Minutes of the 140th Energy Calibration Meeting held on 26 September 1997

1 Missing NMR data from fill 4121

Enrico Bravin confirmed that he has logged all the NMR readings for fill 4121. Paul Bright-Thomas was volunteered to use Enrico's ntuples to make a DST.

2 Moller Status

John Field told us that discussions on availability of parts and expertise for the gas jet target are continuing with the experts at NIKHEF and also with Mario Macri (Genoa) of the JETSET experiment.

Presentations will be made to the ALEPH and DELPHI collaborations in the coming weeks. (OPAL and L3 have already had presentations).

Georg von Holtey will be asked to calculate the effect of synchrotron radiation on the "clumps" in the gas jet target.

3 Spectrometer Status

There has been one meeting of those interested in the spectrometer project with the SL experts concerned. There will be another meeting on 6 November. The most difficult aspect of the project is the magnet survey, which is thought not to be possible for the 1998 running. However, there is still a hope to put in place some new beam pickups/electronics to check their precision and mechanical stability.

4 Energy measurement from radiative returns

This topic is being followed up in the experiments, although not every collaboration has identified a specific responsible person yet. We need a reliable estimate of the possible precision for the next LEPC (11 Nov).

Stanislaw Jadach gave an introduction to the problem of the precision of calculating the radiative return to the Z. In general we have to define some variable X, whose distribution has a peak at X_0 where radiative return events accumulate. (Jadach suggested for example an acollinearity variable. In practice we will be using some estimate of the s' of the event, i.e. centre-of-mass energy squared after removing the photon. However, the arguments that follow depend on how s' is defined eg. just using the angles of the final state particles, or also using energies.)

The fitted value of this peak at X_0 is a function of m_Z^2/s, and of the "missing higher order" QED corrections. We know m_Z, so if we can estimate the QED corrections we can extract s, which is what we want. Since we don't know this exact analytic function, we use a MC to convert X_0 into s. We then need to know the precision of the MC, i.e. estimate the size of the missing corrections.

The calculation would need to include up to a certain order in alpha and leading logarithms. The $\alpha^2 L$ and $\alpha^3 L^3$ terms both make a 1% correction to the αL process which is the effective lowest order of the radiative process.

Some choices of kinematic variable have corrections further suppressed by a factor of Γ_Z/m_Z. Those in the meeting said it would be useful to have some practical examples of such choices.

The YFS3 part of KORALZ has been improved for use at LEP2 and now includes $\alpha^3 L^3$ corrections, but not the complete $\alpha^2 L$. Initial-final state interference is not included in YFS3, although a good approximation is in KORALZ. There is an interface to LUND to take care of hadronisation.

Jadach is continuing to work with Alain Blondel to make tests of the technical precision of these MC calculations.

5 Polarisation News

Bernd showed the results of the polarisation MD in week 36. A successful depolarisation measurement was made at 45 GeV, with an asymptotic level of 24% polarisation on an "unused" bunch. At 50 GeV, 4% polarisation was achieved, and depolarised. However, the mirror ambiguity was not checked explicitly, because the polarisation level was very sensitive to Qs. However, the NMR prediction is much better than the 40 MeV ambiguity from the mirror.

6 Next Meeting

The next meeting will be at 15:00 in the Pavillon on Friday 10 October

Pippa Wells, 30 September 1997