Minutes of the 215th Energy Calibration Meeting held on 16 November 2001

Present: Bernd Dehning, Federico Roncarolo, Eric Torrence (by phone), Guy Wilkinson

1 Field Gradient Systematics and Hall Probes

Federico has read a recent paper discussing systematic biases in magnetic field measurements arising from the combination of finite Hall probe size and a significant field gradient. It is interesting to know whether such an effect can explain the 7×10^{-5} difference between the first and second MBI mapping campaigns, for which very different sets of probes were used. Federico estimates the expected difference between measurements to be 10^{-5}, in the region where the field gradient is highest. Integrated over the whole magnet, therefore, this would be negligible. Despite this, it would be interesting to measure the effect, if any, in the lab.

2 Absolute BPM gains

Eric presented an update of his RF frequency analysis. With cross-terms included in the relative gains, the expected behaviour is seen in the bending plane. This supports an absolute gain consistent with that assumed in the analysis, to a $10 - 15\%$ precision. (The analysis presented in the transparencies suggested a gain slightly higher than expectations, but this assumed an incorrect momentum compaction factor.) He has extended the analysis, which previously consisted of positron fills only, to include an electron fill, which has the same behaviour.

Bernd brought to the meetings attention the fact that the absolute gain is the vertical coordinate is expected to be larger than that in the horizontal coordinate by a factor 1.40. (See for instance page 11 of John Matheson's paper 'Non-linearities in the response of BPMs for the LEP spectrometer'.)

After the meeting Bernd circulated an alternative analysis of the absolute gain coming from a comparison with the WPS (written up in SL-2001-022 BI). This suggests a gain which is high by almost 30%. The systematics in this analysis should be evaluated.

3 BPM analysis

Guy has extended his BPM analysis to fit simultaneously the (change in) beam trajectory and bend angle. This enables the consistency of all the BPMs to be assessed, rather than in previous studies, where each arm was considered individually. Guy showed some example fits which showed the method to be promising, although for many fills the systematics evolve symmetrically in both arms such that it is difficult to identify ‘bad’ BPMs.

4 Next meeting

The next meeting will be at 16:30 Friday, November 30. The location will be announced in due course.

Guy Wilkinson, 19 November 2001.