June 13, 1998
/tex/projects/spectro/mtg16.tex

LEP SPECTROMETER PROJECT

Summary Notes of the 16^{th} meeting held on May 28, 1998

Present: C. Bovet, W. Coosemans, B. Dehning, G. De Rijk, N. Hilleret, W. Kalbreier, J. Montes, G. Mugnai, A. Müller, S. Myers (chairman), R. Perret, M. Placidi, J. Poole, M. Sassowsky, E. Torrence, W. Weterings

Excused: D. Cornuet,R. Genand,Y. Muttoni.R. Valbuena

Comments to Summary Notes of previous meeting - None.

Status of installation - B. Dehning reported that the first tests on the Bergoz electronics for the PUs should be performed around mid June if there are no delays in the schedule at the firm. **At the time of writing we know that Bergoz got wrong filters and will have a 15 days delay**. The first BPM measurements will then be available only at beginning of July.

The heat exchanger for the PUs cooling system will be installed in the tunnel during the two-days access for SPS MD in week 25.

Ground motion - W. Coosemans showed results obtained with a **geophone** placed at different locations in the spectrometer line. The data represent **speed** and not acceleration and are displayed in the three orthogonal directions (see slides: **tra** is for X-direction and **lon** for the beam direction). The measurements are taken at three different locations, namely on the floor, on the stone block#2 and on top of the QL17 quadrupole. The first and the last locations have been measured at two different times this year, January and May, when the "activity" in the tunnel is more important (water cooling vibrations, power supplies etc.).

A 50 Hz component with amplitudes between 1 and 100nm is clearly visible. Lines at 50 ± 6 Hz are also visible on the floor measurements of May that aren't there in January. Some *motion* between 60 and 68 Hz is also visible, with lower amplitudes, on the floor and the block measurements. The spectrum is much more populated in the data from QL17.
In general the amplitudes in the vertical plane are a factor between 5 and 10 lower than in the other directions.
Measurements with the **accelerometer** will be performed after repair of the sensor.

DAQ- After summarising the status of the spectrometer hardware and software E. Torrence showed a first set of data taken with the temperature set, the WPS and the Fluxgate gauss-meter during **operational machine conditions**.

- **Temperature** - Almost all the 39 channels worked during the Z run. (the VM crate in the tunnel, not working at the time of the meeting, has been replaced and works now). Temperature resolution range between $1 \cdot 10^{-3}$ °C (magnet core) and $20 \cdot 10^{-3}$ °C (absorbers). The last figure is probably due to the fixing of the probes on the absorber body, not thick enough (this detail will be fixed for the next year installation). The temperature resolution in the PU blocks is $5 \cdot 10^{-3}$ °C.

Sharp variations ($0.1 \div 0.2$ °C) are visible, probably connected with ramp and/or beam dump operations. Temperatures are more stable in between (≤ 0.05 °C).
The sharp behaviour will be studied in detail synchronously with machine events.

- **WPS** - There is evidence of wire oscillations in both X and Y planes. The **Inside/Long** wire shows a clear signal at 0.75 Hz with amplitudes of $100 \div 150$ nm in X and ten times smaller in Y. A ~ 20 nm signal is also visible at 13 Hz.
  The **Outside/Short** wire shows some $10 \div 20$ nm oscillation at 0.9 Hz.
  A $\sim$ 400 nm ptp oscillation is visible in the worst case in the long wire/X plane, sampled with a 5 Hz waveform.
  Some WPS resolution figures quote ~ 110 nm in X for the reference sensor and $32 \div 37$ nm in Y for sensors in block 1 and 3.
  Data from the Inside/Long wire show fast jumps in both X and Y directions, with amplitudes of $\sim 100 \div 300$ nm at 45 GeV and up to 50 μm at 94.5 GeV.
  Data from the Outside/Short wire at 94.5 GeV show long term drifts of about the same amplitude.
  Note that the time scale is **days**, i.e. **highly compressed**!
  Some relative motion in the μm range seems evident from the triplet residuals.
- **Fluxgate data** - The three-directional head of the instrument is installed on the stone block supporting the vacuum chamber between modules #1 and #2 under a 10 cm lead shielding. It is then at 1.86m from the magnet and about 25cm below beam. The head is oriented following the usual conventions (X positive outside the ring, Y vertical and The resolution for the three axes is respectively $2, 1 \text{ and } 10 \cdot 10^{-2}$ mG.
  Field jumps of 600 mG and 350 mG in X and Z are seen during ramp. Much smaller changes appear in the Y direction. It looks like the Z and Y axes are interchanged.
  The orientation of the head will be checked out at the next access.

Magnetic mapping issues - W. Kalbreier reported on issues from the mapping meeting.

The MBI girder is finalised (W. Weterings).

The clearance between girder and the concrete support of the lead shielding hut is sufficient (G. Mugnai) to accommodate the 4mm horizontal displacement required to align the shorter MBI on the existing beam line (see M. Placidi slide for geometry).

The MBI cooling station will not be installed in the tunnel but in UJ33 to avoid radiation problems on the control electronics.

The delivery of the arm for measurements in ISR is foreseen for August 15.

DAQ software for magnetic measurements in progress. Large participation (students, PhDs and "veterans") is acknowledged.

Field models keep being implemented (M. Sassowsky). 3D-model behaviour of $\int B\, dl$ and $B(x)$ vs x ($z = 0$) agree with 2D results for actual and flat pole profiles but shims contribution looks overestimated.

A detailed job list for MBI is attached.

The **NEXT MEETING** will be held on

THURSDAY, June 18, 1998 at 10:30
in J. B. Adams Room 864/2-B14

AGENDA

- Comments on Notes of previous meeting
- Status of the Project: Active PU cooling system etc. — B. Dehning
- WPS measurements — M. Hildreth
- PU/collimator tests (preliminary) — G. Vismara
- News from magnets — W. Kalbreier
- AOB

M. Placidi