Minutes of the 189th Energy Calibration Meeting held on 18 Feb 2000

1 BPM errors and controls

John Matheson showed a calculation of the expected error on the change in bend angle. With his assumptions a relative error of 1.3×10^{-4} is obtained, in agreement with present data.

John also presented an idea of exploiting the non-linear response of the BPMs in order to determine the BPM centres. This can be done by scanning the beam in x and y, and looking for a quadratic dependence in the results. However in order to be insensitive to 'common mode' in the beam movements, it is preferrable to move individual BPMs and study the triplet residuals. This can certainly be done in x, and it is planned that for the coming run all the BPMs be mounted on individual stepping motors. In a dedicated measurement, the combination of horizontal BPM movement and vertical beam bumps should provide sufficient data to centre the BPMs to $\sim 100\,\mu m$, thereby rendering the spectrometer analysis less sensitive to non-linearities.

2 Progress with finalising '1999' energies

Guy Wilkinson reported that earlier that week new 1999 energy files had been released, with small modifications with respect to those made before Christmas. If no problems are found, these will remain unchanged for the near future.

It is now necessary to assign errors. Following what what agreed in the previous meeting, the spectrometer and Q_s results will only be used as qualitative cross-checks at this stage of the analysis. Therefore the uncertainty will come from the NMR-extrapolation method, and follow a similar prescription to previous years. The extrapolation error itself mainly comes from the flux loop NMR comparison. Results had been shown in the meeting of 28 Jan by Pete Renton which indicated a very similar behaviour to previous years, with a slightly reduced offset and slightly increased individual probe scatter. Since then Pete has extended his studies, and the main conclusions were shown by Guy. (A complete set of the plots is appended to the copies of the transparencies)

Two questions have been addressed. The first is whether any of the individual probe scatter can be attributed to NMRs being changed and reinserted in slightly different positions. The answer seems no, as plots of the residuals of individual NMRs against time, throughout the year, show stability, and no significant jumps which can be correlated to these changes. The second is whether the mean FL vs NMR residuals are significantly different if the FL octants are fitted one-by-one, rather than in an ensemble, as is usually done. This issue is of interest because many FL cycles in 1999 did not have all octants present. How representative are such cycles of the ring as a whole? It was seen that the mean residual is rather similar octant to octant, and also stable year to year.

Given the stability of the FL analysis from 1998 to 1999, it seems reasonable to assign an identical error. Therefore 15 MeV is proposed, with 100

Studies are still being performed in order to provide input for the other error assignments. In addition robustness checks are being made, in particular on whether the instantaneous 'trim' readings used to make the large RF frequency corrections agree with the periodic records in the logging database. An e-mail will be circulated in the coming week with a full list of errors for discussion. On a longer timescale a note will follow, detailing the analysis and substantiating the error assignments.

3 Next meeting

The next meeting will be on 10 March, subject to confirmation.

Guy Wilkinson, 18 February 2000.