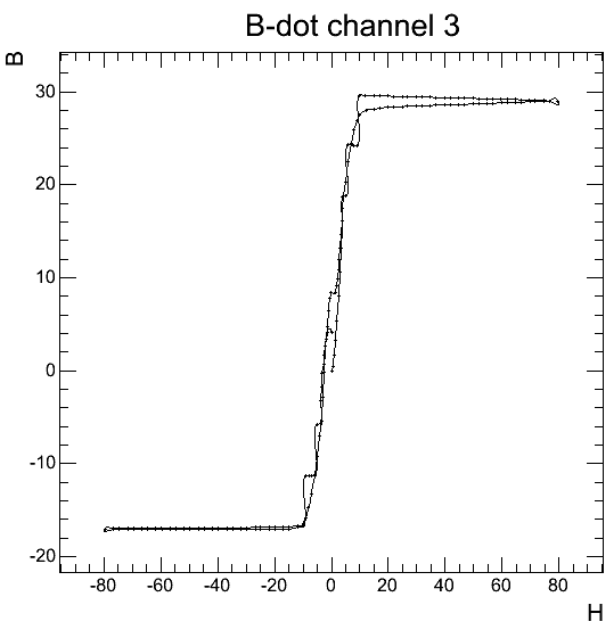
- PC moved around because of bad PCI cards.
- Trigger wires connections finished.
- Loose connections fixed.
- Few broken wires found. (it's being fixed).

B-dot Calibration (II)

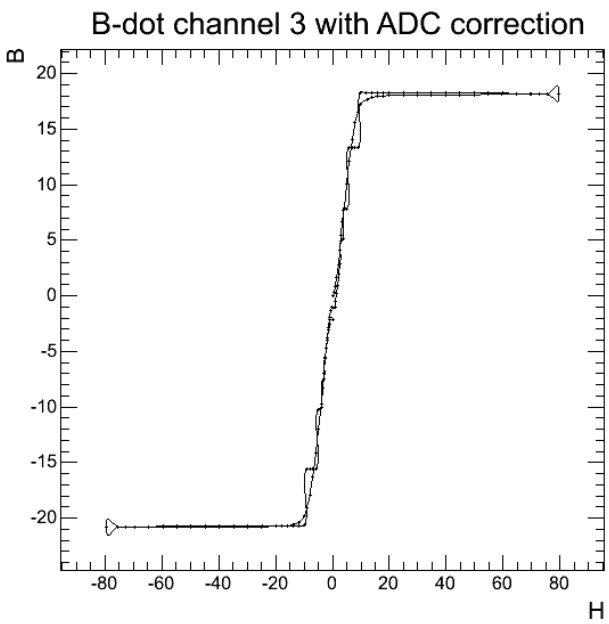
- We want to estimate the average BH changes per plane -> interested in changes of maximums and minimums in the BH curves.



Drift



Drift Reduced



Summary and Plans

B-Field Maps:

- Map 203 available for tests. (no significant differences from 202).
- Working on a parametrized model for End Effect model and BH variations (B -> B').
- Next maps: new map for ND and supermodule gap model.

B-dot Calibration:

- FD and ND code will be the same.
- Fixing problems before the next available time to test system. (Two days available next week).
- Working on the software problems (ADC corrections and data recording).
- Few hardware issues still pending but we can live with those for the moment.
- Trying to have master/client servers up and running for next test. We can run the system manually if this feature is not available.