Minutes of the 176th Energy Calibration Meeting held on 12 May 1999

1 Polarisation plans

The polarisation goals set out in the last meeting (viz. re-commissionning of 60/60 optics, re-commissionning of polarimeter, k-modulation with 60/60 optics) had yet to be achieved, due to other priorities during the start-up. It was agreed to try hard to accommodate this work in the near future.

2 Status of logging/checking/analysis code

Guy Wilkinson reported that the '99 SQL scripts to extract data from the DB and place them in the ECAL area were working, and being activated automatically. 1999 specific code to transform these data into DSTs, and code to analyse these DSTs was ready.

Using this mechanism a preliminary analysis of the 1999 NMR data has been made. For all the fills to data the majority of probes have been logged. Exceptions are probes 5a and 5e, which are completely absent, and the five probes in octant 1, which are not present for the last two fills (5517 and 5522). Giuseppe and Bernd were aware of the problem with octant 5 (which will require an access to remedy), but not of octant 1 (presumably a communication problem?). They will investigate.

Guy noted that the mean field readings for the probes was very similar to those of the second period of Z^0 running in 1998.

3 Eclipse

Pippa had received a message from Konstantin Zioutas at the University of Thessaloniki, which drew our attention to the facts that: a) a solar eclipse will occur on May 11th, b) a conference paper (A.I.P. conf. proc. 320 (1994) 158, G. Cruz Calmeron et al.) claimed the observation of an $\sim 80\%$ reduction in the earth's magnetic field in a previous eclipse, c) a period with a reduced earth field might be of interest to cross-check certain LEP energy systematics.

Pippa summarised the contents of the conference article (see transparencies). She found odd the fact that the observed field reduction only lasted for 9 minutes after first contact, and was not sustained through totality. The postulate for the field reduction proposed in the article is that the moon scattered the solar wind, and disturbed the field lines in the magnetosphere.

Members of the group were sceptical whether such an effect could be genuine. This opinion was substantiated by geophysicists whose views were canvassed prior to the meeting (John Shaw at the University of Liverpool and Trevor Ponman at the University of Birmingham). Finally it was agreed that even if the earth's field were to disappear for some minutes, little would be learnt of use for the energy calibarion. For these reasons, it was decided not to request calibration time during the eclipse, but nonetheless to make what measurements can be made 'for free' (such as logging data from the spectrometer flux gate).

4 Progress with mole analysis

Following his presentation in the previous meeting, Federico Rocarolo said that he had made progress in comparing the field integrals calculated by himself (with the mole) with those calculated by Mike (with the arm). If the same integration routine is used, agreement of a few 10^{-5} is obtained. It is now being investigated which is the correct way to integrate.

5 Analysis of wire sensor data

Jan Prochnow reported on an analysis of the spectrometer wire sensor data, both from last year and this year.

Last year an abrupt change in position of $\sim 10\,\mu$m was observed when beam entered the machine (or was dumped). It was postulated that this was an instrumental effect caused by the synchrotron radiation ionising the air. The sensors have now been shielded against the radiation, and a very different behaviour is seen. When the beam is dumped, rather than a sudden jump a slow change of opposite sign is observed. The meeting suspected that this was merely a temperature effect.

Jan has measured the temperature coefficient of the sensor blocks. In the horizontal plane the whole block expands by about $5\,\mu$m for a 1 degree change in temperature. This effect is very uniform throughout the sensors.

6 Analysis of BPM response

John Matheson presented interim conclusions on his study of BPM response. This was motivated by the problem, first brought to our attention by Ralph Assmann, that the finite beam size introduces higher order effects which can bias the BPM's measurement of the beam position and compromise the precision required by the spectrometer ($\sim \mu$m).

John had first calculated independently the expressions published by physicsts at SLAC (R.H. Miller et al., 1983), for the case of a cylindrical beampipe. He found that he disagreed in the form of the sextupole term. By simulation methods he confirmed that his expression appeared more plausible.

Next John extended the calculation to the case of an eliptical beampipe as found in LEP. He has obtained expressions for the field component perpendicular to the beampipe as induced by a line charge within. He has compared this description with BPM data in an equivalent situation (Borer et al., 1989) and find that his calculations describe the data well.

John's next step will be to generalise the eliptical beampipe situation to the case where the beam has finite dimensions.

7 Visit of Yuri Shatunov

Ralph Assmann reported on the visit of Yuri Shatunov, from Novosibirsk, who was attending the meeting. Dr Shatunov was at CERN to help investigate the possibilities and implications of polarisation at very high energy (see minutes of 166th meeting, 16/10/98). Yuri suspected that the regime of uncorrelated Qs crossing would become dominant closer to 150 GeV, than 100 GeV. This is the bad news. The good news is that the depolarisation time is expected to be sufficiently rapid for a measurement to be viable. Their work will continue.

8 Next meeting

The next meeting will be at 15:00 on Friday 28 May in the pavilion.

Guy Wilkinson, 12 May 1999.