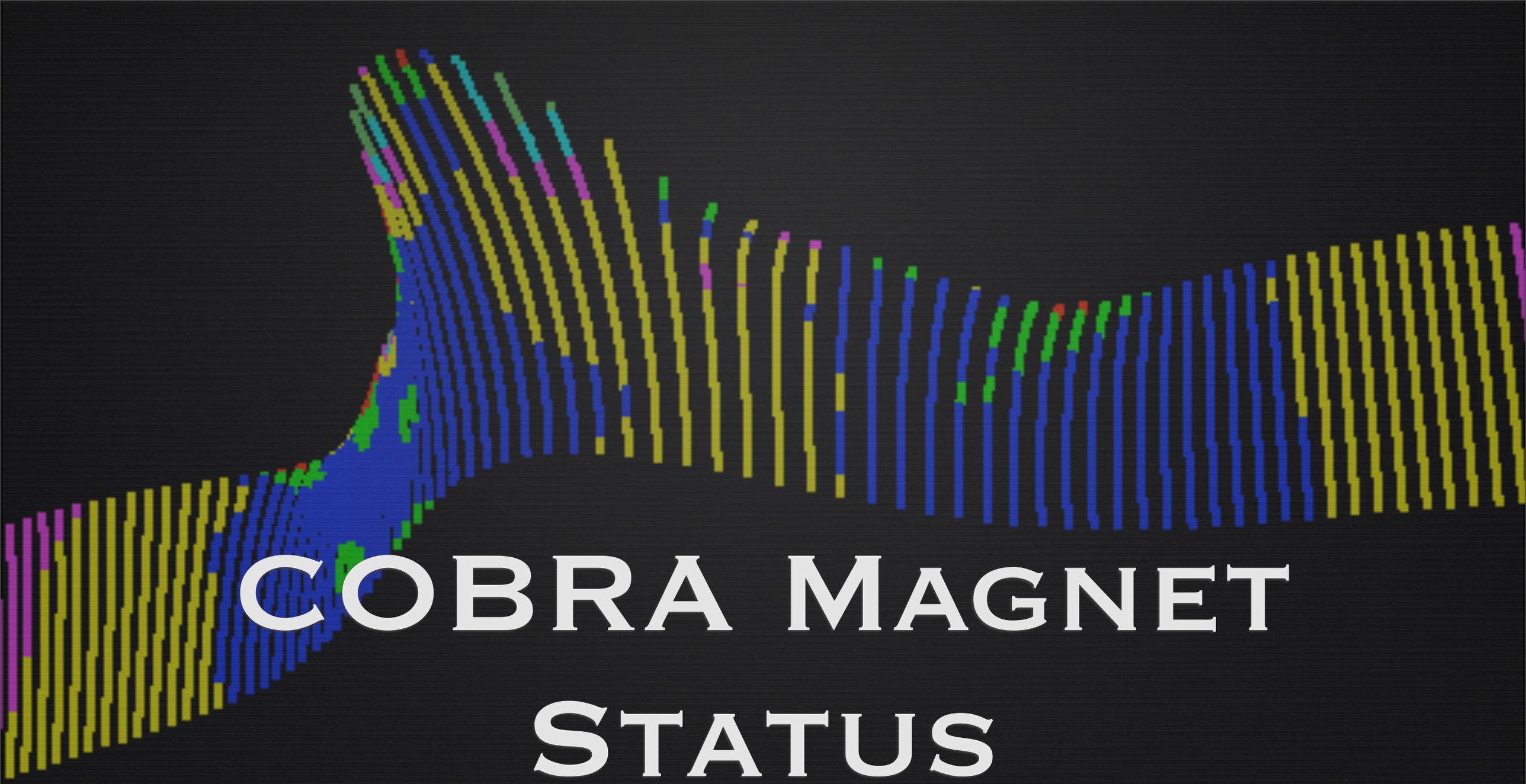


COBRA Magnet Status

W. Ootani

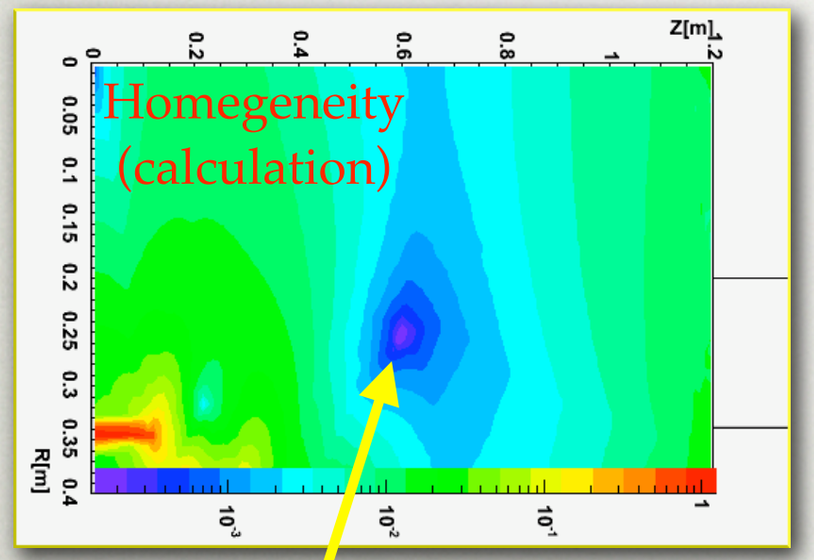
June 27th, 2006 MEG Review

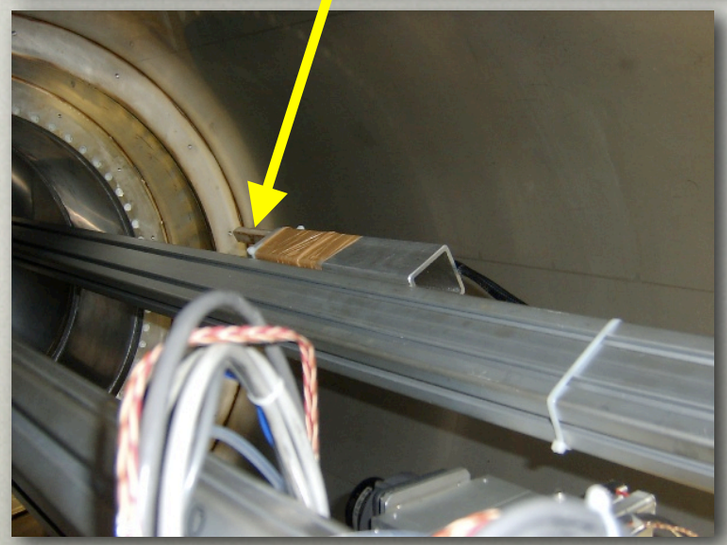
Field Measurement

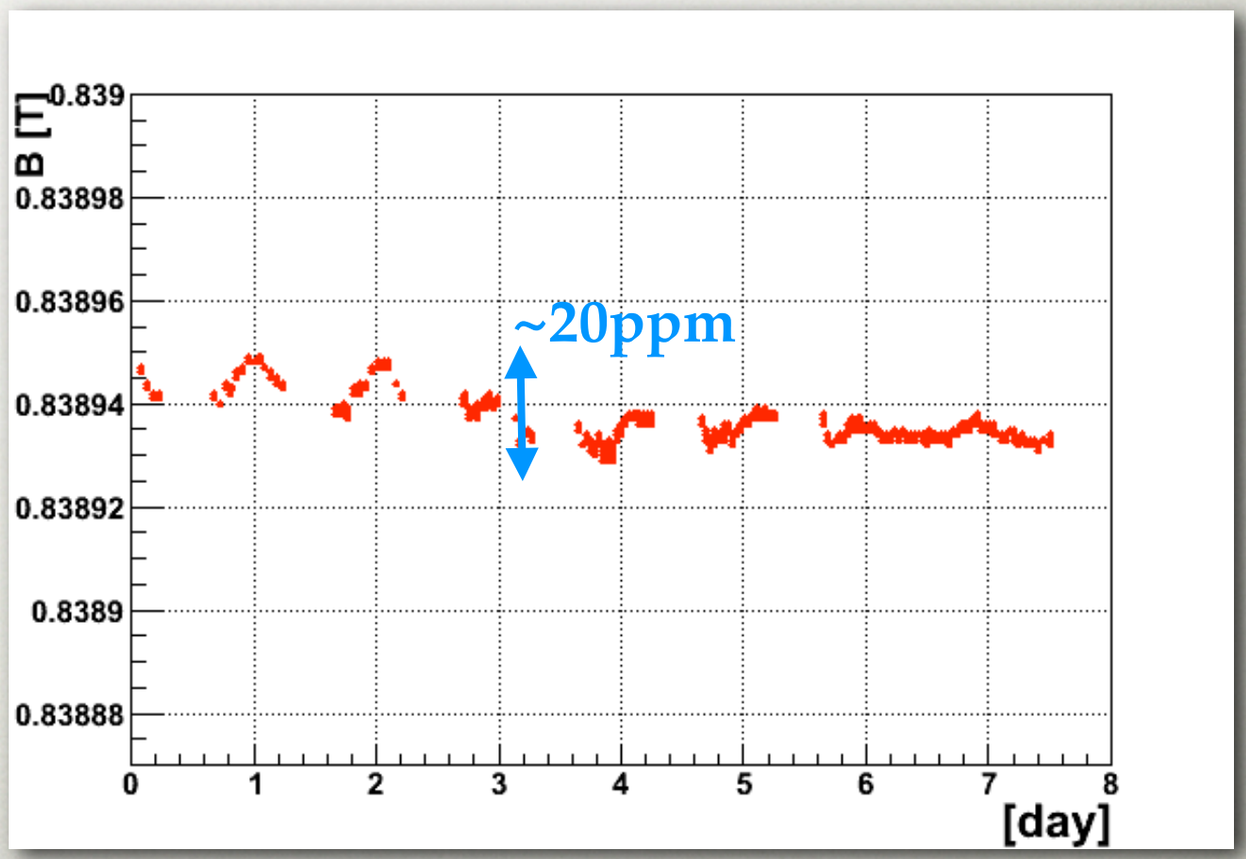
- Final field measurement was done in February as scheduled.
- Measurement summary
  - COBRA field
    - I_{SC}=360A I_{NC}=320A
    - |z|<110cm Δz=2cm, -4cm<R<+29cm ΔR=2cm, 0°<φ<+330° Δφ=30°
    - 22644 points
  - BTS fringe field
    - I_{BTS}=200A (unlike polarity)
    - -110cm<z<0cm Δz=2cm, -4cm<R<+29cm ΔR=2cm, 0°<φ<+330° Δφ=30°
    - 11424 points
  - Field stability measurement with NMR

COBRA Field Stability

- Stability of the COBRA field was measured over a week with NMR at the magic point.
- COBRA field is stable within <20ppm.





