Minutes of the $Q\overline{Q}$ Meeting on 10/01/90

Alain Blondel opened the meeting with good wishes for everyone for the new year.

Then **AB** showed a list of topics which he thinks the group should address in the coming days and weeks. In particular we should finish the work on the Z parameters using the full data set before the Moriond Conference, ie. before 20 Jan. (See transparency copies at the end of this report.) He suggested that the next paper on the hadronic cross section be a longer one giving all the details of the analysis.

Next **John Harton** gave a brief summary of Z results from the recent meeting in Houston, Texas of the American Physical Society Division of Particles and Fields (DPF). In addition to many talks on the Z (see transparencies), **JH** said that there was a lot of discussion on the SSC. The SSC Lab officials in Houston wanted to make it clear that the SSC is a project that is moving forward and that data will be taken near the end of the decade. In his talk on SLC, B. Richter said that the plan was to increase the luminosity by a factor of 100 by 1991 (present luminosity is about 10 Z per day).

Andy Halley gave a progress report on the charge asymmetry measurement from hadronic decays. In general the MC and data agree in all the distributions shown (transparencies). In particular the two jet fraction and the opposite sign jet fraction from MC and data agree very well. The statistical error on the asymmetry for our points near the peak is now approaching the size of the asymmetry itself. The next steps in the study will be to include all the 1989 data, do some more checks, and to calculate the asymmetry using DYMU03. Final results should be ready for the next $Q\overline{Q}$ meeting.

Jim Wear reported on a study of event shape variables important in event selection from a set of MC data generated off the peak with DYMU03. There were no remarkable differences between MC and data (transparencies). The slightly higher multiplicity in the MC seen previously (about 0.5 units), persists with the new generator. The selection efficiency for TPC selection is about 0.975 for all beam energies (same as has been found on peak for different generators). **JW** will next look at the on peak MC from DYMU03.

There was a short discussion on QCD parameters for MC programs. **Ron Settles** reminded the group that the QCD group is at work preparing to fit the parameters of the LUND model to better describe our data. This will be the main topic of the next QCD meeting (30 Jan.).

Next was a short overview of what is needed to complete the hadronic cross section measurement using the full 1989 data set. It seems that the only thing missing is the number of bhabha events for each run. Calibration needs to be done for the lumical and a bug needs to be corrected because the program crashes for data on the most recent runs. **Helmut Burkhardt** has studied the code which was used to select the bahbhas for our two papers and he noticed a cut which was not included in the descriptions we have published. It seems that in addition to the requirement that the energy in stack 1 be higher inside the fiducial region than that outside the fiducial region (method 5'), the tower (all three stacks summed) with the highest energy was required to be in the fiducial region. Since stack 2 usually dominates in energy this would mean that stack 2 was effectively used to determine whether a shower was inside the fiducial region or not. The effect on the luminosity measurement is very small, about .17 %, because the same programs were used on the data and MC. **HB** said that Peter Hansen has prepared new lumi code.

Reiseburo Tanaka showed a study of limits on particle production from the Z width measurement. **RT** uses a slightly different hadronic event selection than either of the methods we have published. His fit results are slightly different and the resulting limits on neutrino and quark masses from the width are also different than those derived from the published results (transparencies).

Alain Blondel reported on the possibility of deducing the effective weak mixing angle at the Z mass, $S_W^2(M_Z)$, from the leptonic partial width and from the full width. It turns out that effects due to radiative corrections which depend on the top quark mass enter into the full width (actually in the $B\overline{B}$ partial width) calculation to a much greater degree than in the calculation of the leptonic width. For this reason, $S_W^2(M_Z)$ cannot be extracted from the full width without an assumption on M_{TOP}. No such strong dependence on M_{TOP} is involved in the leptonic width and thus one can deduce $S_W^2(M_Z)$ from the leptonic width. After deducing S_W^2 from Γ_{LEPTON},

though, there is still the ambiguity of the top mass and the ρ parameter. (The ρ parameter depends on the Higgs structure of nature.) That is, changes in M_{TOP} and ρ are indistinguishable when extracting $S_W^2(M_Z)$ from Γ_{LEPTON}.

AB emphasized, however, that there is important information in the full width regarding the top mass. If one combines information on the boson mass ratio (ie. the Sirlin definition $sin^2\Theta_W = 1 - m_W^2/m_Z^2$) with the LEP measurement of the full width then effects from ρ and M_{TOP} separate and both can be deduced from the data.

(Next meeting at 14:00 on 31/01/90 room TBA)