

JRA1 PCMAG field mapping



Elements of the work:

- Hall sensors: improvements and production
- Calibration of Hall sensor cards
- Mechanical mapping device
- Installation of permanent probes
- Operation of PCMAG for the calibration
- Data collection
- Data analysis





Sorry, I am just back from long holidays, had no time to collect very detailed info so far.

Disclaimer

So this talk is rather superficial

No detailed performance figures



Hall sensors: improvements and production



- Improvements of the Hall sensors taking into account the lessons learnt from LHC field maps:
 - Modification to Hall-probe biasing circuit
 - Improvements of sensors addressing and readout
- Design and tests were carried out in Spring 2007
- 30 new 3D Hall sensors cards were produced for July 2007



Calibration of Hall sensor cards



Prior to mounting them on the field mapper, all new sensor cards were calibrated at CERN.
Stability observed: very close to the target value

Mechanical mapping device

newslune/readmore





Installed at the EUDET test beam in DESY, on July 19th 2007 Excellent alignment precision (<0.2 mm deviation from mechanical magnet axis).

Remote control over z-axis, manual phi-control. Allowed to take data in ~3 days.

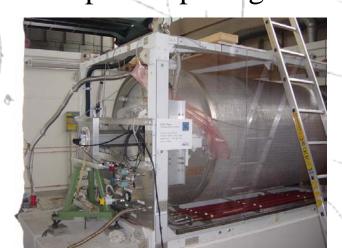
Some photographs



http://www-jlc.kek.jp/~ikematsu/archives/photos/pcmag-fieldmap/











Installation of permanent probes



2 permanent probes are installed
 - 1 in the "neck" of PCMAG
 - 1 glued to the outside of PCMAG

Together with the measurement of the current in the magnet they will form a redundant check of the magnet strength at all times (nominal ~1 Tesla)





The cooling of the magnet took ~5 days (?)

Some improvements to the magnet infrastructure have been proposed as a result of experience gained during the mapping campaign



Data collection



The result of the EUDET mapping can be found on AFS:

- /afs/cern.ch/user/f/fxb/public/eudet
- The directory eudetr contains the raw data, eudetc contains the converted data. The format of the latter is:
- sensor#, Bx,By,Bz[Tesla],temp[deg C].
- Measurements were made every 5 degrees in PHI and every 14 mm in Z.
- From run eu28 on sensor 4 has been put in position properly.
- Files beginning with "offset" contain measurements with field off.
- Files beginning with "eudet" contain measurements with fixed probes.
- The NMR recordings on magnet axes were:
- pos [cm] B [Tesla]

+5

+10

- -10 0.97852 -5 0.98079
 - 0.98160
 - 0.98096
 - 0.97838

• 0 = max field, positiv direction is towards big opening.

Data analysis



Work will be carried out by Christian Grefe from DESY, who has started working on the data.
Christian will come to CERN for a few months (as of September '07) to carry out the task.



Conclusions



Thanks to the EUDET project improved 3D Hall sensors could be developed and constructed
The field mapping of PCMAG was successfully accomplished the end of July 2007

Our aim is to finish the data analysis for the end of 2007.