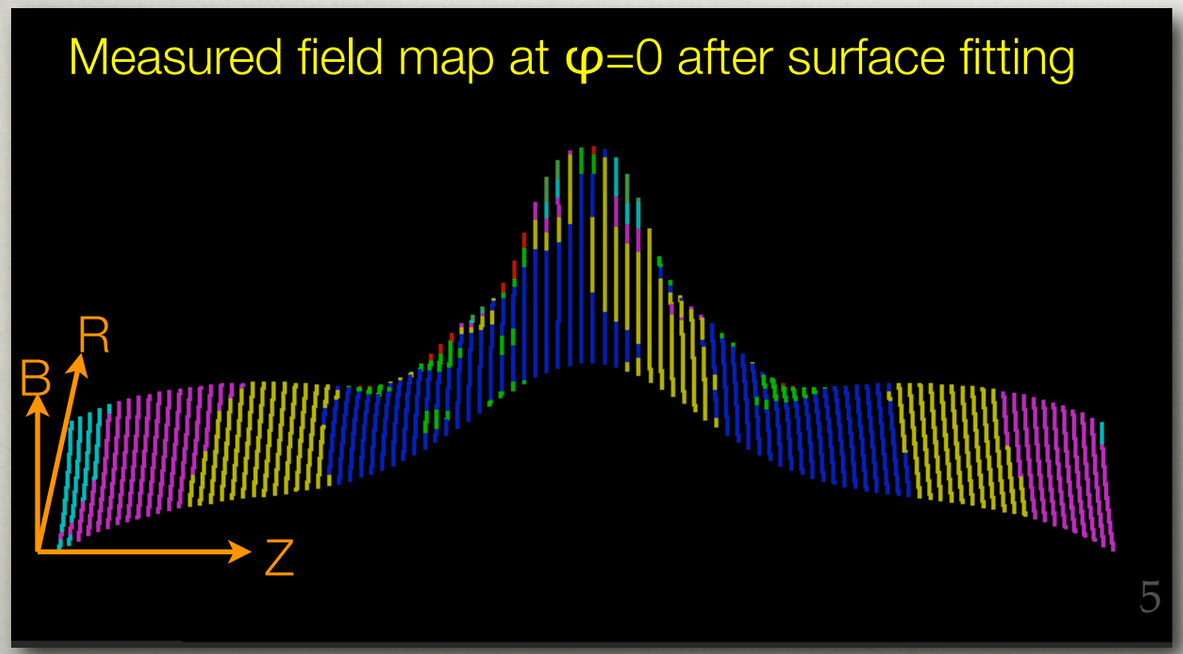


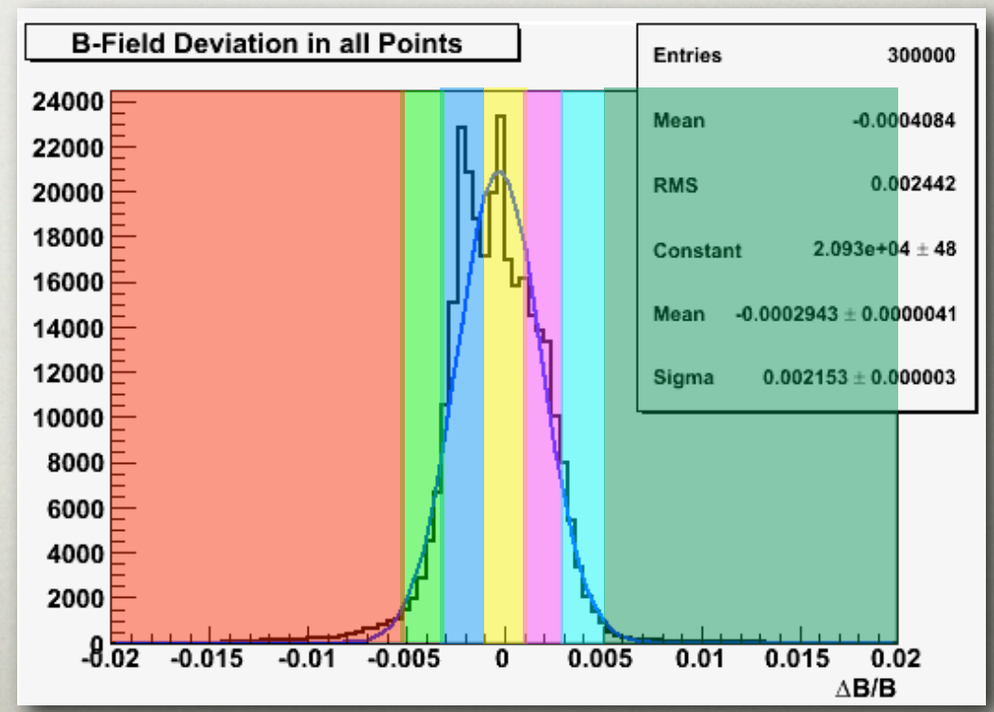
COBRA Field Map

- We are finishing the analysis.
- Measured data
  - Correction for Hall-sensor readout
    - Absolute calibration
    - Temperature compensation
    - Planar Hall effect
  - Correction with the measured position of measuring machine
  - Interpolation bw/ measuring points by means of bspline surface fitting.
- Calculation
  - Detailed coil modeling
