Minutes of the 114th Energy Calibration Meeting held on 13 December 1996

1 A new look at the train NMR48 simulation

Enrico Bravin showed the simulations of the NMR8 and NMR4 behaviour in the ISR tunnel that were made on 9 July 1996 by playing back the voltage recorded on the LEP beampipe on 13 November 1995. The NMR4 applied current was a factor of -0.5 of the NMR8 current. Very good agreement between the NMR readings from the LEP tunnel and ISR test dipole is seen for both NMR4 and NMR8 type behaviour. The temperature in LEP and the ISR simulation was rising smoothly, although with slightly different gradients. Enrico also showed the prediction of a temperature model with just the CT and CTmax coefficients, and compared this with the NMR readings after filtering out the noise. NMR4 tracks the temperature prediction apart from small upward jumps, after which the field is constant until the temperature curve "catches up". NMR8 shows larger jumps with constant field in between. The NMR readings from the ISR in these experiments continue after the train current play back was completed. The train current simulation takes the first 8 hours or so of the plots.

2 Flux loop precision

Joerg Wenninger summarised his estimates of the energy scale and error from the flux loop data. Taking into account the NMR rise per fill has improved the agreement between the absolute prediction of the flux loop for ΔE_{pol} from peak–2 to 50 GeV to 3 ± 2 MeV. Using the polarisation data to calibrate the flux loop, the predictions for the equivalent energy to Enominal at beginning of fill, for temperature of 25 degrees and the central rf frequency are given in the table:

E nominal (GeV)	E flux loop (MeV)
80.5	80610.0 $\pm$ 10.7
85.0	85117.5 $\pm$ 12.2
86.0	86119.9 $\pm$ 12.7

If the 3 MeV discrepency of the absolute FL prediction is used to set the error, that would give an uncertainty of the top energy of about 20 MeV.

3 Status of 1996 analysis

Guy Wilkinson is in the process of making energy files. Almost all ingredients are in place for the 161 GeV data. For the 172 GeV data the RF corrections should be available by early next week. The hope is to have files early next week at which point the data quality can be checked and if found to be OK the files released to the experiments.

There was further discussion of what error to assign for the 1996 energy. The "known" uncertainties in the energy scale are about 12 MeV, but this is not thought to reflect our current incomplete understanding of the problems of extrapolation, although there is a range of opinion as to why/how the error should be increased. However, the span of opinion is between 20 and 25 MeV, and anything below 30 MeV is in any case negligible compared to the current uncertainties on the W mass. We will decide on the final number in early January. There should be a short LEP energy group internal note to accompany the release of the final error.

4 Status of 1993–1995 analysis

There was a short meeting to discuss the dipole model (train and temperature effects) on Thursday 12 December. The conclusions of this meeting were:

- Mike Koratzinos will attempt to implement the combined Bmax/temperature model for the LEP tunnel data
- We will check the simulation of the NMR4 and NMR8 behaviour (already shown by Enrico in this meeting)
- Guy Wilkinson will try to fit temperature coefficients from the LEP temperature test of November 1996
- Angelika Drees will try to refit the tide model parameter κ with our best current understanding of rise effects
- For the final energy values, the proposal is to modifiy the Warsaw values to use a two coefficient temperature model (CT and CTmax)
- Final energy central values are needed in early February if the experiments are going to use them to produce Z lineshape results for Moriond

5 Octant to octant NMR noise correlations

Paul Bright Thomas has updated the checks of the correlations in NMR noise among the octants for the 161 and 172 GeV data. The values are more reliable for 172 GeV because all NMR's are working for a large fraction of the data. The correlations between a pair of octants from the distributions of the difference between adjacent readings. The probes are read every 5s. However, for the multiplexed octants (1 and 5), a 25s sampling is needed to get a reasonable measure of the correlation, because only one probe reading of five is updated each 5s. Stuck values are now rejected. With the improved analysis, a more reasonable distribution of large positive correlations between octants with the same current flow and negative correlation between octants with opposite current flow is seen. The correlations are much smaller if only the quiet period is used.

6 Next meeting

The next meeting will be at 14:00 on Friday 10 January 1997 in the pavillon. The main items for discussion will be the status of the 1996 analysis, and review of energy group status and proposals for the Chamonix workshop. There will be another small meeting to discuss temperature coefficients, trains and the dipole model on 21 January.

Pippa Wells, 16 December 1996.