COBRA MAGNET Status

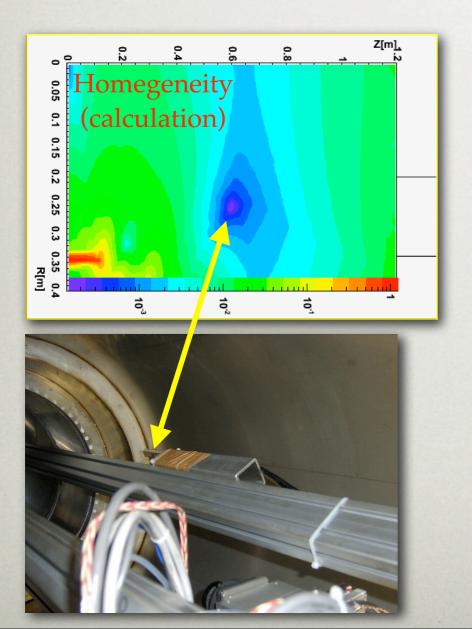
W. OOTANI JUNE 27TH, 2006 MEG REVIEW

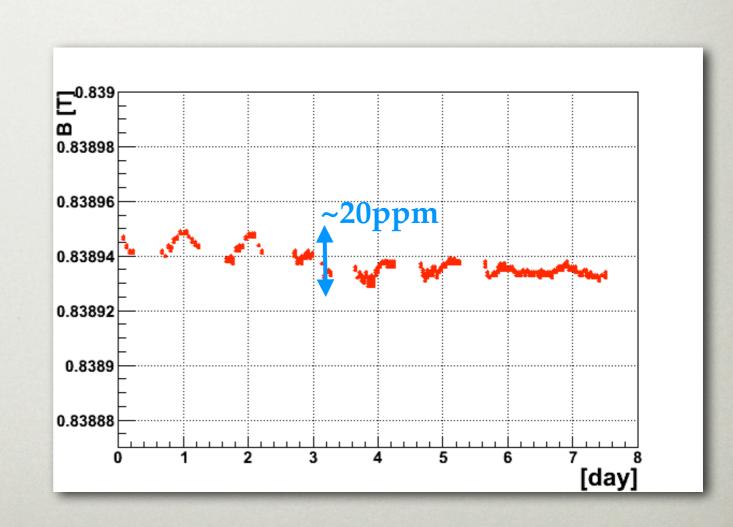
FIELD MEASUREMENT

- Final field measurement was done in February as scheduled.
- Measurement summary
 - COBRA field
 - I_{SC}=360A I_{NC}=320A
 - $|z| < 110 \text{ cm } \Delta z = 2 \text{ cm}, -4 \text{ cm} < R < +29 \text{ cm } \Delta R = 2 \text{ cm}, 0^{\circ} < \varphi < +330^{\circ}$ $\Delta \varphi = 30^{\circ}$
 - 22644 points
 - BTS fringe field
 - I_{BTS}=200A (unlike polarity)
 - -110cm<z<0cm Δz =2cm, -4cm<R<+29cm ΔR =2cm, 0°< ϕ <+330° $\Delta \phi$ =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.



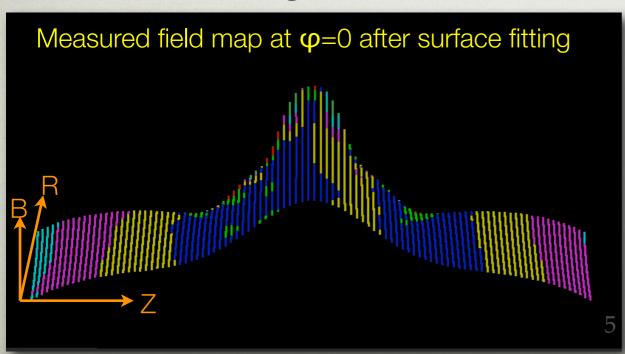


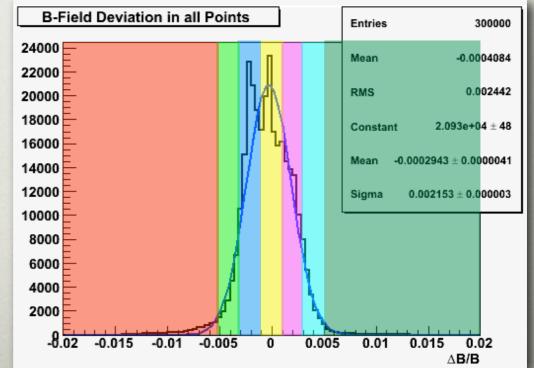
COBRA FIELD MAP

- 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.

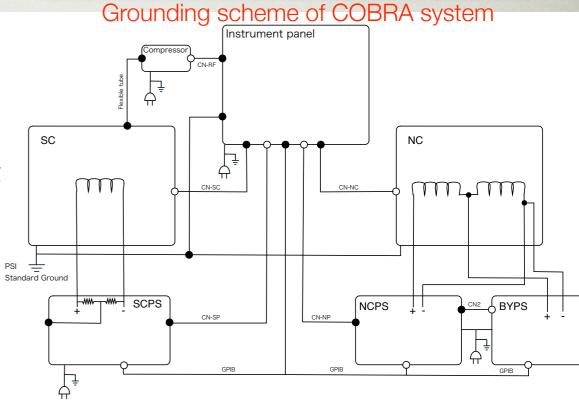




QUENCH PROBLEM

- 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.

Select Data Digital Copy Digital Display	Signal Jump Image: X 1/50
	OD MONIT 0. 1426 CHI HEOC 1.0000V CHI CHI SCA-CcT 0. 1297
Noise	SCA-C6.00y OI 1297 PL-UT OI 0.1047 PK8 HR0C 50.000V CHS OF CONT CHS OF CONT NCA-CUT CHS OF CONT CHS OF CONT NCA-CUT CHS OF CONT CHS OF CONT CHS HR0C 50.000V CHS OF CONT CHS OF CONT CHS HR0C 50.000V CHS OF CONT CHS OF CONT
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	NCA-CuW CH6 0.0516   H5 HR0c 50.0000 CH6 0.9995   CH6 HR0c 50.0000 CH6 0.9995   CH6 HR0c 50.0000 CH6 0.3995   CH7 HR0c 50.0000 CH6 0.0516
	V-SC 248 HR0C 10.000V снв -1.6434 V-NC 248 HR0C 10.000V снв -0.0091 22.289000s
Quench detector signal	NCA-CdT 0.0766 E2 NCA-CdW -0.0281 NCA-CdW -0.0281 RFA-CuP -0.0047
	Critz Had S0.000Y CH12 CV V)   RFA-CUT -0.0484 -0.0484 -0.0484   CH13 HADC S0.000Y CH13 V/ -0.0484   RFA-CdP CH13 V/ -0.0484   CH14 HADC S0.000Y CH13 V/ -0.0219   CH14 HADC S0.000Y CH14 -0.0219 0day0h6min 58.587000s
	RFA-CdT -0. 0656 2H15 HPCC 50.000V CH15 (V)



#### FRINGE FIELD PROBLEM

- A dramatic reduction of beam rate was found in  $\pi$ M3 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 /  $\pi$ M3 and  $\pi$ E5
    - The effect is being calculated.



## FRINGE FIELD PROBLEM, CONT'D

- Shielding with high permeability material (Parmalloy  $\mu$ =180000) was installed in the  $\pi$ M3 beam line last week.
- The effect will be measured on Jun. 26th.