  - Thermal expansion at low temperature (~-0.4%)

COBRA Field Map, cont'd

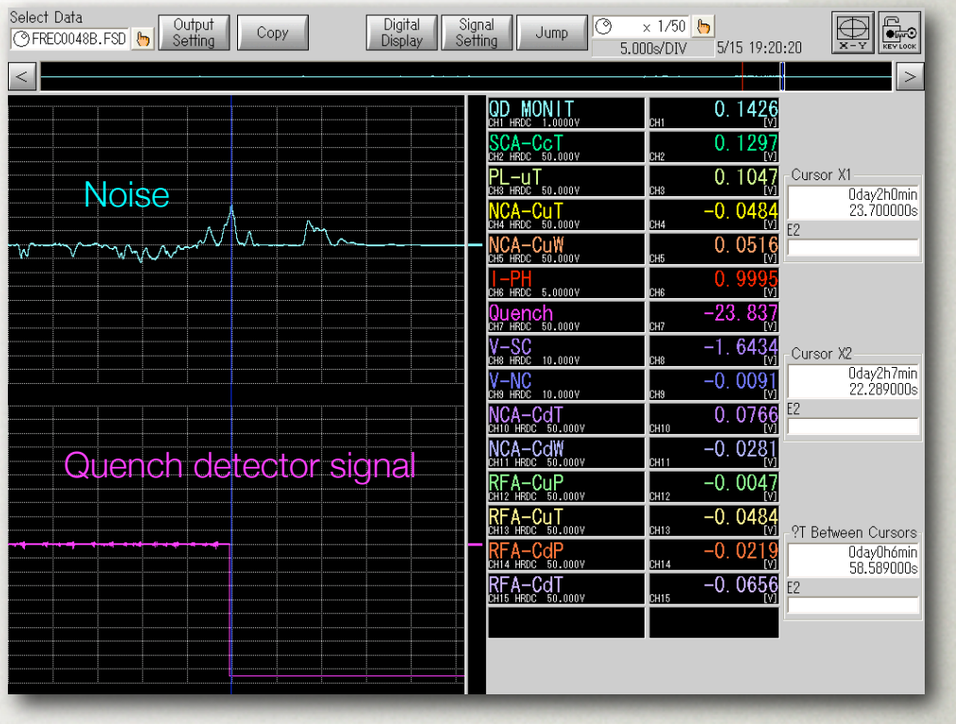
- Comparison with calculation to check the validity of the measurement
  - The measured field is in agreement with the calculation within 0.22%(σ) all over the volume.
  - Center of field difference distribution ~ 0
  - Not a random deviation
  - Difficult to judge which is right.
- Possible usage
  - Measured data for |z|<1100mm R<290mm and calculation for the other regions.



