ALEPH 90-39
PHYSIC 90-21
Thomas Barczewski
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Minutes of the QCD - meeting on the 22.2.1990 at CERN

Present: Thomas Barczewski (Mainz), Owen Boyle (Glasgow), Dave Cinabro (Wisconsin), Glen Cowan (MPI Munich), XU Dezhi (Beijing), Alex Finch (Lancaster), Andrew Halley (Glasgow), HU Hongbo (Beijing), D.W. Kim(Orsay), Eberhard Lange (MPI Munich), Thomas Lohse (CERN), Terry Medcalf (Royal Holloway), D.R. Parker (Uni Sheffield) , A. Putzer (Heidelberg), Tongze Ruan (Beijing), Gerald Rudolph (Innsbruck), Rick St. Denis (CERN), D. Salmon (RAL), H.G. Sander (Mainz), Ron Settles (MPI Munich), Stan Thompson (Glasgow), A. Vayaki (Demokritos), E. Whelan (Lancaster)

1 Fragmentation

Glen Cowan gave an updated value for the mean multiplicity determined by integrating the rapidity distribution. He used 11202 events within an energy range of $91.00\ \text{GeV} \leq \sqrt{s} < 91.5\ \text{GeV}$. The new value is $< n_{ch} > = 21.06 \pm 0.06$ (stat) with a systematic error which has still to be determined. The old value published in the first QCD paper is $< n_{ch} > = 21.3 \pm 0.1 \pm 0.6$. He compared this value to the published values of MARK 2 $< n_{ch} > = 20.1 \pm 1.2$ and DELPHI $< n_{ch} > = 20.6 \pm 1.0$.

Then he reported about his analysis on the inclusive distribution $x_p d\sigma/x_p$ versus $\ln(1/ x_p)$ with $x_p = p/ p_{beam}$. The energy dependence of the peak $[\ln (1/ x_p)]_{max}$ of this distribution is predicted by pertubative QCD with only one free parameter Λ. Glen compared the predictions of the MLLA + LHPD model and the DLA + LHPD model to the data. Near the peak the distribution has a gaussian shape. For the fit Glen used only data above 70% of the maximum value. Using the value for $[\ln (1/ x_p)]_{max}$ measured at ALEPH and the TASSO data at four different beam energies Glen fitted the predicted curves to the data.

Including the ALEPH result to the fit the χ^2 for the DLA + LPHD model becomes worse, whereas for the MLLA + LPHD model the χ^2decreases including the ALEPH value. In this case Glen finds $\Lambda = 0.3647 \pm 0.0034$.

Then Glen talked about K / π / p separation using the energy loss of charged particles in the TPC. The energy loss of a track is determined measuring the deposited charge on at least 80 wires of the TPC sectors.To determine the dependence of the resolution of the dE/dx measurement on the number of wires, Glen used pions in the range of $300\ \text{MeV} \leq E \leq 550\ \text{MeV}$. The ratio R is defined as the measured energy loss dE/dx of a particle normalized on the mean $[dE/dx]_\pi$ for pions.

Then for different momentum intervals he fitted a sum of four gaussians to the normalized dE/dx values. He used the likelihood method for the fit allowing the

fitted curve to be shifted on the dE/dx - axis. That gave the number of e / K / π / p for each momentum interval. Integrating the distribution 1/N • (dn/dz) versus z = p/ Pbeam gives the multiplicity for a particle type per event. Then he showed two transparancies where Terry Sloan compared the measured value of 0.92 ± ? protons per event to low energy data and predictions for the skyrmion model (1.4 protons per event). The uncertainties of the ALEPH measurement have still to be determined, but it doesn' t look too good for skyrmions.
Gerald Rudolph showed fit results using 11000 Z0 in the energy range of 91.00 GeV $\leq \sqrt{s} <$ 91.5 GeV for the Jetset 7.2 and Herwig 3.4 model. He made two fits to both models first leaving the parameters free and then fixing the parameters to their default values. In the second case the χ^2 for the fitted distributions is much higher compared to the free paramter fit for both models. Jetset 7.2 fits better to the data than Herwig except for the P_T^{OUT} distribution.
XU Dezhi and WU Weimin looked at the sphericity,aplanarity,thrust, minor values, P_T^{OUT}, P_T^{IN} ,Z and rapidity distribution for center of mass energies outside the peak. There is no significant deviation from the distributions at the peak. An Aleph paper will be published soon.

2 MC production

A new Monte Carlo production is forseen using the new fitted parameters and the newest version of GALEPH. The production will be done on the Wisconsin RISC - stations. It was proposed that Dave Cinabro, who is the contact person from Wisconsin, should start a small production with the new parameters and the newest MC versions and comparing this events to real data before starting a large production.

3 The next meeting will be on the 15.3.1990