Minutes of the 184th Energy Calibration Meeting held on 8 Oct 1999

1 NMR analysis of recent multipoint fills

Pete Renton and Guy Wilkinson have performed a conventional NMR fit to all available 1999 polarisation data, including the recent multipoint and 101/45 fills. The fit gives sensible looking calibration coefficients, which when applied to the physics data give a beam energy close to that obtained when using the coefficients of 1998. The standard residual plot averaged over all fills shows a mild banana; more droopy for Pete's analysis than for Guy's. The two 101/45 fills show no obvious bias when viewed in residual space, although the most recent fill has a significant scatter. The overall impression is reassuring.

In the most recent 101/45 fill, two energy points were continuously calibrated over a $\sim$ 5 hour time period. Pete has had a very preliminary look to see whether the $E_{\rm pol}$ energy evolution is tracked by the NMRs. The first look does not show perfect agreement, but the discrepancy is not alarming. (NB a mistake was discovered after the meeting in one of the plots; this has been corrected in the transparency copies.)

2 Energy from Q_s

Anke-Susanne Muller presented an update on her measurement of the beam energy through Q_s. She explained how refinements to the basic model relating Q_s, the energy and the RF voltage lead to an excellent agreement with data. The assigned error from present measurements of the beam energy is very competetive, at $\sim 20\,$MeV. Anke agreed to provide for a future meeting a more detailed breakdown of this error assignment.

3 BPM calibration and spectrometer analysis

John Matheson explained a BPM gain fitting technique, developed by Bernd Dehning, Jan Prochnow and himself. This method, when applied to the standard BPM calibration cycle bumps and rotations, returns unique solutions for the fitted gains. Plotting the results from fits to the various calibration cycles over a $\sim$ week timescale gives distributions which are about 0.2% wide for the RHS stations, and $> 0.5\%$ wide on the LHS stations.

Eric Torrence showed an update to his analysis. He has updated and automated his gain fitting technique and applied it to the calibration cycles at each energy point in the recent multipoint fills. He observes that the results are stable to within $\pm 0.5\%$, which implies that it is necessary to keep the beams stable to within $\pm 100 \mu m$ between energy points in a spectrometer measurement so as not to incur a significant error on the bend angle change measurement, and thus energy determination. Including a non-linear term in the calibration has little effect. Using the spectrometer to calculate the energy changes between steps in the multipoint fills gives values which agree with the E_{pol} at the 10^{-4} level.

4 Next meeting

The next meeting will be on Friday 22 October at 14:30.

Guy Wilkinson, 15 October 1999.