# Minutes of the 190th Energy Calibration Meeting held on 7 April 2000

## 1 General status

The meeting reviewed the status of the the energy calibration for the present run (still in $Z^0$s; soon to go to high energy.)

Giuseppe Mugnai reported that all the NMRs were installed, but a magnet patrol was required for adjustments and to ensure all would lock at 41 GeV.

Bernd Dehning introduced a new member to the group, Esther Barbero Soto. Esther will work with Bernd and John on the BPMs.

Concerning the spectrometer, Bernd reported that the WPS looked fine. The BPM electronics are presently in the lab where they have been subjected to various tests, notably investigating their stability with respect to temperature changes. The conclusion is that it is best to limit variations to $< 0.1°C$, and a cooling system will be installed to ensure this is the case. With such efforts, plus improvements to the cable connections, it is hoped that the response in 2000 will be more stable. Final adjustments are also being made to the motors which will be used to centre the BPMs. Bernd estimated all would be ready and installed by the end of next week.

When everything is operational time will be spent, in parallel with physics operation, to collect data in different positions in order to align and centre the BPMS. We will then be ready for energy measurements.

Concerning the general logging on the database, there have been several problems at the start of this run, most notably with the RF system. Guy is in touch with Markus Albert who is investigating.

Thinking forward to our first requests for machine time, it was recalled that we shall try and proceed without any k-modulation measurements (although Bernd suggested some limited measurements in the spectrometer region might be useful). Time is needed to commission the polarisation optics.

## 2 Status of the $Q_s$ analysis

Anke-Susanne Muller presented an update on the $Q_s$ analysis (see 185th meeting on 22/10/99 for last presentation). Recent work has tackled the uncertainties of the energy dependence of the momentum compaction factor, and the knowledge of the inverse bending radius. The first problem can be dealt with easily by parameterising the dependence – this will essentially remove a 10 MeV systematic in the analysis. The second problem is more involved.

A relative uncertainty of 0.1% in the inverse bending radius induces a 15 MeV error on the energy estimate. Leaving the inverse radius as a free parameter in the $Q_s$ fit gives a correction to the nominal MAD value of 0.3±0.1%, independent of energy. However, larger corrections of 1.6% are expected from calculations of how the fringe fields of the magnets (not included in MAD) will modify the energy loss. (Informed opinion trusts both the fit results and the calculation of the fringe field effects, but suspects the base MAD value to be untrustworthy.) The best solution will be to determine the correction externally. Anke proposes that this can be done by extracting it in a fit of the $Q_s$ determined energy against a reliable reference energy, eg. NMR calibrated at 'low energy'. This will merely require including more low energy points when a $Q_s$ vs $V_{RF}$ scan is performed. A plausibility study performed against the NMRs at high energy is promising, and also supports the 0.3% correction.

The three $Q_s$ measurements so far performed above 80 GeV give an energy offset with respect to the NMR values of $9 \pm 11$ MeV.

# 3 Next meeting

The next meeting will be on 28 April, subject to confirmation.

Guy Wilkinson, 12 April 2000.