Minutes of the 213th Energy Calibration Meeting held on 31 August 2001

Present: Anke-Susanne Muller, Pippa Wells, Bernd Dehning, Federico Roncarolo, Giuseppe Mugnai, Pete Renton (by phone), Eric Torrence (by phone), Guy Wilkinson

1 Status of Q_s analysis

Anke told the meeting of progress with the Q_s analysis. A plausible model has been developed which relates the energy dependence of the voltage calibration factor, observed for the 2000 data, with the unusually high Q_s damping also present in this year. More work is required to verify this hypothesis.

2 Status of the flux loop analysis

Pete presented the status of the flux loop analysis. The flux loop extrapolation residual has been scrutinised: year by year; against energy; octant by octant and NMR by NMR. Additional studies have looked at the stability of the results when individual NMRs are artifically eliminated, and have followed the evolution of single NMRs versus time, calibrated against a single octant. No unexpected results have been found. Pete will start to write this work up in an ECAL note. Some additional cross-checks were suggested by the meeting to be included in this report.

3 Status of the mapping analysis

Federico described the recent studies he has made into the differences seen in end field, comparing between the present mapping campaign and the ISR. When computing the absolute field differences, very characteristic structures are seen in both arms. Moreover these structures are different for maps before and after a certain instant in the present campaign.

Federico demonstrated, through manipulating the data themselves, that these structures can come about through a shift in the absolute z-scale of a few 100 microns. This shift needs to have itself changed at some instance to generate the time dependent effect observed. In fact the issue is not of primary importance, as the structures are anticorrelated between the arms, and lead to a negligible difference in the integrated field between the two campaigns – it cannot explain the observed $\sim 5 \times 10^{-5}$ offset. More worrying is a jump of $\sim 10^{-4}$ seen in recent maps performed after modifications were made to the apparatus. This is attributed to a poor re-alignment of the Hall probes with respect to the NMRs. It was suggested that Federico attempt to use what field structure is seen in the core, and match this up between Hall probes and NMRs, thereby measuring the separation between the two instruments and verifying this statement. If necessary, the alignment should be re-performed and further maps taken.

4 Status of BPM analysis

Guy has repeated the triplet residual shift analysis of the last meeting with an extended BPM gains fit.
He has fitted cross-coupling terms to account for the observed non-orthogonality between x and y. These terms are between 0 and 3% and have a behaviour which suggest them to be mainly electronic in origin, rather than geometrical. As in the primary terms, a dependence is seen on the particle type. Including these terms improves the quality of the data, particularly in y.
Making a global analysis of the residual shifts against energy, as presented in the last meeting, leads to the same conclusion that suggests that bunch length &/or bunch size could be driving this effect. Re-analysis of the wiggler experiments shows correlated residual shifts when the wigglers are manipulated. There is possibly evidence of similar effects when the Q_s and f_{RF} is changed (alternative ways of altering the bunch length), but here the data are less clean and harder to draw conclusions from.
Guy has made a similar analysis for the 3 fills of 1999. Certainly residual shifts are seen. Very intriguingly those in the left hand side have a slope of different sign to that observed in 2000.
Eric is presently analysing the f_{RF} frequency ladders and will report results soon.

5 Next meeting

To be decided.

Guy Wilkinson, 3 September 2001.