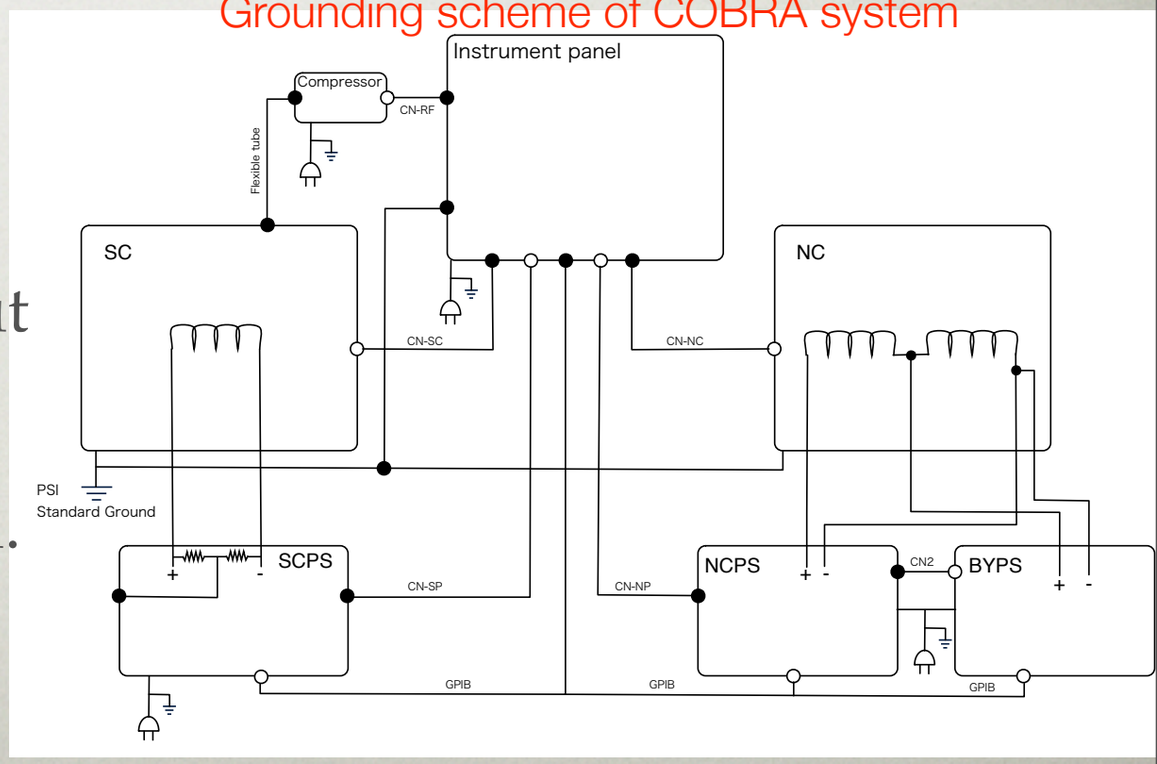


Quench Problem

- There were frequent quenches in the COBRA magnet.
- We found that it is caused by the external noise on the input signal line of the quench detector.
- It seems that they happen mostly at the beg. and the end of the working time.
- Modified shielding and grounding scheme are being tried.
- No quench for the past three weeks, but with zero coil current.
- Looking for the noise source in parallel.



Grounding scheme of COBRA system



Fringe Field Problem

- A dramatic reduction of beam rate was found in πM3 beam line last month when the COBRA ON.
  - Reduction: 30% @ GPS, 95% @ LTF
  - Transverse component causes diffraction of the beam.
- There is an effect also at πE3 beam line, but it's not serious once the field is stabilized.
- Possible solutions @ πM3
  - Shielding on beam pipe with high-μ material
    - Installation of Parmalloy sheet (μ =180000) was done last week.
    - Shielding factor ~400 is expected.
  - Retune the beam line
  - Add horizontal steering magnet
  - Soft iron wall bw / πM3 and πE5
    - The effect is being calculated.

Fringe Field Problem, Cont'd

- Shielding with high permeability material (Parmalloy μ=180000) was installed in the πM3 beam line last week.
- The effect will be measured on Jun. 26th.