Minutes of the 193rd Energy Calibration Meeting held on 29 May 2000

Last week saw the second MD of the year, 7251 (25-26/5/2000), which successfully depolarised 41, 45 and 50, plus measured the spectrometer bend angle at these energies + 70 and 93 GeV. The meeting reviewed the data from this experiment, further analysis of fill 7129, and associated measurements.

1 BPM studies

John Matheson presented preliminary results from recent measurements where the motors were used to scan BPM stations horizontally.

John has attempted to determine the gains of the BPMs by calibrating the change in horizontal triplet postion against the change recorded by the WPS. A comparison of this between stations enables the relative gains of the BPMs to be extracted. For the RHS BPMs this gives a result consistent with that obtained from the beam based calibration method; for the LHS BPMs there is a significant discrepancy. This is to be understood.

John then showed a first look at the BPM non-linearities, inspected by monitoring the triplet residual in y for horizontal scans. These show the expected behaviour: a parabolic dependence which flips sign when the scan is performed at $y = \pm 1.5$mm.

2 WPS behaviour

Esther Barbero has looked at the WPS data for fill 7251. x looks stable but there is odd behaviour in y, with a $6 - 7\,\mu m$ excursion see in y external (LHS) and y internal & external (RHS).

3 BPM performance and analysis of spectrometer energy

Eric Torrence presented the status of the spectrometer energy analysis for both fills. These show very consistent results, but results which are in disagreement with both the polarisation and the NMRs. Normalising to 41 GeV a discrepancy of 130 MeV is found for fill 7129 and 110 MeV for fill 7251.

Looking at data quality plots it is seen that the gains are very stable, both within the fill and compared with the previous fill. The amplitude of the bumps has been reduced to $250\mu m$ to be within the dynamic range at all energy points. Also the calibration procedure has been modified so that displacements are now made in 5 steps (2 up, 2 down, 1 middle), rather than 3 (1 up, 1 down, 1 middle) as previously. A final difference between the two fills is that the resolution in BPM6 has improved due to the replacement of a noisy card.

Eric has found a problem in the internal consistency of the data which may point to the cause. It had already been noted for the previous fill that the position of the horizontal triplet residuals evolve with time/energy. Motivated this Eric has constructed the change in bend angle with time/energy using different combinations of BPMs, in addition to the 'standard' combination. It is observed that different combinations give different changes in angle! These differences are at the level necessary to generate the discrepancy with the E_{pol} /NMR. Fill 7129 and an experiment from 1999 have been analysed in the same manner. The former shows the same problem, whereas the latter looks consistent. A possible explanation of the 2000 discrepancy is to attribute all the problems to BPM-3 – that station which faces the incoming electron an accompanying synchrotron radiation. However this needs more thought, and in fill 7129 inconsistencies were also seen in the other arm (prior to the replacement of the card for BPM-6). Still, dedicated ramps with positron beams only may be informative.

4 Next meeting

To be announced.

Guy Wilkinson, 5 June 2000.